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ICT, Society and Human Beings 2010

EDITED BY
Gunilla Bradley

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FOREWORD

These proceedings contain the papers of the IADIS International Conference ICT, Society and Human Beings 2010, which was organised by the International Association for Development of the Information Society and co-organised by Albert-Ludwigs-Universität Freiburg, Germany, 29 – 31 July, 2010. This conference is part of the Multi Conference on Computer Science and Information Systems 2010, 26 - 31 July 2010, which had a total of 1237 submissions.

The effects of ICT on humans comes in focus in the conference but also the interaction between ICT – Individual – Society. Interaction and Effects - both are important.

Changes in behaviour, perspectives, values, competencies, human and psychological aspects, feelings are all of interest. Computer Science and ICT related disciplines work more and more together with various behavioural and social sciences. Organisational and institutional changes, Societal changes, Cognitive effects and changes, Motivational and emotional changes, Value changes and new lifestyles are all considered as well as experiences from Child psychology and Development psychology.

In general all types of research strategies are encouraged and especially cross disciplinary and multidisciplinary studies. Case studies, broader empirical field studies, theoretical analyses, cross cultural studies, scenarios, ethnographic studies, epistemological analyses

The IADIS ICT, Society and Human Beings conference addresses in detail seven main aspects: Globalization and ICT, Information and Communication Technologies (ICT), Life environment and ICT, Life role and ICT, Effects on humans, Actions for reaching the Good Information Society, Desirable goals and Perspectives. The conference has the intention to provide a contribution to academics and practitioners.

The IADIS ICT, Society and Human Beings 2010 conference received 78 submissions from more than 21 countries. Each submission has been anonymously reviewed by an average of four independent reviewers, to ensure that accepted submissions were of a high standard. Consequently only 16 full papers were approved which means an acceptance rate below 21 %. A few more papers were accepted as short papers, reflection papers and posters. An extended version of the best papers will be published in the IADIS International Journal on Computer Science and Information Systems (ISSN: 1646-3692) and/or in the IADIS International Journal on WWW/Internet (ISSN: 1645-7641) and also in other selected journals, including journals from Inderscience.

Besides the presentation of full papers, short papers, reflection papers and posters, the conference also included one keynote presentation from an internationally distinguished researcher. We would therefore like to express our gratitude to Professor Alice Robbin, Director, Rob Kling Center for Social Informatics, Indiana University, Bloomington, USA, for accepting our invitation as keynote speaker.
As we all know, organising a conference requires the effort of many individuals. We would like to thank all members of the Program Committee, for their hard work in reviewing and selecting the papers that appear in the proceedings.

This volume has taken shape as a result of the contributions from a number of individuals. We are grateful to all authors who have submitted their papers to enrich the conference proceedings. We wish to thank all members of the organizing committee, delegates, invitees and guests whose contribution and involvement are crucial for the success of the conference.

Last but not the least, we hope that everybody will have a good time in Freiburg, and we invite all participants for the next year edition of the IADIS International Conference ICT, Society and Human Beings 2011, that will be held in Rome, Italy.

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Advances in new digital platforms, innovative applications, and the convergence of computer, information, and communication technologies are transforming our everyday lives. ICTs have consequences for governance, community, work, information, knowledge, human communication, and well being, to name only a few. We live in a world where change is a constant, where interdependencies are multiple, heterogeneous, and increasingly fragile, and where uncertainty, ambiguity, incomplete information, and unanticipated consequences are the norm. The outcomes of our engagement with technology are complex and unpredictable. They defy simple conclusions because they are historical, temporal, situational, and embedded. Moreover, they are problematic and surprising: inconsistent, paradoxical, disorderly, contradictory, and contingent. In this talk I want to examine some of the empirical evidence about the complexity of our technological landscape and suggest ways to make sense of what is happening through theoretical frameworks drawn from different disciplinary traditions. Following Nobel Laureate in Economics Elinor Ostrom, our aim should be to “dissect and harness complexity rather than eliminate it” so that we an create responsive and resilient systems.
Full Papers
USING IT TO OPTIMIZE CORPORATE STRATEGY FOR DUTCH NOTARIES

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ABSTRACT
This research provides new insight in the application of IT to optimize the corporate strategy of notaries in the Netherlands. Since the forced liberalization of prices and the freedom of establishment introduced by the 1999 Notary Act, notaries have become entrepreneurs. Notaries are forced to adopt a competitive corporate strategy. This has brought new opportunities for the application of IT. This paper outlines the possibilities for IT to support a competitive corporate strategy. We will provide insight in the willingness of notaries to change their corporate strategy and to adopt IT. This can be contributive to the software vendors and other third parties targeting the notarial domain, as they can adjust their business strategy based on the results of this study. We will suggest a notarial strategy optimization method to transform generic corporate strategies into situational strategies, and assemble solutions into situational strategy advices. This method can be used to compose situational corporate strategy advices, and is a starting point for further research on mixed corporate strategies and corporate strategy maturity.

KEYWORDS
Corporate strategy, Latin notary, Shared Service Center, Outsourcing, Customer Relationship management, competitive advantage, Value disciplines model.

1. INTRODUCTION
For ten years now, forced liberalized prices and freedom of establishment are applicable to the Dutch notarial system. The Dutch notarial system is one of the least regulated In Europe. Whereas in other Latin notary systems prices of services are fixed, and the number of notaries is regulated, in the Netherlands there is an open market. Since the introduction of the 1999 liberalization, notaries are forced to become entrepreneurs that need to adopt a competitive corporate strategy in order to survive in the market. The liberalization created new opportunities for both the notarial entrepreneurs and third parties. It made notarial entrepreneurs open up for new possibilities, like the ones provided by the application of IT. Especially when IT can contribute to the competitive advantage or efficiency, notaries are willing to adopt IT solutions. These solutions include small changes like software to automatically generate quotations, but also more substantial changes like the adoption of a shared service center (SSC) or customer relationship management (CRM).

Little research has been performed on the influence of the liberalization on corporate strategies. The positive and negative effects of the liberalization are studied by theoreticians and politicians, as the trend in Europe is to liberalize markets in order to open them up for international competition. On the practitioners’ side, a new group of notarial companies that provide standardized low costs services is arising. This strategy, referred to by Porter (1980) as a cost leadership strategy could not exist in the Dutch notarial market before the 1999 liberalization. As legal quality is not easily accessed by customers, their decision to purchase can be price based (Bergh & Montangie, 2006). This fundamental change in the market rises the question if and how notarial corporate strategies have changed and how they can be optimized.

In their search for new innovative solutions to gain competitive advantage, notarial companies are confronted with IT related concepts like outsourcing, shared service centers (SSCs), and customer relationship management (CRM) (Ahlers, 1997 – 1998). In order to be competitive, companies need to be open towards the adoption of concepts that fit their corporate strategy, and above all optimize their corporate
strategy. The clarification of a corporate strategy is therefore essential to identify possibilities for the
application of IT.

With this study we want to provide insight in the possibilities IT can provide for notaries in the
Netherlands and particularly in what way it can be contributive to the optimization of their corporate strategy.

The research question is: In what way can IT support a corporate strategy for the Latin notarial profession
in the Netherlands, in order for notarial companies to be more competitive?

2. THE NOTARIAL DOMAIN

The Latin notary system is used in most European countries (80%), and also in the Netherlands. In the United
States of America, the United Kingdom and most Scandinavian countries the notary public system is used,
also called the Anglo-Saxon notary system. The Latin notary system is the more regulated variant of the two
used notary systems (Nahuis, et al., 2005; Kuijpers, et. al, 2005).

The main difference between the two systems rests in the status of the notary profession. A Latin notary
has a more dominant position in comparison to a notary public. A Latin notary is a legal professional, a
notary public is not (Gnoffo, 1996-1997; Nahuis, et al., 2005; Kuijpers, et al., 2005). The two different
systems are the result of two different law systems. The Latin notary system is the result of the Civil Law
system. The notary public system is the result of the Common Law system. The notarial system used in a
country corresponds with the applicable law system in that country.

This study focuses on the Latin notarial profession in the Netherlands. A Latin Notary is: A private legal
professional, who advises and drafts legal documents for private parties, maintains a permanent record of the
transaction and has the authentication power of the state delegated to him (Malavet, 1995).

In general, notarial processes are similar for all notarial companies. This is partially forced by law. The
processes are performed relatively efficient. There are not many possible improvements for the notarial
processes with respect to efficiency, as most actions are driven by law. The competitive advantage gained by
process optimization will therefore be limited. This study therefore focuses on corporate strategy
optimization. For understanding of the notarial process we will describe the generic notarial process
composed based on the interviews in this study. The modeling is done using the meta-modeling technique
(Weerd, Brinkkemper, 2008).

As displayed in figure 1, the process immediately forks into family services and other services. For both
paths, the customer will be invited for a conversation, but for family services the customer will talk to the
notary. For the other services the customer will talk to the referrer. For family services, the notary fills out a
questionnaire during the conversation. For the other services, a questionnaire is sent to the customer by the
notary, filled out by the customer, and returned to the notary. This conversation together with the
questionnaire clarifies the customers’ whishes.

In the next phase, the notary performs several preparation steps, depending on the service. Preparation
steps can include: checking properties at the land and public registers agency; checking if there is a mortgage
for the property; checking if the property is registered as a monument.

Next, the notary chooses or composes an instrument model. This model is adjusted with the customers’
data. When completed, the notary finalizes the instrument. This instrument is sent to the customer and
possibly other involved parties.

In the next phase, the signing of the document, the notary makes an appointment with the involved parties
to sign the instrument. The instrument is signed by the involved parties and the notary. The invoice is
sometimes sent before the signing of the document, and sometimes at the end of the process. Some notaries
ask their customers to pay at the desk on the date of the appointment.

Depending on the service, the notary performs finishing steps. These finishing steps are submissions to
multiple registers. Depending on the kind of service, the registers are updated by the notary. After completing
the finishing steps, the notary sends a copy of the instrument to the customer.
3. CORPORATE STRATEGY OPTIMIZATION

For this study we have determined the corporate strategy of multiple notarial companies. A comprehensive definition of corporate strategy is provided by Andrews & David (1987): A corporate strategy is the pattern of decisions in a company that determines and reveals its objectives, purposes, or goals, produces the principal policies and plans for achieving those goals, and defines the range of business the company is to pursue, the kind of economic and human organization it is or intends to be, the nature of the economic and noneconomic contribution it intends to make to its shareholders, employees, customers, and communities.

We studied multiple corporate strategy models. Notaries are restricted by law to exclude specific notarial services. Notarial companies have to be full service companies. A corporate strategy of targeting a specific group of customers with a specific group of services is therefore not possible. The classification scheme of
Porter (1980) cannot be used for notarial companies, because the strategies “cost focus” and “differentiation focus” have a narrow target scope.

We found the Dimensions of competence strategy model of Treacy and Wiersema (1993) well suited for the notarial market as the described paths to market leadership do not take into account targeting specific groups. The three paths Treacy and Wiersema (1993) describe are: “customer intimacy”, “operational excellence” and “product leadership”. The model is displayed in figure 2. A corporate strategy can be positioned on the model. When there is an unclear strategy or no strategy, companies remain in the middle and struggle with survival. A more explicit distinctive corporate strategy is positioned closer or beyond the success line, indicating these are more profitable companies (Treacy and Wiersema, 1993; Ward & Peppard, 2002).

The customer intimacy strategy is about targeting a specific market of market segment, without excluding specific customers. Products and services have to be tailored to the needs of the customer. The operational excellence strategy is about enabling product and services to be obtained reliably, easily and cost-effectively by customers. With the product leadership strategy, companies aim to achieve a continuing product innovation, to meet the customer needs. As mentioned earlier, we see a group of operational excellence notaries arising in the Netherlands.

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4. RESEARCH APPROACH

Explorative research is chosen due to the scarcity of empirical research on notarial strategy determination. The Dimensions of competence model of Treacy and Wiersema (1993) is translated into a situational corporate strategy model for the notarial domain by translating each of the three generic strategies into situational strategies. The situational strategy characteristics are assembled to construct a framework that is used to determine the strategy mix of notarial companies, and map them on the Dimensions of competence model.

We performed a field study at twenty notarial companies, the supplier of a notarial shared service center (SSC) and an outsourcing vendor. The field study is split up in two phases, each containing ten notarial companies. The companies are randomly selected based on size and urbanity. Table 1 shows the selection of companies for the first phase. Size 1 stands for one or two notaries, size 2 is three to six notaries, size 3 is seven or more notaries. U stands for an urban area over 100,000 inhabitants, N stands for a non-urban area.

<table>
<thead>
<tr>
<th>Company</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Urbanity</td>
<td>U</td>
<td>U</td>
<td>N</td>
<td>U</td>
<td>N</td>
<td>N</td>
<td>U</td>
<td>N</td>
<td>N</td>
<td>U</td>
</tr>
</tbody>
</table>

The first phase aims to identify the notarial processes and strategies, and solutions in the field. This is used to compose advices with possibilities for strategy optimization. The second phase aims to validate the proposed notarial strategy advices.
The strategy solutions identified in the field during the first phase are grouped into three generic strategy advices for notarial companies. The solutions include both IT and non IT solutions that notaries use in order to excel in one of the three paths of market leadership mentioned by Treacy and Wiersema (1993). The advices are supplemented with solutions found in literature that are not found during the field study in order to provide comprehensive advices that include solutions that are new to the notarial domain.

After determining the current strategy mix of a company, we determined the desired corporate strategy of the company by discussing each of the three paths to market leaderships and their implications in the notarial domain. The difference between the current strategy and the desired strategy results in the desired strategy change. The advice corresponding with the desired strategy change is provided to the company and validated on usefulness.

5. RESULTS

We found a division of notarial companies into all three strategies. The two main strategies followed are customer intimacy strategy and the operational excellence strategy. Only few notarial companies follow the product leadership strategy. Some companies where struggling with excelling in any of the strategies, and remained in the middle. According to Treacy and Wiersema (1993), these companies are struggling with survival. We did not find many companies extremely excelling in one strategy. At all notarial companies there was room for improving and redefining the corporate strategy. Many companies wanted to excel more in product leadership by adding product leadership to their existing strategy mix. The application of IT for product leadership is limited, as the product leadership strategy is about engineering the decision making process for speed in order to develop new services.

Most product leadership initiatives come from collaborations like unions of notarial companies, or from third parties like software suppliers. A good example is NetWyse, a notarial shared service center (SSC) owned by Netwerk Notarissen, a large collaboration of over 150 notarial companies. In the SSC, the companies share an IT infrastructure and generic instrument models to create notarial deeds. The willingness of organizations to cooperate with notaries outside a union is very limited.

According to the Value disciplines model, notaries should excel more in one of the three strategies. When companies are stuck in the middle of two or three strategies, changes have to be made in the corporate strategy of notarial companies, in order to survive. There is an exception for companies that have managed to excel in two strategies, when these companies are leading in both of the strategies. This study does not include specific advices for mixed strategies.

For the operational excellence strategy we identified the strategic solutions mentioned in table 2 under the column ‘advice element’. The other columns are the results of the validation phase. Two companies that want to excel in operational excellence validated the advice elements as shown in the table.

<table>
<thead>
<tr>
<th>Advice element</th>
<th>Identified at company OE1</th>
<th>Identified at company OE2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Reduce (tangible) mail by using email;</td>
<td>Adopted</td>
<td>Adopted</td>
</tr>
<tr>
<td>2. Send documents to the customer by a secured online environment, not by tangible mail;</td>
<td>Maybe</td>
<td>Adopted</td>
</tr>
<tr>
<td>3. Perform personal data checks in batches at predefined moments, or automate these checks;</td>
<td>Will not</td>
<td>Will adopt</td>
</tr>
<tr>
<td>4. Use standard company models to create instruments, not different models per notary;</td>
<td>Adopted</td>
<td>Adopted</td>
</tr>
<tr>
<td>5. Generate quotations automatically based on clients data provided on the website;</td>
<td>Will not</td>
<td>Adopted</td>
</tr>
<tr>
<td>6. Send invoices automatically when the case is closed;</td>
<td>Maybe</td>
<td>Adopted</td>
</tr>
<tr>
<td>7. Do not combine cases, combined cases are not standard;</td>
<td>Maybe</td>
<td>Adopted</td>
</tr>
<tr>
<td>8. Use standard workflows to eliminate unexpected obstacles;</td>
<td>Will not</td>
<td>Adopted</td>
</tr>
<tr>
<td>9. Let customers track changes of their file status online, do not call them;</td>
<td>Maybe</td>
<td>Adopted</td>
</tr>
<tr>
<td>10. Family services: sign the instrument within one hour after the first appointment in order to save costs.</td>
<td>Maybe</td>
<td>Maybe</td>
</tr>
<tr>
<td>11. Reduce the costs of employees by answering the phone only three hours per day;</td>
<td>Will not</td>
<td>Adopted</td>
</tr>
<tr>
<td>12. Use tactical CRM software to lower transaction costs of communication (e.g. automatic emails);</td>
<td>Maybe</td>
<td>Maybe</td>
</tr>
</tbody>
</table>
13. Use an outsourcing vendor to outsource administrative steps like financial services, this must be a cost efficient back office; Maybe Will not
14. Use software to spread manuals to employees, do not print manuals; Maybe Adopted
15. Use standardized interactive models to create instrument models fast; Will not Will adopt

For customer intimacy, we identified 9 strategic solutions, showed in table 3. They are validated at three companies that want to excel in customer intimacy.

Table 3. Validation of customer intimacy advice elements

<table>
<thead>
<tr>
<th>Advice element</th>
<th>Identified at company CI1</th>
<th>Identified at company CI2</th>
<th>Identified at company CI3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Do not use standard workflows in order to remain flexible;</td>
<td>Adopted</td>
<td>Adopted</td>
<td>Adopted</td>
</tr>
<tr>
<td>2. Create or check the quotations by hand in order to provide the treatment the customer wants;</td>
<td>Adopted</td>
<td>Adopted</td>
<td>Adopted</td>
</tr>
<tr>
<td>3. Combine cases in order to provide a personal treatment that fits the customer needs;</td>
<td>Adopted</td>
<td>Adopted</td>
<td>Adopted</td>
</tr>
<tr>
<td>4. Use strategic CRM software to keep track of customers and build a long term relationship;</td>
<td>Will adopt</td>
<td>Maybe</td>
<td>Will adopt</td>
</tr>
<tr>
<td>5. Call customers to confirm or update a status change of their file;</td>
<td>Adopted</td>
<td>Not applicable</td>
<td>Adopted</td>
</tr>
<tr>
<td>6. Inform the customer of all the steps being performed by the company;</td>
<td>Will adopt</td>
<td>Maybe</td>
<td>Adopted</td>
</tr>
<tr>
<td>7. Let customers choose the way of communication (e.g. email or tangible mail);</td>
<td>Will adopt</td>
<td>Will not</td>
<td>Will adopt</td>
</tr>
<tr>
<td>8. Use questionnaires to get better insight in the customer needs;</td>
<td>Will not</td>
<td>Will adopt</td>
<td>Adopted</td>
</tr>
<tr>
<td>9. Use “Call me back” feature on the company website;</td>
<td>Maybe</td>
<td>Will not</td>
<td>Maybe</td>
</tr>
</tbody>
</table>

The key of the product leadership strategy is to create an organization where there are many opportunities for new inventions. This advice consists of innovative solutions found in the field study. Adopting these solutions does not make the company a product leadership company. The product leadership strategy is about coming up with new inventions and solutions. Examples of innovative solutions found in the field, and the validation of five notarial companies is shown in table 4.

Table 4. Validation of product leadership advice elements

<table>
<thead>
<tr>
<th>Advice element</th>
<th>Identified at company PL1</th>
<th>Identified at company PL2</th>
<th>Identified at company PL3</th>
<th>Identified at company PL4</th>
<th>Identified at company PL5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Link IT systems to each other (e.g. financial system to document management system);</td>
<td>Adopted</td>
<td>Will adopt</td>
<td>Will adopt</td>
<td>Adopted</td>
<td>Maybe</td>
</tr>
<tr>
<td>2. Bundle strength with other companies for IT needs by sharing an IT infrastructure;</td>
<td>Will adopt</td>
<td>Will adopt</td>
<td>Maybe</td>
<td>Adopted</td>
<td>Maybe</td>
</tr>
<tr>
<td>3. Share models and experiences with other companies/locations to create a best practice model;</td>
<td>Will adopt</td>
<td>Will adopt</td>
<td>Will not</td>
<td>Maybe</td>
<td>Maybe</td>
</tr>
<tr>
<td>4. Cooperate with third parties outside the notarial domain to get strategic advantage and additional knowledge (e.g. e-commerce transactions);</td>
<td>Maybe</td>
<td>Will adopt</td>
<td>Will not</td>
<td>Maybe</td>
<td>Maybe</td>
</tr>
<tr>
<td>5. Store instrument model fragments in a database in order to manage the knowledge in the models;</td>
<td>Will adopt</td>
<td>Adopted</td>
<td>Maybe</td>
<td>Adopted</td>
<td>Adopted</td>
</tr>
<tr>
<td>6. Store working procedure fragments in a database in order to manage changes and knowledge in the working processes;</td>
<td>Will adopt</td>
<td>Will adopt</td>
<td>Will adopt</td>
<td>Adopted</td>
<td>Maybe</td>
</tr>
<tr>
<td>7. Use a centralized back office with other companies to store knowledge and develop innovative working procedures and instrument models;</td>
<td>Maybe</td>
<td>Will adopt</td>
<td>Will not</td>
<td>Maybe</td>
<td>Maybe</td>
</tr>
</tbody>
</table>

The willingness to adopt the suggested changes is variable for the advices. This could be due to the nature of the advice elements or due to the nature of the notarial companies. The operational excellence companies wanted to adopt changes with a short return on investment. The adoptability of changes that do not contribute to saving time or money was found to be low, as is shown by the many “will not”. We found many of the customer intimacy advice elements to be already adopted. The willingness to adopt the advice was relatively
high, maybe because the elements are already adopted or easy to adopt. The willingness to adopt changes was highest for product leadership companies. These companies where very open towards changes.

6. CONCLUSIONS

The adoption of IT in the notarial profession is found to be relatively low. No companies were found with significant tactical or strategic CRM. The adoption of SSC and outsourcing arrangements is mainly driven by costs considerations, and therefore adopted by operational excellence companies. These adoptions mainly take place in unions, as the willingness to cooperate with companies outside a union is low. There is room for product leadership and customer intimacy companies to look into these concepts, as they can also be beneficial for these companies. When well implemented, notarial companies can use these concepts to enlarge their competitive advantage.

The willingness to adopt changes in the corporate strategy was found to be relatively high. Especially companies that want to excel in product leadership have a high acceptance of corporate strategy changes. The willingness to adopt changes was found to be lowest for operational excellence companies, as these companies were only willing to adopt changes when they are cost effective on the short or medium term. The willingness to adopt corporate strategy changes does not automatically result in a high willingness to adopt IT solutions.

IT solutions for the notarial profession should be explicitly usable for one or two of the notarial strategies. Sending automatically generated offers only fits the operational excellence strategy, where video intake meetings can fit both the customer intimacy strategy when used as an additional service for the customer, and the operational excellence strategy when used to save office costs. IT suppliers should be aware of the strategies of their notarial customers, as the adoption of IT is generally low, but can become high when it can be used to gain more competitive advantage.

IT will be playing an increasingly more important role for the notarial profession in the future, as it does already. Notaries can use IT to excel in a strategy. However IT could become a force that pushes notaries in the same direction. This phenomenon is described by Porter (1980) as the bargaining power of buyers and suppliers. Notaries should be aware of this force and keep a critical attitude towards new IT developments. Therefore the role of IT will be important and supportive, but will not substitute the notarial profession completely.

7. DISCUSSION AND FURTHER RESEARCH

For both the explorative field study as for the validation phase, the number of companies included in this study was relatively limited. In order to gather sufficient data for validation, the number of companies should be above 15 to 20 per strategy, per validation round. The proposed method is time consuming.

Treacy and Wiersema (1993) indicate that some companies can have a mixture of two strategies. For companies that want to follow a mixed path, this study does not provide a suitable advice. More research is needed on the positioning of the advice elements in order to be able to create a mixed path strategy. When the advice elements are stored in an advice elements matrix, an advice might be composed by using the starting point of the company, the path to be followed, and the positioning of the advice elements. When the advice elements are positioned in a matrix, it may be possible to describe a to be followed path that results in a dynamic advice for the company. The new positioning into dynamic advices instead of three generic advices may raise new challenges for the validation of the results. More research on this way of composing advices is needed.

In this study we found big differences in the strategy maturity level of the companies. We did not take into account the strategy maturity of the companies. Companies that are in the survival area of the Value disciplines model, and want to excel in one of the strategies, may need a different advice than companies that are already excelling in one of the strategies and want to excel further or move to another strategy. These different approaches are not taken into account in this study. More research is needed on this area.

During the validation phase of this research, some companies indicated they were not willing to adopt some of the advice elements. It remains unclear if this was due to the nature of the advice elements or
because of the willingness for the organization to change. When performing the proposed method, an additional study on the willingness for organizational changes must be performed. This area was beyond the scope of this study and therefore not taken into account.

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COGNITIVE BLINDNESS—LOOKING FOR SOURCES OF HUMAN ERRORS WITH PRODUCT INTERACTIONS & INTERFACES

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ABSTRACT
While it's easy to determine the physical characteristics of users (at least in a face-to-face situation), the cognitive characteristics are elusive. Most individuals don't even know if they have less than average working memory capacity or if their personality undermines their ability to notice detailed information. As product designers, we tend to design for ourselves first—if we can't use it, chances are it won't work for others as well. But if the product's interface serves its designer well, it's no guarantee that it will serve its audience with equal success. Cognitive blindness is a term used here to recognize the difficulty we all face when it comes to knowing how others think and how these cognitive processes are different from our own. For a simple example, consider the ability to remember a photographic image. Are you better than most at this task? How can we compare and judge the quality of visual memory? Did a person focus on details or the overall effect? Was the composition or color scheme more memorable? Did everyone see the same color? But while judging the quality of memory is difficult, finding errors is easier—did the person remember the color of the butterfly spots or not? This paper analyzes some common sources of human errors and provides a few suggestions for design compensations. The main theme is to design with human errors in mind: every product will fail, but designers can minimize and mitigate the most common errors and those with the worse outcomes.

KEYWORDS
Interaction design, interface design, human errors, cognitive blindness.

1. INTRODUCTION
Cognitive blindness refers to the recognition of the difficulties designers face when they try to imagine cognitive differences between themselves and their users. The result is that educational designers focus on designing products that are intuitive to them, but not necessarily so to their student users. Users make mistakes, experience frustration, and develop negative attitudes towards products. One solution to cognitive blindness is a design process that focuses on common roots of user errors. This article explores memory, attention controls, perception, language, background knowledge, cultural differences, and others cognitive characteristics as sources of product interaction failures.

2. MEMORY ERRORS
When it comes to product's interaction and interface failures, most users complain of inability to "find that button" or not remembering how to use the something. In analyzing user errors, we're starting with memory failures. It's important to remember that students using technology to further their education have to learn and become comfortable with the technological platform delivering educational content as well as the learning materials themselves.

Cold Recall vs. Recognition. Cold recall and recognition deal with long term memory access (Woolfolk, 1998). As with any good library of information, the quality of the index system is key to success. Long term memory filing and retrieval differs in efficiency from person to person and from subject area to subject area.
Expertise in a particular domain implies a high-quality index to long term memory data. Many memory errors can be traced to a person's inability to pull up the right bit of information at the right time (Jonassen & Grabowski, 1993).

It's easier to choose from a list of options rather than pull information from memory. Cold recall requires a great degree of familiarity with content, with subject matter knowledge. But even an expert can find himself struggling to remember a term or a formula that is not part of his everyday discourse. Icons, illustrations, drop-down lists are all methods to elicit recognition in the user and to limit the search space for the correct choice (Mandel, 1997). They effectively place the needed information into the environment.

**Working Memory Overload.** Working memory is where all the thinking takes place. It's where we manipulate ideas that we pull from long term memory, store interim solutions, and examine observations coming in from our senses. But working memory is very limited. The common proverb, "he's able to walk and chew gum at the same time," is the commentary on the limitations of working memory. It's very difficult to do multiple tasks simultaneously—working memory gets easily overloaded and we lose track of important information (e.g.: the next sequence in a complex routine, the first digits of the telephone number, car keys).

In a continuous effort to present more and more information at the same time, interaction designers can easily create working memory overload in their users. While designing interfaces that rely on recognition, product creators have to keep in mind the limitations—most individuals can only hold in mind and compare a few items at the same time (Shneiderman, 1998). Thus the recognition search space has to be reasonably small to support the users and limit the errors. In situations where the consequences of a wrong action have catastrophic results, working memory limits needs to be given top consideration.

**Anxiety & Working Memory.** Anxiety is a working memory hog—the precious limited resource of working memory is easily reduced even farther by the feelings of stress (Jonassen & Grabowski, 1993). In anxious people, most of the working memory is taken up by processing the feelings about the situation rather than analyzing the problem at hand. If a person is spending most of her working memory on worrying, then she has less working memory capacity to dedicate to the task itself. This is why some students are not good at taking tests—they might know the material, but the stress of the test situation diminishes their mental resources (Bransford et al., 2000). Anxious individuals don't deal well with uncertainty and require a lot of support. They also require a great deal of structure when they first encounter a new instructor, a new material, a new technology, or a new situation. Setting and meeting the expectations of anxious product users increases the probability of success and satisfaction with the product.

**3. PERSONALITY-BASED DIFFERENCES IN ALLOCATION OF WORKING MEMORY**

**Observers vs. Introspectives.** Some personality traits can be described in terms of dimensions that specify how individuals allocate their working memory and attention. One such dimension specifies whether an individual predominantly focuses on information coming from his senses—such individuals define the Observer end of the continuum—or on information streaming from internal dialogue—an Introspective end. We all do a bit of each, filling our working memory with thoughts, but some do more of one then the other. Thus observant people pay attention to the information that arrives through their physical senses, directly observing surrounding tangible reality and allocating most of their working memory to sensory input. Introspective individuals prefer to direct their attention inward, using their senses to gain impressions, which are then amplified by their imaginations. Introspective individuals tend to do a great deal of unconscious background synthesis; they pay attention to their thoughts or an internal dialogue. There are three times as many observant individuals than introspective ones in the American population (Keirsey, 1998).

**Schedules vs. Probers.** Another personality train continuum is the Schedulers to Probers dimension—a trait dealing with perception, processing, and comfort level with time management. Probers like to take risks and are comfortable with uncertainty. Schedulers are the exact opposites—they tend to be judicious, while probers are open to options. Schedulers make agendas, timetables, programs, lists, syllabi, calendars, outlines, registers, and so on, for themselves and others to follow. Probers keep their eyes open for chances to do things they want to and for opportunities and alternatives with which to avail themselves (Keirsey, 1998). Clearly, students who fall on the schedulers end of this continuum tend to do better at school and are able to cope well with independent study situations.
Observers and Probers: When the Combination of Personality Traits Undermines Working Memory Performance. Individuals with a personality that combines both observing and probing traits make up about 38% of the general population (Keirsey, 1998). For individuals with this personality type, it's all about the process; the end result is less interesting. And the process needs to be enjoyed—an individual with this personality will eventually (sooner rather than later) abandon an activity if he is not having a good time. If the activity is too repetitive or has little variation, it is not a good activity for this group. Thus drill and practice will not hold these people's attention for long (Gregorc & Butler, 1984). Lectures and presentations should be short, and so should reading assignments—this group works and learns in small-sized chunks (Werby, 2008A).

This is a group that jumps from one activity to the next and is impulsive. Thus the content has to grab a person and hold the users' interest in order for them to succeed. Games and simulations work really well. And these individuals thrive in problem-solving situations that challenge their skills. They are willing to take risks to succeed. They love hands-on activities and multimedia presentations. And they are very good at negotiating.

If bored, a person with an observing and probing personality is likely to act out, poking others, banging on furniture, and otherwise being disruptive. These individuals crave excitement and fun, even at work. They can be annoying to others around them, as they start far more projects than they ever complete.

From data, this group is the least represented in universities and colleges and has the lowest correlation between ability and school performance (Keirsey, 1998).

Environment Induced Errors. The amount of concentration one can bring to bear on a task depends, in part, on the number and quality of the distractions. Environment affects the working memory—anxiety and stress about a particular situation affects individual performance. A simple demonstration of the environmental effects on working memory is difference in performance of three digit multiplication problems while standing on a table in front of an audience as opposed to sitting at the desk (Werby, 2008A).

4. GROUP DYNAMICS AND ERRORS CAUSED BY INTERPERSONAL MISCOMMUNICATION

The structure of a group project can support or undermine the success of the enterprise. People talk a lot about collaboration and cooperation without real understanding of the difference and its impact on the group dynamic. When a hundred Russian peasants dragged the barges up the river, they worked together, collaborating on every pull of the rope. But when a crew of sailors runs a ship, they each have a distinct job to do, even though their goal is the same. Do these sailors have the same degree of collaboration in their work as the peasants pulling the barge? Clearly, there's a difference. Collaboration and cooperation are not identical in meaning or in a group dynamic (Werby, 2007; Dillenbourg, 1999).

In a cooperative interaction, the overall goals are shared by all of the participants of a group, but the work load can be distributed in many different ways. Cooperative group members can make different contributions to the whole: some might take charge of the project's scheduling, some produce graphics and/or written materials, and others provide data. If group members work on different parts of the project, it's important to analyze the individual contributions and responsibilities to the whole. The relevant questions are: “Are all participants equally responsible for the overall project?” and “Are there disparities in work loads?” In a cooperative task, the work load does not have to be distributed equally among the group and usually is not.

Collaboration, on the other hand, specifies that group members work together on all aspects of the overall project: all contribute to writing, managing, data collecting, and so on. Making this distinction between collaboration and cooperation is helpful to set clear expectations of work load upon individual contributors to a group project. In collaborations, everyone knows each other and each other's capabilities, groups tend to be small, and projects limited in scope. In cooperations, some group members know each other and some don't. Cooperative groups can be large with members having limited knowledge of what others are doing, and group members can come and go during the project's tenure.

Individuals in both cooperative and collaborative projects share goals for the overall project and contribute their work towards achieving those goals. The relevant variables to consider during the initial group organization are (Werby, 2007):
• Duration—Is it a one-time thing or a continuous collaboration? Is it short-term or long-term working arrangement?
• Number of Participants—Are there a lot of individuals involved or few?
• Degree of Required Participation—Do all collaborators contribute the same amount to the job?
• Volition—Are the participants collaborating out of self-interest or out of necessity? Who generates the necessity?
• Constitution of the Group over Time—Are the same people collaborating for the duration of the project or are individuals free to come and go?
• Reward—Is the collaboration set up as a self-rewarding experience or is there an outside incentive?

5. PERCEPTUAL ERRORS

Time & Space Perceptual Confusion Errors. Sequential/temporal perceptual processing deals with the ability to observe and understand ordered chains of information—strings of data that have sequential patterns or a particular arrangement in time. The sequential processing system tends to be located on the left side of the brain, the spatial processing system on the right (Jonassen & Grabowski, 1993; Woolfolk, 1998).

People with poor sequential/temporal processing have trouble in making and keeping schedules. They are always late and have poor time management skills. These individuals might also have trouble understanding a sequence of instructions, have issues with recipes, and are poor at following directions.

Spatial perceptual processing deals with the ability to figure out visual patterns and to arrange information spatially. Geometry problems, mathematical graphs, chess board positions are all examples of spatially arranged information.

People with poor spatial processing tend to have closets that look like there has been an avalanche of socks. They have trouble managing and keeping track of their possessions. Their desks are messy. And they tend to have problems reading structured visual information—graphs are difficult, tables are hard, mathematical equations seem out of reach (Levine, 2002).

There are wide differences between individuals in their abilities to interpret, store, and communicate sequential/temporal and spatial information (Werby, 2008B). Clearly, if a person has poor sequential/temporal and spatial perceptual processing skills, she will have trouble remembering such information and will experience stress when forced to deal with sequential/temporal or spatial data, further burdening her already overwhelmed working memory.

The interaction with sequential/temporal and spatial information can be broken down to (Werby, 2008B):
• Perceiving—an ability to figure out a pattern of sequentially or spatially arranged data;
• Remembering—the ability to remember a sequential or spatial pattern of information;
• Making—the ability to create, organize, or arrange information in a sequential or spatial pattern (this includes time and materials management); and
• Thinking—the ability to solve problems, to reason, and to think critically about sequential or spatial information.

An individual can be good at remembering sequential or spatial patterns of information, but be lousy at creating such patterns. Just as there are many more good readers than there are good writers, there are far fewer information architects than there are consumers of well organized information.

Level of Detail. If you’ve ever played a game requiring you to find hidden images inside a thematically unrelated illustration, then you know that some find these games easy while others struggle. The difference is how widely or narrowly one can focus the perceptual field. The ends of the continuum in the level of detail of perceptual processing dimension are Focusers and Scanners (Woolfolk, 1998; Jonassen & Grabowski, 1993). Scanners direct their attention actively and freely to all parts of the field. They miss a lot of detail and have a wide range focus of attention. Focusers have a narrow focus of attention and a restricted attention to fewer facets of their surroundings, but they notice more details from that limited field.

Focusers tend to miss the overall structure of interaction design, while scanners tend to misplace buttons, links, and directions. Certain professions require individuals to be closer to one spectrum then the other. Editors, for example, have to be able to narrow their focus or they’ll miss too many mistakes. Impressionist painters are just the opposite. It’s good to know the audience that is being targeted by the product so that interaction designers can create appropriate tools.
Colorblindness. About ten percent of the population is color blind to some degree, males being the overwhelming majority. The percentage can be higher among certain ethnic groups (e.g.: in a Jewish male population, colorblindness can reach into 20%). Red/green confusion is the most common form of colorblindness. A significant proportion is not even aware of their problem. Given such a high incidence of colorblindness among the population, it seems only prudent not to use red and green cues as a way of conveying differing information.

6. ATTENTION CONTROL ERRORS

Attention controls regulate how individuals manage their working memory (Levine, 2002; Werby, 2008A). Failures due to multitasking directly result from inadequate attention controls under taxing environmental conditions. Having a painting come into a visual field, for example, is not the same as seeing the painting by directing the attention to perceiving and processing of visual information—focusing the cognitive resources on the painting. Many user errors result from poor attention controls or inability to pay attention to the right thing for just the right amount of time.

Perceptual Blindness. Perceptual Blindness is an attention control error—it occurs when individuals focus so intently on a task that the miss obvious information coming in through their senses. Selective attentional focus in combination with limited working memory resources can be the source of many user errors.

Daniel J. Simons of the University of Illinois and Christopher F. Charbris of Harvard University conducted an experiment designed to test our ability to process visual information (as opposed to our ability to see using our eyes). They asked a group of students to watch a video of a group of basketball players passing the ball to each other. The students were instructed to count how many passes were made during a certain period of time. After 35 seconds, a man in a gorilla suit ran into the field of players, beat his chest, and ran out of the room. When the researchers asked the students whether they saw a gorilla, 50% said no!

How could a group of visually healthy students miss the appearance of a man in a gorilla suit? They didn't expect a gorilla, and so it slipped past their perceptual processing, which was occupied with counting the basketball passes. In fact, when these students saw the video again, they accused the researchers of switching tapes! To read more about this experiment, visit http://viscog.beckman.uiuc.edu/djs_lab/

It's good to keep in mind just how much of an impact our expectations have on our ability to control our attention controls and to process information. This is particularly relevant in analyzing eyewitness testimony in criminal cases.

Autopilot Errors. Autopilot errors occur when we are very comfortable doing something—we are experts at performing the sequence of actions (Norman, 1998; Werby, 2008A). For example, we rarely end up at a store when we are driving around looking for a particular address. So anytime a person is asked to perform the same action over and over again with only an occasional variation, there is a strong chance that autopilot errors will arise. Such errors are the bane of factory assembly line workers and can lead to serious injuries.

Absentmindedness Errors. Have you ever caught yourself putting your reading glasses in the refrigerator instead of the milk? Or throwing away the present instead of the wrapping paper? In both cases, you knew what you had to do—put the milk in the refrigerator or clean up the mess—but you just stopped paying attention to what you were trying to do. The result was that you performed the right action on the wrong object (Norman, 1998; Werby, 2008A). This is an example of an absentmindedness error.

There are individuals who excel at absentmindedness. If you talk to them, they know exactly what they need to do, but somehow it always turns out wrong. They put on pajamas when they should be getting dressed for work. They pack the wrong book into their bags, not because they don't know what to take, but rather because they stopped paying attention to what they were doing. They work on the wrong assignments or save papers in the wrong file. These peoples' actions are not intentional and thus are not remediable by punishment or even embarrassment. It's the job of an educational product designer to save these people from themselves!

Interruptus Errors. An interruptus error occurs when you forget what was being done in the middle of an action. You opened the refrigerator but then forget why you were there—it just slipped your mind. You were trying to make a point, but forgot what you were going to say—you lost your train of thought. In both
cases, working memory got overloaded with other thoughts or outside resulting in an awkward moment. These are also examples of attention control errors—failure to keep the ideas in working memory by paying attention to them (Norman, 1998; Werby, 2008A).

A relative of interruptus error is completion error. Completion errors result when there is an interruption in mid multi-step action. The person is distracted and either skips steps or fails to finish the task all together. Completion errors occur in environments where multiple people or tasks vie for the attention of the individual, making it difficult to focus attention on a particular task. A perfect example is emergency rooms of a busy hospital. A doctor or a patient can easily get working memory overload and fail to complete a task or a procedure.

People who daydream a lot or who get easily preoccupied or distracted suffer interruptus errors all the time. The same is true for anxious individuals—most of their attention is taken up by worrying, leaving only a small sliver of working memory space to deal with current reality.

Interruptus errors can be particularly damaging for individuals who have a smaller than average working memory. These people already have a hard time managing the in and outflow of information. If, on top of this limitation, their attention easily wanders away from the task at hand, their performance suffers.

**Mode Errors.** Mode errors result when a device has multiple modes of operation, making an appropriate action in one mode give an erroneous result in another (Norman, 1998; Werby, 2008A; Carroll & Thomas, 1982). My microwave examples aside, this is the familiar remote control error—you press the play button for the DVD while the remote is in a TV mode and nothing works as expected. This is just another form of attention control error.

Unfortunately, as devices get smaller and smaller, designers rely on one button to do multiple actions, thus spawning numerous mode errors. And while they seem harmless (you can always just try switching modes), some people never get comfortable with the operation of some devices due to multiple functionality of controls. And in cases like car radio buttons, which tend to do double duty as CD controls, drivers can get into accidents while they fiddle with mode controls.

Note that these kinds of errors are different from the ones when a person just doesn't get how to use their remote—one is an attention error, the other in a background knowledge error. Understanding these types of errors makes it possible to try to design educational products that help student and teacher users avoid them.

7. **CULTURAL AND SOCIAL ERRORS**

Cultural errors focus on the differences between large groups, differentiated by political borders, language, and history. Social errors result from local variations and customs among people speaking the same language, living in the same country, and sharing the same history. (Werby, 2008A)

If we had to think through all of the implications of each social situation, we would get very little done. Fortunately, for most ordinary circumstances, we rely on scripts—a collection of expectations of dialogues and actions that fit specific interactions. We have restaurant scripts and doctor office visit scripts. And as long as everyone follows them, we feel comfortable to devote less then our total working memory capacity to each situation.

Cultural errors arise when our everyday scripts don’t match those of another culture with which we have to deal. Thus the errors are not only in language fluency, but also in the choice of culturally appropriate responses given a particular situation. For example, if after asking an individual “How are you?” the person launched in a lengthy discussion of personal vows, we would be shocked at the inappropriate response. For Americans, this question is not a question but a polite way of say hello.

Social errors focus on unfamiliarity of interpersonal interactions of a small subgroup of individuals: employees of a particular company, members of a profession, students in a specific school. Creating a unique set of interaction scripts can identify group members and single out outsiders.

8. **LINGUISTIC ERRORS**

Many people talk about language barriers as the cause of user errors. Obviously it pays to be more specific—the more designers know and understand the source of user errors, the easier it is to design products that
compensate for those failures. Like memory errors, communication failures come in many different flavors, requiring different design solutions. One of such communication breakdowns is discussed below.

Language provides access: access to information, access to community, access to social status, access to employment. Language is embedded in culture and inseparable from it. We talk about street language and scientific discourse—both might be based on the English language, but the vocabulary, the turn of phrase, and even the sound of the words are quite different. It's easy to speak the same language and still be unable to communicate. To join a community, to become a member of a social group, you have to learn its language.

Communication Barriers (Werby, 2008A):
- Lack of common language
- Colloquial variations
- Insufficient vocabulary
- Incomplete subject matter knowledge
- Cultural differences in tone, emotional style
- Divergent communication styles

Product interaction is a form of communication: it's a dialogue between the product designer and her audience. To be understood, product designers have to speak the language of their audience. They have to become part of that community of users, at least temporarily.

9. BACKGROUND KNOWLEDGE ERRORS

Formal versus Informal Domain Knowledge Errors. Background knowledge refers to individual’s expertise in a particular subject matter. It’s composed of formal background knowledge—information learned in formal educational settings like schools—and informal background knowledge—information that is picked from the environment through observation and other informal means. Informal background knowledge can be incorrect and still produce accurate predictive results to quarrries (diSessa, 1993). For example, the sun orbiting around the earth results in similar predictions to the earth revolving around the sun. Knowledge acquired through formal means can also be inaccurate—it’s easy to misunderstand a concept taught in math or misremember a history date, for example.

Users base their decisions of the information they have access to, in particular to their personal background knowledge. Thus it’s important to know the level of expertise among the user population for which the product is designed.

Inappropriate Mental Models. A mental model is a mental representation of how something works (Norman, 1983 & 1988; Young, 1983; Carrol & Thomas, 1982; Kieras & Bovair, 1984; Halasz & Morgan, 1982). People have thousands of mental models of devices they use everyday: computers, calculators, cars, cameras, camcorders, cats, coffee makers, c-sections, coolers, spray canisters, rice cookers...

Mental models evolve based on observation. Unfortunately, people are not very good at making accurate observations. Individuals tend to pay attention to things they think are relevant and omit those that don't seem to be connected to the object of interest. Thus it's easily decide that two events form a pattern even when they have nothing in common other then spatial or temporal proximity.

Understanding the mental models that the users are likely to bring to the products is key for designers. Interaction designers can help users form more accurate mental models by creating diagrams or making action-sequence links more visible. Optimally, designers want to maneuver the user into taking a single action—the only obvious and right thing to do with the product.

Like mental models provide explanations and could be right or wrong and they might generate good predictions or bad. And mental models can be completely wrong and still have pretty good predictive powers.

Users have lots of mental models, but so do product designers. And designers are not immune to generating wonderfully outlandish ones. But the mental models don't end with product designers; they get released into the world through the products they create. Mental models don't only affect how users interact with products. They also change how designers approach them.
10. CONCLUSION

Designing of errors should be a common approach to solving interaction and interface design problems. It’s important to understand the origin of errors to be able to design appropriate solution and improve user experience. This paper touched briefly on a few frequently encountered errors and their origins. Most errors can be traced to attention controls, memory, perception, language, cultural differences, and circumstances under which the product is being used. Cognitive blindness describes the difficulties that product designers have visualizing the cognitive differences between themselves and their users.

REFERENCES


HOW DO E-TUTORS SUPPORT COLLABORATIVE LEARNING? - GUIDELINES FROM A EUROPEAN STUDY

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ABSTRACT
Virtual collaborative learning is becoming more and more common over the last two decades. In collaborative knowledge construction scenarios, the learner-tutor interaction plays a major role in successful learning. In this context, the support of the e-tutor is of importance. Possible support methods include the preparation and organization of the learning unit and direct interventions during the collaboration process. Even though support methods are relevant from a theoretical point of view, the question is whether or not e-tutors effectively use such methods in their actual e-learning courses. To gain further insight into the real practices of e-tutors, in our study we developed a questionnaire to survey the main support methods used. Seventy-eight e-tutors from 17 different European countries participated in this study. Results showed that e-tutors support collaborative learning by providing specific technical and didactical support and by fostering the collaborative learning process, especially content-specific activities such as online discussion. Based on these results, guidelines for supporting virtual collaborative learning were developed.

KEYWORDS
Virtual collaboration, e-tutorial support, guidelines.

1. INTRODUCTION
Virtual collaborative learning is increasingly being used in different contexts: in schools, in universities, in higher or in further education. This is due to the fact that collaborative learning has several benefits, e.g. fostering individual knowledge acquisition (Lou et al., 1996), supporting the application of knowledge (De Corte, 2003), and encouraging the acquisition of social competencies. But collaborative learning is not successful in itself (Salomon & Globerson, 1989). There are some pre-conditions necessary for ensuring that collaborative learning will have a positive effect. Furthermore, virtual learning is more demanding for learners, who must handle both the technique as well as the physical absence of the collaborating partners. They must learn how virtual learning is connected to different ways of collaboration. Furthermore, in virtual collaboration, interaction occurs mainly through written forms. Therefore, it is necessary to provide support.

This support for virtual collaboration and collaborative learning is often realized by the e-tutor. According to an epistemic-engagement perspective, the importance of socially shared activities which are essential for individual cognitive development and for learning is stressed (Larreamendy-Joerns & Leinhardt, 2006). In this context, learning in practice that is realized through collaboration and discourse between e-tutors and learners is of main importance. But how can e-tutors support virtual collaborative learning? And which means do they use to foster collaborative knowledge construction? Furthermore, how do they intervene to handle dysfunctional phenomena? These questions were the starting point of a European research initiative in which 78 e-tutors from 17 different European countries were asked how they foster virtual collaborative learning.

In the following sections, we present the theoretical background on the support of virtual collaborative learning, the method of the study and its results. These results are then summarized as guidelines for e-tutors.
2. SUPPORTING VIRTUAL COLLABORATION BY E-TUTORS

2.1 Theoretical Background

E-tutors are defined according to their main function, namely the supervision of their learners. According to this perspective, e-tutoring comprises all the activities of a teacher that support a learner in constructively and actively dealing with the learning environment (Kopp, Germ, & Mandl, in press). In this context, an e-tutor has several options for supporting virtual collaboration. We distinguish between tasks for preparing and organizing the learning unit and tasks for supporting the learning processes. While the first tasks are especially relevant before starting the learning unit, the second tasks are necessary during the learning unit.

In the following chapters, we want to highlight important aspects for the preparation and organization of the learning unit and for the learning processes and activities that are relevant to virtual collaboration.

2.1.1 Preparing and organizing the Learning Unit

When we look at the preparation and organization of the learning unit, there are especially two relevant aspects: the technical and didactical design of the learning environment. Even though, the e-tutor does not always have an influence over the didactical and technical design, they are main concerns for virtual communication and collaboration.

The didactical design is the second main criteria in the context of preparing the learning environment. A main differentiation in this design is between more structured or less structured approaches. Designing a learning environment in a structured or systematic way means that the content is structured as the e-tutor thinks is best for achieving the respective learning goals. It is assumed that the content could be delivered one-to-one from e-tutor to the learner. The learner is able to represent this knowledge in the same way as the e-tutor. A situated, less structured approach such as problem-based learning assumes that learning is an active, constructive, self-regulated, situated, social and motivational-emotional process (Capon, & Kuhn, 2004). To foster active collaborative knowledge construction, learners are provided with certain tasks and problems to solve. In solving such problems, learners apply their knowledge to a specific situation to avoid inert knowledge (Renkl, Mandl, & Gruber, 1996). A meta-analyses of 43 studies on problem-based learning showed its advantage in comparison to systematic approaches (Dochy, Gijbels, & Van den Bossche, 2005).

In the context of the technical design, there is a main differentiation between synchronous and asynchronous communication and collaboration tools. Synchronous communication often takes place with a chat or a videoconferencing tool. In this learning scenario, learners are permanently connected with one another throughout the learning process through a shared application on their screen. They communicate either by typing statements or sentences when using computer chat or by speaking into a microphone during videoconferencing (Ertl, Fischer, & Mandl, 2006). Such scenarios enable frequent learner interaction. When the computer provides asynchronous communication, learners often communicate through discussion boards in the learning environment, in which learners express themselves by typing statements into the computer interface (Kopp, Schnurer, & Mandl, 2009). As the communication is asynchronous, there is no immediate reply to each learner’s entry, rather the learner can proceed at his/her own pace. The written messages are permanent and usually allow for later access as well as for editing and improvement.

2.1.2 Collaborative Learning

There are several collaborative learning strategies relevant for a successful collaboration, especially collaborative activities and providing feedback.

Collaborative activities are distinguished into cognitive and social learning processes. Cognitive learning processes include sharing knowledge and online discussions, argumentation and considering different perspectives, solving problems or cases collaboratively as well as organizing and planning group activities.

Sharing knowledge and online discussion is a key aspect of collaboration as collaboration takes only place when knowledge is exchanged and disseminated among all group members. In this context, the kind of knowledge being disseminated is the most important factor, because every group member possesses unshared knowledge. The main advantage of groups is the dissemination of unshared knowledge, so that every learner is able to profit from collaboration. Unfortunately, research shows that group members often refer only to shared information, whereas they do not articulate the unshared information that only one group member has
exclusive access to (Stasser, & Titus, 1985; Wittenbaum, & Stasser, 1996). Discussion can then take place based on the sharing of knowledge. This includes the exchange of different opinions as well as the evaluation of and reflection on information.

Argumentation and considering different perspectives is another key activity in collaboration. Collaboration can benefit from the different opinions and points of view of every group member. But this is only the case when group members adequately justify their points of view (Van Eemeren, Grootendorst, & Henkeman, 1996). Especially in scientific discussions, arguing is necessary to explore diverse perspectives in collaborative task-solving (Andriessen, Baker, & Suthers, 2003). Often these different perspectives are comprised of different knowledge, information and opinions which are necessary for solving an interdependent task collaboratively (Jonassen, 2000).

Collaborative problem or case solving is an essential activity in collaborative learning. In this context, content-specific and coordination-specific problem solving activities are important (Hasenbein, Kopp, & Mandl, 2008). Content-specific activities refer to the collection and preparation of information needed to solve the task as well as to develop a solution to a problem. Coordination-specific activities include the planning of the procedures as well as managing the interaction process.

Organizing and planning group activities is necessary for virtual collaboration as e-learning makes it possible to work and learn at any time and any place. But this advantage has an oppositional effect when collaborators do not use the e-learning environment at all or do not adequately plan their procedures.

**Social processes** are related to the interaction of group members. Even though “collaborative learning” is the “royal road” to knowledge acquisition (e.g. Kreijins, Kirschner, & Jochems, 2003), grouping two or more people together is neither a guarantee that they will be able to collaborate, nor that they will be able to learn. There are four main aspects which are relevant to the context of social processes: constructive confrontations and conflict regulation, goal orientation and group’s motivation, social influence processes, and the individuals’ involvement in group activities and responsibility during group work.

Constructive confrontations among group members and conflict regulation are necessary in the context of successfully resolving conflicts and problems and to reach a solution which is satisfactory to all parties involved. In this context, it is necessary that group members use epistemic means to try to solve conflicts based on incompatible points of view. This means that group members pay attention to the issue and elaborate on the diverging elements in depth, thus arriving at elaborate alternative and original solutions (Schwarz, Neuman, & Biezuner, 2000). Group goal orientation and motivation is a second key social aspect relevant for collaboration. Theories and research about group goal orientation (Dweck & Elliot, 1983; Elliot & Mc Gregor, 2001) showed that especially mastery goals are effective for collaboration in comparison to performance goals. As learners who are holding mastery goals want to profit from the learning opportunities as much as possible, as opposed to simply performing best, they are more persistent in effort, self-regulate their learning and are open-minded (Harackiewicz, et al., 2002).

Social influence processes are relevant in collaboration as they influence the way groups search for and handle information and knowledge, and how group solutions are generated. For example, interaction with peers is more helpful for acquiring more advanced cognitive skills than interaction with experts, adults or teachers (Doise, & Mugny, 1984). Moreover, minority influence is more likely to promote the deeper scrutiny of information (Moscovici, 1980), creative and divergent thinking (Nemeth, 1986), knowledge transfer and generalization of learning (Quiamzade & Mugny, 2001).

Participation and responsibility in group work is another key aspect for successful virtual collaboration. It is necessary for all participants to engage in the group activity, put forward their points of view, and be encouraged to sustain their claims even if they are the minority in the group. Social loafing that occurs when participants exert less effort in the group work than they would do in individual work (Latané, Williams & Harkins, 1979) and free riding, which occurs when one or more learners do little or no work, thereby contributing almost nothing to the group’s task (Kerr & Bruun, 1983), are the most common pitfalls in all forms of group collaboration.

**Providing feedback** is a key activity of the e-tutor that stimulates collaboration and learning (Krause, Stark & Mandl, 2009). According to Hattie and Timperley (2007) feedback “is conceptualized as information provided by an agent (e.g., teacher, peer, book, parent, self, experience) with regard to aspects of one’s performance or understanding” (p. 81). The objective of giving feedback is to reduce the discrepancies between the student’s current understanding and a desired goal. Research in classroom settings has shown that teaching with feedback is more effective than teaching without feedback. In e-learning contexts,
feedback provided by the e-tutor is very helpful to prevent the student’s sense of being totally alone and unguided (Schweizer, Paechter, & Weidenmann, 2001). Therefore, providing feedback is essential for collaborative learning.

2.2 Method

2.2.1 Sample

Seventy-eight e-tutors from 17 different European countries (see table 1) were asked to answer a questionnaire regarding their e-learning experiences with collaborative learning. 74.4% were experiences within university courses or lifelong learning experiences.

Table 1. Sample of the study

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of e-learning experiences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>5</td>
</tr>
<tr>
<td>Belgium</td>
<td>4</td>
</tr>
<tr>
<td>Denmark</td>
<td>1</td>
</tr>
<tr>
<td>Finland</td>
<td>17</td>
</tr>
<tr>
<td>France</td>
<td>16</td>
</tr>
<tr>
<td>Germany</td>
<td>16</td>
</tr>
<tr>
<td>Greece</td>
<td>2</td>
</tr>
<tr>
<td>Hungary</td>
<td>1</td>
</tr>
<tr>
<td>Ireland</td>
<td>1</td>
</tr>
<tr>
<td>Latvia</td>
<td>1</td>
</tr>
<tr>
<td>Italy</td>
<td>23</td>
</tr>
<tr>
<td>Netherlands</td>
<td>2</td>
</tr>
<tr>
<td>Poland</td>
<td>1</td>
</tr>
<tr>
<td>Romania</td>
<td>2</td>
</tr>
<tr>
<td>Spain</td>
<td>1</td>
</tr>
<tr>
<td>Swiss</td>
<td>10</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>2</td>
</tr>
</tbody>
</table>

2.2.2 Data Sources

A questionnaire was created for this purpose on a theoretical basis to study a collection of noteworthy e-learning experiences that promoted online interaction between learners and e-tutors. The questionnaire consisted of four main dimensions: general data, technical aspects, collaborative activities, and giving feedback. The first two dimensions were relevant to the preparation and organization of the learning unit, the other two dimensions were relevant to the support of the learning processes.

General data is necessary to provide an overview of the specific e-learning courses. Therefore, data about the e-tutor and the e-learning course were surveyed. In this context, the didactical design of the e-learning course is of main importance to gain deeper insights into reasons for best practices in e-learning.

The technical aspects comprise main information on the platform the e-learning course utilizes as well as on the available tools and features of the e-learning platform. The main focus was on four questions regarding collaboration and communication tools: (1) The technical options for communication, (2) the most effective communication tool, (3) the extent of using different features of communication and (4) the extent of using specific tools for supporting collaboration.

With respect to collaborative activities, the questionnaire distinguished between cognitive and social aspects of collaboration and providing feedback. Regarding the cognitive aspects of collaboration, the questionnaire included four main activities: sharing knowledge and online discussion, argumentation and considering different perspectives, collaborative problem or case solving, and organizing and planning group activities. To get deep insights into these activities, the questionnaire comprised the following structure: In a first step, the importance of each of these dimensions was asked for on a six-point Likert scale (from 1, not important, to 6, very important). In a second step, e-tutors were asked whether they intervened to foster the specific collaborative activity and in a third step, they were asked if yes, how they intervened and if no, why they did not intervene. Social interaction comprised eleven questions concerning dysfunctional phenomena of group work such as conflicts, competition, ignoring minorities, lack/diffusion of responsibility. In the
questionnaire, e-tutors were first asked whether they intervened to avoid a dysfunctional phenomenon. If they answered yes, they were asked how they intervened, and if no, they were asked why they did not intervene.

The last dimension was about providing feedback. In this dimension, providing content-specific feedback and feedback on collaborative activities were of main interest. The questionnaire followed the same structure as the one which surveyed cognitive activities.

2.2.3 Statistical Analyses

All of the e-tutors answers were analyzed according to the following scheme: Closed questions were analyzed by the mean of the ratings when a Likert-scale was used or by the percentage when yes/no questions were used. Open questions were deductively analyzed according to a qualitative content analysis, e.g. the didactical design or the specific support methods used by the e-tutors.

2.3 Results

2.3.1 General Data

Regarding the experiences of the e-tutors, 57 e-tutors (73.1%) were experienced in the design and realization of collaborative online courses. Most of these e-learning experiences were offered in higher education/university contexts (74.4%), followed by 19.2% in further education. Didactically, 20 e-learning courses were offered in a blended learning manner, alternating between face-to-face and online phases. Collaborative and problem-based learning were mentioned 19 times. The main objectives of the courses were knowledge acquisition (88.5%) and knowledge application (80.8%), followed by the acquisition of social skills (52.6%).

2.3.2 Technical Design

Looking at the technical design, almost 40 different platforms were used. 98.7% of the platforms offered asynchronous collaboration tools (77), only 46.2% (36) also offered synchronous collaboration tools. Therefore, the most effective tool in fostering collaboration was the forum (mentioned 33 times), followed by email (15 times). When rating the extent of the use of different features of communication, the same picture occurs: The forum was rated highest with $M=4.34 \ (SD=1.70)$, followed by email with $M=4.04 \ (SD=1.75)$.

To support collaboration, activity tracking was used the most frequently (see table 2).

<table>
<thead>
<tr>
<th>Features to support collaboration</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support for groups</td>
<td>4.09</td>
<td>1.99</td>
</tr>
<tr>
<td>Support for workspaces</td>
<td>4.15</td>
<td>1.85</td>
</tr>
<tr>
<td>Assigning roles and permissions</td>
<td>3.51</td>
<td>1.96</td>
</tr>
<tr>
<td>Activity tracking</td>
<td>4.51</td>
<td>1.53</td>
</tr>
<tr>
<td>Task assignment</td>
<td>4.30</td>
<td>1.76</td>
</tr>
<tr>
<td>Evaluating/Testing knowledge</td>
<td>4.03</td>
<td>1.90</td>
</tr>
</tbody>
</table>

Table 2. Mean and standard deviation of the evaluation of features to support collaboration.

2.3.3 Collaborative Activities

To gain further insights into collaborative activities, we distinguished between cognitive and social processes. Cognitive processes were the sharing of knowledge and online discussion, argumentation and consideration of different perspectives, collaborative problem or case solving, and organizing and planning group activities.

The sharing of knowledge and online discussion was evaluated as very important ($M=5.10; \ SD=1.33; \ Min=1.00; \ Max=6.00)$. 80.8% (63) of the e-tutors intervened to foster online discussion. The intervention methods could be subdivided into five categories: (1) organizing and structuring the course, e.g. using role play, structuring the discussion of the groups, providing deadlines; (2) providing specific tasks to learners (e.g. collaborative construction of a document); (3) giving feedback to learners’ work or summarizing the work and pointing out omitted arguments; (4) giving general suggestions (e.g. promoting group cohesion, reduce tensions) and (5) giving examples of more structured practices (e.g. proposing some questions). The
first two interventions are used in the context of preparing and organizing the learning unit, the following three are used during collaboration itself.

The e-tutors also evaluated the cognitive activity of arguing and considering different perspectives on a very high level (\(M=4.87; SD=1.52; Min=1.00; Max=6.00\)). 78.2\% (61) of e-tutors intervened to promote argumentation and the consideration of different perspectives by preparing and organizing the learning unit (e.g. assigning tasks to learners, organizing the group work using guidelines for interaction etc.) and by supporting the collaborative learning process by moderating, giving feedback, provoking, and requesting clarification.

Collaborative problem solving was also evaluated high with \(M=4.54 (SD=1.80, Min=1.00, Max=6.00)\). 67.9\% (53) of the e-tutors intervened to foster collaborative problem solving by specifically preparing and organizing the learning unit using rules and guidelines or by assigning roles and responsibilities, and by supporting the learning process by helping and guiding the learners.

Organizing and planning group activities were both evaluated on a high level with \(M=4.85 (SD=1.42; Min=1.00; Max=6.00)\) for organizing and with \(M=4.18 (SD=1.65; Min=1.00; Max=6.00)\) for planning group activities. Even though rated as important, only 57.7\% (45) of the e-tutors intervened to foster the organization of the group activities, and 48.7\% (38) to foster the planning of group activities. Mostly, e-tutors provided structural support in the beginning of the learning unit, e.g. by assigning roles or activities, or by providing a timetable etc. Sometimes e-tutors intervened during the collaborative learning by reminding learners of their tasks or roles.

The reasons, why e-tutors did not intervene to foster content-specific activities were the same in all four dimensions. Mostly, e-tutors said it was not necessary as the groups worked effectively or they did not want to intervene because they wanted to preserve the autonomy of the group.

Social activities included constructive confrontations and conflict regulation, goal orientation and group’s motivation, social influence processes, and the individuals’ involvement in group activities and responsibility during group work.

To achieve constructive confrontations and conflict regulation, e-tutors did not intervene very often. Only 37.2\% of the e-tutors (29) mentioned intervening to preserve positive relationships between their participants and to avoid interpersonal conflicts. For the most part, e-tutors intervened by mediation, moderation, or guidance. The most often reason why e-tutors did not intervene, was that there was no need for such action.

To avoid competition and to guarantee group goal orientation and group motivation, 23.1\% of the e-tutors (18) intervened. These interventions were mainly role play, assigning specific tasks for individual learners or providing specific rules. Mostly, e-tutors did not see the need to intervene.

Regarding social influence processes, 62.8\% of the e-tutors (49) did not intervene to prevent the minority opinion being ignored, mainly, either because it was not necessary or to preserve the autonomy of the group.

To guarantee individuals’ involvement in group activities and their responsibility for group work, 38.5\% of the e-tutors (30) did intervene. This intervention was mainly related to assigning roles, installing a rotating moderation and face-to-face discussions. No intervention was either due to the fact that it was very difficult to identify the problem or that it was not seen as necessary.

2.3.4 Providing Feedback

Providing feedback was measured by two dimensions: providing content-specific feedback and feedback on collaborative activities.

Content-specific feedback was evaluated on a very high level with \(M=5.54 (SD=0.94; Min=1.00; Max=6.00)\). 85.6\% (67) of the e-tutors implemented content-specific feedback in the form of peer feedback, self-assessment or in the form of tutors’ feedback. To provide content-specific feedback tutors specifically provided written analyses of the group solutions, additional material, or the summary of the discussions etc.

Feedback on the collaborative activities was evaluated with \(M=4.37 (SD=1.61)\). Thus, even though it was highly rated, this kind of feedback was evaluated lower than content-specific feedback. Again, the e-tutors used self-assessment and peer-evaluation, but also gave feedback themselves by summing up the discussions, giving comments or directly contacting participants.
3. CONCLUSION

This study shows in detail how European e-tutors support virtual collaborative learning in practice in their respective e-learning experiences – in preparing and organizing the learning courses as well as in fostering specific collaborative learning activities and providing feedback. We have summarized the different interventions in specific practical guidelines which are relevant for e-tutors, teachers and every practitioner in the virtual field.

Three main aspects are relevant when looking at the preparation and organization of the e-learning courses: the learning task, the didactical and the technical design of the learning unit. Regarding the learning task, it is necessary to design a task that must be solved collaboratively, not individually. Furthermore, this task should stimulate intrinsic motivation by using inspiring starting points. Structuring the task in phases or sub-tasks would also be helpful for the learners. Didactically, the learning unit should be designed in a blended learning scenario that includes both face-to-face and virtual phases. Technically, the learning environment should be portable, easy for everyone to handle and should offer different kinds of collaboration tools such as email, forum or chat.

When looking at the collaborative learning activities, content-specific processes were evaluated as more important than social processes. The main means which are used by e-tutors to foster content-specific processes from the beginning of the collaboration include providing a collaborative task and relevant sub-tasks, assigning specific roles and responsibilities to the collaborators using collaboration scripts, as well as using timetables, rules and guidelines for collaboration. During the collaboration process, e-tutors mainly support learners by asking provoking questions, presenting different perspectives, providing further information, criticizing, summing up different viewpoints, or giving examples.

E-tutors did not see social processes as important as content-specific activities. Therefore, they also did not intervene as much in fostering such processes. Nonetheless, according to the responses, some guidelines could be formulated especially for the learning process. In this context, it is especially important to encourage the construction of complementary positions, strengthen reciprocal and active participation, avoid negative judgments and provide alternatives instead of a right and unique solution. In this context, collaboration scripts are also used effectively.

Providing feedback was also very important for the e-tutors, especially content-specific feedback. This kind of feedback could be given through written analyses, test results and corrections, self-assessment tests or practical exercises. Feedback on the collaboration process is provided by reminding the groups of their rules, proposing improvements and giving advice or prompting learners on ways to optimize group processes.

Even though this study was able to show how European e-tutors use specific methods to support virtual collaborative learning, it is not exhaustive in mentioning every possible support method. Therefore, there is a limitation in respect of other effective means, e.g. the use of pre-structuring methods such as content schemes. Nonetheless, the described means and guidelines are practical and were used effectively in the 78 e-learning experiences.

DISCLAIMER

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IDENTIFICATION USING BIOMETRIC TECHNOLOGY: ISSUES AND ATTITUDES

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ABSTRACT
The process of establishing identity is performed routinely for preventing unauthorized access and for aiding criminal justice. Biometric technology, which involves the use of some unique physiological and behavioral characteristics, is being increasingly used for this purpose. Due to its intrinsic nature, authentication based on biometric technology is much less susceptible to compromise than traditional methods such as passwords. But the personal nature of biometrics and the ease of replicating and sharing it in digitized form naturally raise questions about its usability, security and privacy aspects. This study is an investigation into people’s attitude towards biometrics. It is based on a survey of the most common biometrics: facial image, fingerprint, voice, hand geometry, keystroke dynamics, iris scan, retina scan, and signature analysis. Three domains regarding attitudes are studied - how comfortable survey participants felt with biometric technologies, how secure they thought these technologies were, and how intrusive they thought these technologies would be if used on a daily basis. Possible differences in attitude towards this technology based on gender, age, personality and ethnicity are examined. The investigation also deals with the issues of privacy, protection and ownership associated with biometric data.

KEYWORDS
Identification, biometrics, biometric technology, user perception.

1. INTRODUCTION
The word biometric(s) stems from the Greek words ‘bios’ meaning life and ‘metron’ meaning measure. As a noun, it refers to physiological characteristics – for example, someone’s fingerprint. As an adjective, biometric relates to anything dealing with the use of such characteristics – the most well-known example of this being biometric technology (also referred to simply as biometrics).

Biometrics has existed throughout history as a tool for identifying people; the use of some distinctive feature such as a unique scar, or more recently, the use of fingerprints are examples of this. Although traditional use of biometrics such as fingerprints has been mainly for the purpose of criminal investigation, the proliferation of information systems that store massive amounts of data related to all aspects of people’s lives, has provided impetus for the use of biometrics to protect confidentiality of information by preventing unauthorized access. Fighting crime using biometrics has also taken on a new dimension with the recent increase in the threat of terrorism, where the ability to accurately and efficiently distinguish between the innocent and the suspect can lead to a significant saving of resources, and potentially, lives.

Biometrics in the information technology field is a relatively new concept of identifying information system users and protecting such systems from intruders. A very important task in information assurance is user authentication (“Am I who I claim to be?”) before allowing access to information. A more challenging task is that of recognition (“Who am I?”), often used in fighting crime and countering threats to public security. In user authentication, the well-established method of using passwords for authentication is becoming increasingly vulnerable due to the sheer number of passwords one has to remember these days. At the same time, with increasing use of information technology and automation in all aspects of life, the need for efficient and reliable identification is greater than ever. Consequently, biometric technology has become an active area of research and development. Biometrics is expected to be increasingly used in applications for
improving security in physical installations such as airports, and preventing identity theft in financial and social services.

The surge in interest in biometrics has resulted largely from the deficiencies of traditional knowledge-based (“something I know”) and token-based (“something I possess”) techniques. Passwords can be forgotten, shared, or stolen. Tokens, such as smart cards and magnetic stripe cards can be lost, stolen, duplicated, or left at home. Only biometric authentication is based on intrinsic personal features that have two very important advantages over traditional methods. Except in extreme situations (for example, through accident or disease) they cannot be lost. Secondly, unlike a password or smart card, they cannot be shared. This makes biometric-based identification much less susceptible to compromise.

While biometric technology has been making significant progress in the last two decades or so, its application is yet to become widespread. There are a number of factors behind the relatively slow spread of this technology – some are technical such as reliable acquisition and levels of accuracy and consistency, while others have to do with issues like user-acceptance and ethics. This paper introduces current biometric technology and related technological as well as non-technological issues. It next gives a brief account of some research done on user perception of this technology before presenting the initial findings of a study to investigate possible links between user perception and user background characterized by gender, age, ethnicity and personality traits.

2. BIOMETRIC CATEGORIES

Biometric information can be categorized into two broad groups - physical and behavioral.

2.1 Physical Biometrics

Physical biometrics pertains to any form of biometric that is found on and measured off the human body. Common physical biometrics include fingerprints, iris and retinal scans, hand geometry, facial image, and DNA pattern. A key component of physical biometrics is that they hardly change over time. A person’s fingerprint, eye, and DNA are unlikely to change through their lifetimes except in highly unusual circumstances. Facial recognition is the exception to this property of invariability. People’s faces can change with age, use of glasses to help vision impairment, or changes in hair style or facial hair.

2.2 Behavioral Biometrics

Behavioral biometrics encompass the habitual information of a person. It can be captured and analyzed through the use of signature recognition, keystroke analysis, and voice analysis. Although each person’s voice is unique in pitch, voice analysis focuses on the way a person speaks. Unlike physical biometrics that remain relatively constant over time, behavioral biometrics can change in a very short period of time. For example, people might not have a consistent style signature.

3. OPERATION OF A BIOMETRIC SYSTEM

Regardless of the type of biometrics, in order to establish identity, there must be a way for a biometric system to collect, store, and compare the biometric data captured from its users. Two main processes, called enrollment and verification, accomplish this goal.

3.1 Enrollment Process

Enrollment and verification involves the capturing, transformation, transfer, and storage of biometric data to acknowledge who the person claims to be (Coventry, De Angeli & Johnson, 2003). The enrollment process is where a user inputs their data into a biometric system for matching with future inputs. The first step in the enrollment process is to capture a user’s raw biometric data through a biometric capture device like a camera,
microphone, or fingerprint reader. Once the data is collected, a template for that user is made. Normally this template is a composition of multiple data captures, which helps create a more generic template for that user. This ‘reference template’ is then transmitted and stored in a database (Coventry et al 2003).

3.2 Verification Process

As shown in figure 1 below, the first step in the verification process is similar to the enrollment process. The user’s raw data is captured and made into a ‘sample template’. This sample template is used to verify the user’s identity. There are two main methods of comparing a user’s sample and reference templates. Recognition takes the sample template and compares it against all other templates in the database. Verification compares the sample template against the reference template of who the unknown user claims to be.

3.3 Technological Issues

There are three common terms used to assess the quality of a biometric system’s enrollment and verification process. These measures are the FTE (Failure to Enroll) rate, which shows how well the system is able to acquire and enroll users into the system, the FAR (False Acceptance Rate), which is how often the system grants access to intruders, and the FRR (False Rejection Rate), which is how often the system denies access to legitimate users (Coventry et al 2003). A sample template and the corresponding reference template (if any) are unlikely to be exact matches. Because of this, a threshold value is used to determine how close the sample template is to the reference template (Wickins, 2006). The threshold can be manipulated to adjust the FAR and FRR rates. A reduction in the FAR value usually results in an increase in FRR. Consequently, the right balance between these two conflicting system characteristics has to be reached so that a biometric system’s reliability needs are met. In addition to adequately low FAR and FRR rates, an acceptable FTE rate is also essential for the type of biometric chosen for a system. As an evolving technology, biometric systems need to increase both accuracy and speed when it comes to the enrollment and verification processes.

3.4 Legal and Ethical Issues

The use of biometrics is not entirely new. Fingerprints and facial images have been routinely used long before computers became commonplace. But the use of information technology and new types of biometrics has given rise to the need for standards among biometric systems (Chandra & Calderon 2005). Work on standards in the use of biometric technology is currently in progress at international and national levels (Bromba, 2010; NTSC, 2010). Ideally biometric data should be classified as personal data, and fall under appropriate legal protection; for example, biometric data should be gathered only with user consent (Sprokkereef & de Hert, 2007). There are currently no set guidelines on what a system’s FTE, FAR, FRR and threshold need to be, or what information is allowed to be collected and stored. There is also no standard way to collect and store biometric data. All these factors can make it difficult for biometric evidence to be
admissible in court (Chandra & Calderon 2005). There is also the issue of providing access to a biometric system for users with a documented disability. Depending on how the law is interpreted, designers may be forced to consider alternative methods of granting access to people who are unable to enroll in the biometric system.

Legal and ethical issues are often closely tied together, and biometric technology is no exception. A difficult ethical issue relevant to biometrics is social exclusion. It can affect biometrics in that not everyone may be able to enroll into a biometric system and gain the benefits of the latest technology. A study found that about 0.62% of one of the survey’s subgroups was unable to enroll in a biometric system (Wickins, 2006). People with a physical and/or learning disability along with the elderly can have difficulty enrolling in a biometric system (in terms of accuracy and time spent enrolling). This can lead to certain groups of people being excluded from everyday activities that should be available to everyone.

3.5 Socio-cultural and Privacy Issues

Issues with the use of biometric technology can also arise due to one’s religious and cultural background, and prevailing social and political situation (Woodward, Webb, Newton, Bradley & Rubenson). One possible obstacle to biometric acceptance may be stigmatization. Some communities associate fingerprinting with law enforcement and acts of criminal behavior (Sprokkereef & de Hert, 2007). Subjecting oneself to procedures involving physical exposure and/or contact may become an issue with specific religious groups. Along with possible stigmatization is the fear of tracking; the ability to monitor in real time an individual’s actions or to search databases that contain information about these actions (Sprokkereef & de Hert, 2007). Individuals might have a fear of “Big Brother” watching them, and collecting information about their actions without their knowledge.

There is also the concern that biometric data will be used to stereotype or classify people. A study conducted in Sweden found a link between data collected from iris scans and different personality types in adulthood (Sprokkereef & de Hert, 2007). This can lead to the fear that employers who ask for biometric data during the hiring process might discriminate between potential hires based on biometric data.

Another popular concern from the security and trust standpoint is that of function creep. When applied to the field of biometrics, function creep refers to the issue of biometric data being used outside of their original purpose (Chandra & Calderon 2005; Jones et al, 2007; Sprokkereef & de Hert, 2007). Organizations selling or passing on personal information such as names and addresses to others without seeking consent is an ongoing phenomenon. But the unique and permanent nature of biometric information adds a more serious dimension to such a breach of confidentiality; since unlike passwords, fingerprints or retinal patterns cannot be changed if identity theft is suspected.

4. CURRENT RESEARCH ON USER ATTITUDES

Issues such as those mentioned above may stem from how the users interact with a biometric device, and how they perceive the risks and benefits of using biometrics for identification over traditional knowledge and token based systems. There have been a number of reported studies that gathered data about user acceptability and usability of biometric technology (Furnell & Evangelatos, 2007; Heckle, Patrick, & Ozok, 2007; Jones, Antón, & Earp, 2007; Moody, 2004; Pons & Polack, 2008; Wickins, 2006). All these surveys, except one, were solely questionnaire-based. The study reported in (Wickins, 2006) used a mock biometric system that participants were asked to use before responding to a survey. This approach, although attempting to gather feedback on actual user experience, was restricted to the experience of only one type of biometric.

All these reported survey methods yielded results that showed that participants have heard of biometrics, yet were skeptical about using the technology (Heckle, Patrick, & Ozok, 2007; Jones et al, 2007). In most of the surveys, a relatively low percentage of participants had used a biometric device. The oldest of these surveys, reported in a journal article published in 2004, found that only 6% of its participants had used a biometric device (Moody, 2004). This serves as an indicator that at least until the early 2000s, biometrics had not had a prominent presence in people’s everyday lives. This is in contrast with the findings we reported below in section 5.
Although the reported surveys provide a wealth of information, most are limited in some way or other such as - surveying only Computer Information Systems (CIS) students (Pons & Polak, 2008), surveying a large college class of mostly Caucasian students aged 18 – 21 (Jones et al, 2007), having a small participation pool (under 50 participants) (Heckle et al, 2007), and the age of most participants surveyed being under 30 years (Furnell & Evangelatos, 2007; Jones et al, 2007; Pons & Polak, 2008). Surveys that included older age groups showed different results in acceptability and usability (Moody, 2004; Wickins, 2006). This includes the general tendency to avoid biometric systems in favor of a traditional system, and a more difficult time enrolling in a biometric system. Most of these surveys did not consider the ethnic background of their participants. Also, none of these surveys attempted to relate personality traits with people’s perception.

5. A SURVEY ON USER ATTITUDE TOWARDS BIOMETRICS

As part of an ongoing study of people’s perception of biometric technology used for identification, we examined attitudes towards 8 common biometrics used for this purpose: facial image, fingerprint, voice, hand geometry, keystroke dynamics, iris scan, retina scan, and signature analysis. We focused on three domains regarding attitudes: 1) how comfortable participants felt with biometric technologies; 2) how secure they thought these technologies were; 3) how intrusive they thought these technologies would be. In addition to investigating how people felt regarding these three aspects of biometric technology, an additional goal was to look for possible links between attitudes towards these three aspects and a participant’s own attributes; gender, age, ethnicity and personality traits among them. During 2009, students in several courses across the university were contacted in their classrooms and invited to participate in the survey. Data collection for this study was completed online using a Web-based survey tool.

We developed a 47-item questionnaire to record participants’ thoughts regarding biometric technologies. They were asked to provide demographic information, and information regarding their familiarity with different biometric technologies. To minimize the effect of ignorance on specific types of biometrics, each question was accompanied, where appropriate, by a brief description of the associated technology. In order to measure individual differences in personality, the Big Five Inventory (BFI: John & Srivastava, 1999) was used. The BFI is a widely used measure of adult personality. Personality is broadly defined as characteristics that we display consistently across situations. According to one of the most commonly accepted theories of personality, there are 5 dimensions of human personality: neurotiscism (i.e., emotional stability), extraversion (i.e., how sociable a person is), agreeableness (i.e., how trusting, helpful, easygoing a person is), conscientiousness (i.e., how disciplined a person is), and openness to new experience.

Participants were 184 students (67 males, 117 females). Average age of participants was 24 years. Fifty-nine percent of our participants were European-American, 30% were African-American, 4% were Asian-American, 3% were Hispanic, and 4% identified their ethnicity/race as ‘other’. About 49% of participants had a background in information technology (study or work related); the rest were from a non-IT background spanning 20 different areas of study such as English and Nursing. A majority of the participants indicated that they had heard of biometrics. Among the biometric technologies, facial recognition, fingerprint, and voice analysis were the best known; hand geometry analysis was the least known technology. A majority of participants, 63%, indicated that they had used biometric technologies before. Fingerprint and signature analysis were the most commonly used biometric technologies - used by 40% and 31% of the participants respectively.

Participants’ perception of the eight types of biometrics investigated with regard to the three aspects of comfort, security and intrusiveness were found to be as follows:

5.1 Comfort Level

Participants appeared to be most comfortable with fingerprint analysis, with 82% putting it in the first place; voice (67%) and hand geometry analysis (62%) came second and third. The feeling of comfort with fingerprinting may be due to familiarity arising from its longstanding and widespread use. This attitude of comfort about fingerprinting also appears to go against the “criminal stigma” concern mentioned earlier.
5.2 Security

In terms of a feeling of security, once again fingerprinting occupied the first place among respondents (75%); followed by retina scan (66%) as second and iris scan (65%) a close third. Fewer than 9% of the respondents thought it would be easier to steal biometric information than stealing traditional markers of authentication such as passwords. Overall, biometrics was regarded more positively than the two most popular conventional identification techniques but opinion was divided; 55% thought it should replace ID cards and 57% thought similarly about passwords. Also, the standard deviation on the security aspect was greater (0.19) compared with those of comfort (0.09) and intrusiveness (0.08).

5.3 Intrusiveness

Some level of concern was noticeable on the intrusive nature of biometrics. Facial imaging concerned participants most (43%) for being intrusive; followed by retina scan (40%) and iris scan (37%). Given the invasive nature particularly of iris scan, it is interesting to note that physical intrusiveness does not appear to be a major concern, even for an apparently invasive method like retina scan (40%), which requires a person to stare into an infrared beam for a number of seconds at a close range. Overall, fewer than half of the participants seemed worried about this aspect of biometric technology.

5.4 Gender Differences in Attitudes towards Biometric Technologies

In order to explore gender differences in attitudes towards biometric technologies, t-tests were performed on the data. There were no differences between male and female participants with respect to how comfortable they felt with biometrics technologies [t(182) = -.74, p > .05], how secure they thought these technologies were [t(182) = .44, p > .05], and how intrusive they thought these technologies would be if used on a daily basis [t(182) = .19, p > .05]. See Table 1 below for details.

Table 1. Descriptive statistics for male and female attitudes towards biometrics

<table>
<thead>
<tr>
<th></th>
<th>Male (N=67) Mean (SD)</th>
<th>Female (N=117) Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude</td>
<td>28.79 (7.75)</td>
<td>28.03 (5.95)</td>
</tr>
<tr>
<td>Security</td>
<td>26.57 (5.41)</td>
<td>26.94 (5.55)</td>
</tr>
<tr>
<td>Intrusiveness</td>
<td>23.01 (8.29)</td>
<td>23.22 (6.38)</td>
</tr>
</tbody>
</table>

5.5 Differences in Attitudes as a Function of Ethnicity

In order to explore differences in attitudes towards biometric technologies t-tests were performed on our data to compare European-American and African-American participants. There were no differences between these two groups with respect to how comfortable they felt with biometrics technologies [t(162) = -.37, p > .05], how secure they thought these technologies were [t(162) = -.77, p > .05], and how intrusive they thought these technologies would be, if used on a daily basis [t(162) = -1.81, p > .05]. See Table 2 for descriptive statistics.

Table 2. Descriptive statistics for attitudes towards biometrics as a function of ethnicity

<table>
<thead>
<tr>
<th></th>
<th>African American (N=55) Mean (SD)</th>
<th>European American (N=109) Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude</td>
<td>28.49 (6.43)</td>
<td>28.08 (6.93)</td>
</tr>
<tr>
<td>Security</td>
<td>27.20 (6.35)</td>
<td>26.49 (5.22)</td>
</tr>
<tr>
<td>Intrusiveness</td>
<td>24.75 (7.16)</td>
<td>22.61 (7.14)</td>
</tr>
</tbody>
</table>
5.6 Differences in Attitudes as a Function of Age

In order to explore the links between personality traits and attitudes towards biometric technologies, we used correlations between scores on three scales of attitudes (i.e., comfort, security, and intrusiveness) and age of participants. Age was not related to how comfortable participants were with biometrics (r = .03, p>.05), how secure they thought these technologies were (r = -0.03, p>.05), or how intrusive they thought these technologies were (r =-0.13, p>.05).

5.7 Differences in Attitudes related to Personality

In order to explore the links between personality traits and attitudes towards biometric technologies, we used correlations between scores on three scales of attitudes (i.e., comfort, security, and intrusiveness) and scores representing five dimensions of personality (i.e., openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism). Attitudes towards biometrics were found to be not related to personality traits. Individuals who had more positive attitudes towards biometrics had higher scores regarding how secure they thought these technologies were, and lower scores regarding how intrusive they thought these technologies were. See Table 3 for details.

<table>
<thead>
<tr>
<th>Attitude</th>
<th>Security</th>
<th>Intrusiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comfort</td>
<td>.58**</td>
<td></td>
</tr>
<tr>
<td>Security</td>
<td>-.14*</td>
<td>.03</td>
</tr>
<tr>
<td>Intrusiveness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extraversion</td>
<td>.08</td>
<td>-.11</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>.10</td>
<td>.10</td>
</tr>
<tr>
<td>Contentiousness</td>
<td>.04</td>
<td>.11</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>-.10</td>
<td>-.13</td>
</tr>
<tr>
<td>Openness</td>
<td>.02</td>
<td>-.10</td>
</tr>
</tbody>
</table>

* p ≤ .05, ** p ≤ .001, N= 184

To assess privacy concerns about biometrics, one of the survey questions asked participants how trustworthy they thought different public and private institutions were for keeping biometric data private. Business organizations were regarded as the least trustworthy in this respect (only 16% appeared to have confidence in them), while government institutions appeared to enjoy the most confidence. The fact that no more than 57% appeared to trust the government may be a reflection of the underlying deep-rooted concern people have in general about the protection of their privacy by organizations.

6. CONCLUSION

Based on their age, gender, ethnicity and personality, we found no significant differences in the survey participants’ perception of the comfort, security and intrusiveness of biometric technology. Opinions varied on the acceptability of individual types of biometrics, but overall, the participants appeared to be more cognizant of this technology, and have a more positive attitude towards it than previously reported. There does appear to exist a significant level of concern regarding the maintenance of biometric data confidentiality by institutions storing such data.

The investigation described in this report used a survey involving male and female subjects who were relatively young. They were graduate or undergraduates university students, and had a mixed background in terms of ethnicity and areas of education (more than 20 different fields). The sample size was bigger than any of the previous studies we had come across. Despite these facts, the subjects are not representative of the population at large in three respects: the distribution of age, levels of education and occupation. As such, the results of this study should be regarded as somewhat limited in its scope, even though many, if not all, of what it highlights as user perception may be indicative of more recent public opinion at large. A more
detailed analysis of the data involving clustering is planned to discover any underlying patterns in users’ attitudes based on their personal attributes.

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E-GOVERNMENT FUNDAMENTALS

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ABSTRACT
Effective e-government is becoming an important aim for many governments around the world. Within this context this paper aims to review and reorganize the previous work about e-government such as: e-government definition, types, advantages and barriers to e-government. It provides essential background knowledge to the research subject, as well as highlighting the main concepts of e-government.

KEYWORDS
E-government, Fundamentals, Types, Advantages, Barriers.

1. INTRODUCTION

Information and Communication Technology (ICT) is one of the most important characteristics of our age and every new development changes our lives to some extent. Its evolution has dramatically changed how citizens interact with their government, creating an important development in their expectations (Dodd, 2000). Following e-commerce’s evolution in the private sector, electronic government (e-government) seems to be the next generation of the development in the public sector. More and more governments around the world are introducing e-government as a means of reducing costs, improving services for citizens and increasing effectiveness and efficiency at national, regional and local levels of the public sector. 179 out of 192 UN members reported that they developed strategies to implement e-government systems and therefore e-government has been identified as one of the top priorities for governments across the world (UN, 2008). The main concepts of e-government will be discussed in following sections.

2. E-GOVERNMENT DEFINITION

E-government is also known by different terms such as Electronic Government, Electronic Governance, Digital Government, Online Government, e-Gov etc. (Grönlund, 2004, p. 1). In fact, there are many definitions for the term e-Government and differences reflect the priorities in the government strategies. Fang (2002) defined e-government as a way for governments to use the most innovative information and communication technologies, particularly web-based Internet applications, to provide citizens and businesses with more convenient access to government information and services, to improve the quality of the services and to provide greater opportunities to participate in democratic institutions and processes (2002, 1). Moreover, the term “e-government”, as used by the OECD E-government Project, applies to the use of ICT as a tool to achieve better government. Therefore, e-Government is not about business as usual, but should instead focus on using ICT to transform the structures, operations and, most importantly, the culture of government. The OECD report highlights that e-government is an important component in terms of overall reform agendas because it serves as a tool for reform; renews interest in public management reform; highlights internal consistencies; and underscores commitment to good governance objectives (OECD, 2003). World Bank, (2001) define E-government as the government owned or operated systems of information and communication technologies that transform relations with citizens, the private sector and/or other government agencies so as to promote citizens’ empowerment, improve service delivery, strengthen accountability, increase transparency, or improve government efficiency (Ndou, 2004).
3. TYPES OF E-GOVERNMENT

E-government offers services to those within its authority to transact electronically with the government. These services differ according to users’ needs, and this diversity has given rise to the development of different type of e-government. E-government functions can be classified into four main categories.

3.1 Government-to-citizen (G2C)

The majority of government services come under this application, towards providing citizens and others with comprehensive electronic resources to respond to individuals’ routine concerns and government transactions. Government and citizens will continuously communicate when implementing e-government, thus supporting accountability, democracy and improvements to public services. The primary goal of e-government, is to serve the citizen and facilitate citizen interaction with government by making public information more accessible through the use of websites, as well as reducing the time and cost to conduct a transaction (Ndou, 2004). In applying the idea of G2C, customers have instant and convenient access to government information and services from everywhere anytime, via the use of multiple channels. In addition to making certain transactions, such as certifications, paying governmental fees, and applying for benefits, the ability of G2C initiatives to overcome possible time and geographic barriers may connect citizens who may not otherwise come into contact with one another and may in turn facilitate and increase citizen participation in government (Seifert, 2003).

3.2 Government-to-business (G2B)

Government to business, or G2B, is the second major type of e-government category. G2B can bring significant efficiencies to both governments and businesses. G2B include various services exchanged between government and the business sectors, including distribution of policies, memos, rules and regulations. Business services offered include obtaining current business information, new regulations, downloading application forms, lodging taxes, renewing licenses, registering businesses, obtaining permits, and many others. The services offered through G2B transactions also play a significant role in business development, specifically the development of small and medium enterprises (Pascual, 2003). Fang (2002) argued that G2B applications actively drive e-transaction initiatives such as e-procurement and the development of an electronic marketplace for government purchases; and carry out government procurement tenders through electronic means for exchange of information and goods. This system benefits government from business’ online experiences in areas such as e-marketing strategies. The government-to-business G2B is as useful as the G2C system, enhancing the efficiency and quality of communication and transactions with business also, it increase the equality and transparency of government contracting and projects (Moon, 2003).

3.3 Government-to-government (G2G)

This refers to the online communications between government organizations, departments and agencies based on a super-government database. Moreover, it refers to the relationship between government and its employees as outlined below. The efficiency and efficacy of processes are enhanced by the use of online communication and cooperation which allows for the sharing of databases and resources and the fusion of skills and capabilities. It renders information regarding compensation and benefit policies, training and learning opportunities, and civil rights laws in a readily accessible manner (Ndou, 2004). The vital aim of G2G development is to enhance and improve inter-government organizational processes by streamlining cooperation and coordination. On another G2G front, the use of information technologies by different governmental agencies to share or centralize information, or to automate and streamline intergovernmental business processes such as regulatory compliance, has produced numerous instances of time and cost savings and service enhancements (Gregory, 2007).
3.4. Government-to-employee (G2E)

Government to employee is the least sector of e-government in much e-government research. Some researchers consider it as an internal part of G2G sector and others deal with it as a separate sector of e-government (Riley, 2001). G2E refers to the relationship between government and its employees only. The purpose of this relationship is to serve employees and offer some online services such as applying online for an annual leave, checking the balance of leave, and reviewing salary payment records, among other things (Seifert, 2003). It is a combination of information and services offered by government institutions to their employees to interact with each other and their management. G2E is a successful way to provide e-learning, bring employees together and to encourage knowledge sharing among them. It gives employees the possibility of accessing relevant information regarding compensation and benefit policies, training and learning opportunities, and allowing them access to manage their benefits online with an easy and fast communication model. G2E also includes strategic and tactical mechanisms for encouraging the implementation of government goals and programs as well as human resource management, budgeting and dealing with citizens (Ndou, 2004).

4. BENEFITS OF E-GOVERNMENT

The adoption and use of the e-government strategy can provide significant benefits for government in the delivery of more effective and efficient information and services to all e-government sectors. It enables government agencies to align their efforts as needed to improve service and reduce operating costs (Ndou, 2004). OECD (2006) thoroughly examined e-government initiatives in its members’ countries and listed the advantages of e-government as: improving efficiency in processing large quantities of data; improving services through better understanding of users’ requirements, thus aiming for seamless online services; helping achieve specific policy outcomes by enabling stakeholders to share information and ideas; assisting government economic policy objectives by promoting productivity gains inherent in ICT and e-commerce; contributing to governments’ reform by improving transparency, facilitating information sharing and highlighting internal inconsistencies; and helping build trust between governments and their citizens, an essential factor in good governance by using internet-based strategies to involve citizens in the policy process, illustrating government transparency and accountability.

E-government has potential for stronger institutional capacity building, for better service delivery to citizens and business, for reducing corruption by increasing transparency and social control (United Nations Division for Public Economics and Public Administration, 2001, p. 5). A study by the Intergovernmental Advisory Board (2003, p. 1) “High Payoff in Electronic Government: Measuring the Return on e-Government Investments” recommends that any successful e-government program should address at least one of the following areas: financial – reduced costs of government operations with enhanced revenue collection; economic development; reduced redundancy - consolidating and integrating government systems; fostering democratic principles; and improved service to citizens and other constituencies.

Deloitte Research study (2003) states that the strategic application of IT mainly e-government has the potential to radically reduce the amount of time, money and effort that businesses and citizens must spend to comply with rules and regulations. It might do so in many ways: providing information in one easy-to-access location; simplifying delivery of services to citizens; improved interactions among government units and with business, industry and citizens; improved productivity (and efficiency) of government agencies; simplifying and streamlining reporting requirements; reducing the number of forms; making it possible for citizens, businesses, other levels of government and government employees to easily find information and get service from the government and government agencies; making transactions (paying fees, obtaining permits) easier; and more effective, cheaper and more convenient delivery of information, knowledge and services. Seifert & Bonham (2003) point out that implementation of e-government not only saves resources, but it can also significantly increase service levels by reducing time spent in bureaucracy. The desire to provide new and improved services has a tendency to concentrate more on improving the citizen’s experience interacting with the government when seeking out information or trying to obtain various services. The evolution of e-government and technology creates the potential for new services to emerge, which contributes to improved service quality.
5. BARRIERS OF E-GOVERNMENT IMPLEMENTATION

There are several challenges that can delay progress towards realizing the promise of e-government. The variety and complexity of e-government initiatives implies the existence of a wide range of challenges and barriers to its implementation and management. This section will briefly introduce the most important and common challenges and barriers as follows.

5.1 ICT Infrastructure

The implementation of e-government initiatives face some technological difficulties such as lack of shared standards and compatible infrastructure among departments and agencies. ICT infrastructure is recognized to be one of the main challenges for e-government. Internetworking is required to enable appropriate sharing of information and open up new channels for communication and delivery of new services (Ndou, 2004). For a transition to electronic government, an architecture providing a uniform guiding set of principles, models and standards, is needed. Sharma & Gupta (2003) point out that implementation of the whole e-government framework requires a strong technology infrastructure. In order to deliver e-government services, government must therefore develop an effective telecommunication infrastructure. In addition, they stated that successful e-government implementation would depend upon how the capacities of various infrastructures are structured and how they are capitalized with an integrated focus.

5.2 Privacy

Privacy and security are critical obstacles in implementation of e-government in citizen concern (OECD, 2003). Privacy refers to the guarantee of an appropriate level of protection regarding information attributed to an individual (Basu, 2004). Government has an obligation to ensure citizens’ rights regarding privacy, processing and collecting personal data for legitimate purposes only (Sharma & Gupta, 2003). Concerns about website tracking, information sharing, and the disclosure or mishandling of private information are universally frequent. There is also the concern that e-government itself will be used to monitor citizens and invade their privacy. Seifert (2003) emphasized that e-government should be approached with an eye toward the protection of individual privacy. Both technical and policy responses may be required when addressing the privacy issue in an e-government context. In addition, there is a need to respond effectively to privacy issues in networks in order to increase citizen confidence in the use of e-government services. Citizen confidence in the privacy and careful handling of any personal information shared with governmental organizations is essential to e-government applications. Basu (2004) mentioned that in developing countries, many people are so concerned with privacy and confidentiality issues they decide to forego e-government opportunities. A comprehensive privacy policy should specify citizens’ rights to privacy and mandate that personal data be collected and processed only for legitimate purposes (Teeter & Hart, 2003).

5.3 Security

Security of an information system means protection of information and systems against accidental or intentional disclosure to unauthorized access, or unauthorized modifications or destruction (Layton, 2007). It refers to protection of the information architecture including network, hardware and software assets and the control of access to the information itself (Basu, 2004). Furthermore, Seifert (2003) points out that information security, referred to as cyber security or computer security, is an important e-government challenge as it is a vital component in the trust relationship between citizens and government. Thus, security policies and standards that meet citizen expectations are an important step toward addressing these concerns (Sharma & Gupta, 2003). Security can be classified into two elements: network security and documents security. It should include maintenance and e-infrastructure protection in the form of firewalls and limits on those who have access to data. Furthermore, the use of security technology, including digital signatures and encryption, to protect user IDs, passwords, credit card numbers, bank account numbers, and other such data being transmitted over the Internet and stored electronically is essential to fulfilling security goals in e-government applications (Feng, 2003). People need to be educated on the importance of security measures,
such as private passwords, to ensure their own protection. Cohen & Emicke (2002) point out that while security will remain an obstacle to e-government, it will not extensively affect its progress as the public learns to work with and accept its occasional lapses. Also, they mentioned three keys that affect the success of security. The first involves continuous improvement and upgrades in an attempt to stay ahead of criminals. The second is that security be visible and foreboding to deter would be criminals. Finally, it must be accepted that no security system is perfect and that all can eventually be overcome. However, governmental organizations, being responsible for the collection, maintenance, and distribution of sensitive or confidential information, should consider methods of providing security for collected information as well as for their web sites. Thus, a body of security professionals should be setup to respond to threats and breaches. Also the need for authority and an infrastructure encryption system has to be given top-priority (Feng, 2003).

5.4 Policy and Regulation Issues

Feng (2003) points out that e-government is not a technical issue, but rather an organizational issue. Implementation of e-government principles and functions requires a range of new rules, policies, laws and governmental changes to address electronic activities including electronic archiving, electronic signatures, transmission of information, data protection, computer crime, intellectual property rights and copyright issues. Dealing with e-government means signing a contract or a digital agreement, which has to be protected and recognized by a formalized law, which protect and secure these kinds of activities or processes. In many countries, e-business and e-government laws are not yet available. Establishing protections and legal reforms will be needed to ensure, among other things, the privacy, security and legal recognition of electronic interactions and electronic signatures (Caldow, 1999). The effort must incorporate a holistic view, one that is not just focused on technology. Legal reforms and new policy directives may have to be adopted before the online world can function smoothly. Archaic laws, old regulatory regimes, overlapping and conflicting authorities can all greatly complicate or altogether halt a project.

5.5 Lack of Qualified Personnel and Training

Another major challenge of an e-government initiative can be the lack of ICT skills. This is a particular problem in developing countries, where the constant lack of qualified staff and inadequate human resources training has been a problem for years (UNPA&ASPA, 2001). The availability of appropriate skills is essential for successful e-government implementation. E-government requires human capacities: technological, commercial and management. Technical skills for implementation, maintenance, designing and installation of ICT infrastructure, as well as skills for using and managing online processes, functions and customers, are compulsory. To address human capital development issues, knowledge management initiatives are required focusing on staff training in order to create and develop the basic skills for e-government usage. Ongoing access to training is a fundamental prerequisite as the rate of change increases and new technologies, practices and competitive models appear. The full economic benefits of ICT depends on a process of training and learning skills, this is universal for all governments (OECD, 2003).

5.6 Lack Partnership and Collaboration

Collaboration and cooperation at local, regional and national levels, as well as between public and private organizations, are important elements in the e-government development process. However, collaboration and cooperation are not easy factor to achieve. Governments often exhibit considerable resistance to open and transparent systems as they try to preserve their authority, power and hierarchical status (Nodu, 2004). Citizens distrust their governments, especially where there has been a history of dictatorship, political instability or large-scale corruption. To ensure that the public and stakeholders will be partners in the e-government effort, it is important to try to build trust in government (Carvin, 2004). Collaboration between the private and public sectors is needed too, in order to provide resources, skills and capabilities that the government may lack. A ‘new’ development model is emerging that focuses on partnership among stakeholders in the knowledge-based development program. Government should play the role of facilitator and encourage the private sector to participate in e-government development and implementation (Nodu, 2004).
5.7 Digital Divide

The ability to use computers and the Internet has become a crucial success factor in e-government implementation, and the lack of such skills may lead to marginalization or even social exclusion (UNPA & ASPA, 2001). The digital divide refers to the gap in opportunity between those who have access to the Internet and those who do not. Those who do not have access to the Internet will be unable to benefit from online services (OECD, 2003). In the case of the digital divide, not all citizens currently have equal access to computers and Internet, whether due to a lack of financial resources, necessary skills, or other reasons. In fact, computer literacy is required for people to be able to take advantage of e-government applications. Government should train its employees and citizens in basic skills of dealing with the computer and Internet in order to let them participate in e-government development applications. In addition, Smith (2002) points out that making computer available in public locations, such as grocery stores, post offices, libraries, and shopping malls, may help in addressing the gap between those households that have access to the Internet and data services and those who do not. Feng (2003) mentioned that the lack of Internet access among certain sections of the population was considered the most important barrier to e-government development. Indeed, this lack of access among vulnerable or low-income citizens prevents them from being able to make use of those services provided specifically to them. UN (2008) survey found that an increasing in digital divide in developing countries increases the cost of technical barriers in launching and sustaining e-government services.

5.8 Culture

Some barriers to the implementation of e-government are not technical, but the cultural implications of new technologies. Personal characteristics and subjective conditions are more likely to be influenced by cultural factors than are the objective conditions surrounding the development and diffusion of new technology (DeLisi, 1990). Cultural norms and individual behaviour patterns play a role in how citizens and policy makers use technology. Because culture plays a significant role in an individual’s outlook, many people resist change and adopt new technologies slowly and with great deliberation (Feng, 2003). Hackney & Jones (2002) identified that improving working relationships between internal departments and external agencies, and adopting a corporate approach as keys to successful e-government. To achieve this, it was felt that major cultural changes are necessary. Organizational development should be included in the implementation process so that internal cultural changes are accommodated. Chang (2002) states that culture can be determined by several factors: social structure, religion, language, education, economic philosophy and political philosophy. Technical enhancements are not only structural changes, but also cultural changes. These cultural changes, though not as easily tangible, must receive at least as much planning so that technical change is implemented successfully.

5.9 Leaders and Management Support

The literature shows that without support from the top management, an innovation is less likely to be adopted. Thus, e-government implementation needs the support from the highest level of government for successful implementation. Top management support refers to the commitment from top management to provide a positive environment that encourages participation in e-government applications. Therefore, it plays a significant role in the adoption and implementation of e-government (Akbulut, 2003). Leadership involvement and clear lines of accountability for making management improvements are required in order to overcome the natural resistance to organizational change, to gather the resources necessary for improving management, and to build and maintain the organization-wide commitment to new methods of conducting government (McClure, 2001). The involvement of high-level leadership, as well as an integrated vision of IT, is vital to vertical e-government planning, the acquisition of necessary resources, the motivation of officials, the support of dealings with external partners and stakeholders, to interagency and ministry co-ordination. As can be observed in transitional democracies and developing countries, political leadership and an integrated vision of IT are what drive the development of e-government. Leaders who perceive a potential gain from the promotion of e-government are more likely to support such initiatives, even in the face of obstacles, while those who believe that they stand to lose from the implementation of e-government cannot be counted on for
sustained support (Seifert & Bonham, 2003). Therefore, government needs to educate the upcoming ranks of
government leaders, managers and administrators in planning and managing ICTs across all public sectors,
focusing on access opportunity, economic development, and effective delivery of public information and
services (OECD, 2003).

6. CONCLUSION

E-government has the potential to greatly improve how government operates internally and how it serves its
customers. E-government is much more than a tool for improving cost-quality ratios in public services. It is
an instrument of reform and a tool to transform government. Thus, e-Government is not primarily about
automation of existing procedures (which may or may not be effective), but about changing the way in which
government conducts business and delivers services (The World Bank, 2005). This paper examined the
literature to define and illustrate the types, stages, advantages and barriers of e-government. It is clear that e-
government has many advantages to offer to all sectors of government. However, many critical issues face
the implementation of e-government, some of which are non-technical in nature with wide impact and require
comprehensive planning. The findings in this paper indicate that it is important to conduct deep research into
obstacles facing e-government implementation and understand the relationship between these barriers in
order to offer some solution to overcome them. More research will be conducted on e-government
implementation stage models to investigate what is required for governments to apply stages incrementally in
each separate department, and how governments might apply them to the whole organization as one project.

7. FUTURE WORK

The outcome of this paper indicates that it is important to conduct deep research into obstacles facing e-
government implementation and understand the relationship between these barriers in order to offer some
solution to overcome these challenges. More research could be conducted on e-government implementation
stage models to investigate if the government can apply all the stages in every single department, or whether
government have to apply it to the whole organization as one project.

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ABSTRACT

The potential use of Information Communications Tools (ICTs) to help immigrants to solve their needs and problems is presented. Different methods, such as literature review, website analysis, interviews, and questionnaire were associated to find what kind of needs of services the immigrants have, and then, what the priority each service has for the community of immigrants living in Brazil. The results pointed out by this article are shown as challenges as well as research opportunities aiming at the efficient use of technological resources. Based on our findings, some technological themes are suggested that can act as critical components concerning the vulnerable situation of immigrants.

KEYWORDS

ICT, immigrant, minority, inclusion, user’s requirements.

1. INTRODUCTION

Contemporary societies are being influenced by a continuous mass of people arriving/departing from/for new places, looking for new life conditions or, in many cases, trying to find conditions to keep living. The target territory can count on workers, force to develop the economy local economy, and new genetic and cultural features to improve its own pure attributes. Yet, the flow of immigrants can cause some dilemmas and raise conflicts between different cultures, behaviors, social patterns, beliefs and institutions (Lee and Calvin 2006). Some citizens, or even some society segments, would question the relevance of opening the boundaries for foreigners. As a rule, human beings tend to strengthen the unfavorable conditions and, as a consequence, the immigrant community has its basic civil rights confiscated; in many circumstances, they are regarded as second level individuals, are excluded from the social decision process and treated with suspicion and mistrust (IOM 2008).

These elements per se qualify the immigrant community as a minority group. As defined by Wikipedia, “minority is a sociological group that does not constitute a politically dominant voting majority of the total population of a given society” (Wikipedia 2010). A sociological minority is not necessarily a numerical minority - it may include any group that is subnormal with respect to a dominant group in terms of social status, education, employment, wealth and political power. In the case of immigrants, their vulnerable situation make them susceptible to physical and emotional injury, without access to appropriate health and education services, and having their rights disrespected – even though these rights are granted and guaranteed by international conventions and agreements.

During the last years, the Computing community has devoted more efforts to researches that involve the use of technology to change the social scenario. Social divide is one of these social problems, and it is configured in several perspectives, for instance: economic, educational, cultural and technological. Focusing specifically on the technological context, Digital Divide is defined as a barrier for certain minorities “from receiving adequate access to the wide variety of resources offered by computer technology” (Kim 2005). This
influenced some contemporary actions concerned on how to mitigate Social and Digital Divide (Stuart, Mack et al. 2003).

As happens to other minorities (Neo, Goh et al. 2007; Takagi, Saito et al. 2007; Freire, Russo et al. 2008), Information and Communication Technologies (ICTs) can play a crucial role in order to modify the inevitable fate, or predestination, of the immigrant community. The main objective of this paper is to identify the particular needs of the immigrant considering general facilities – such as communication, job announcements, city maps etc. –, and public services – such as legal issues, health and education services, required documentation, transportation etc. These needs are then assumed as challenges for future research agenda. Then, this research analyzes and discusses the main features and advantages of some ICTs for the purpose of the immigrants, and how to employ ICTs to the benefit of this community.

To achieve the presented objective, firstly, we produced a deep bibliographic research; secondly, we undertook a qualitative study of the immigrant community in a large metropolitan city in Brazil. The study involved individuals who were currently immigrants, as well as professionals that work directly with the immigrant community.

The outline of this paper is as follows: Section 2 describes the methodology used in this study, the experiments performed and the results; Section 3 discusses how ICTs can accomplish the immigrants’ necessities; and finally Section 4 concludes this article.

2. METHODOLOGY

A multiple experiment study approach (Bitektine 2008), both qualitative and quantitative methods, was used in this study to identify and explore the immigrant community that lives in Brazil general needs that could be supplied by ICTs initiatives. Specifically, the methodology for this study consisted of four steps: 1) Study of term’s definitions and main concepts connected to the immigration subject, 2) Identification of services that other countries offer for immigrants, 3) Discussion with professionals, researchers and specialists engaged in immigration programs and actions about the feasibility of the identified services to the immigrant’s community in Brazil, and 4) Confrontation of the set of identified services with the needs of individual who are members of the immigrant’s community in Brazil.

Following is a brief description of each component of the methodology employed in this study.

2.1 Immigration and Immigrants

Globalization and the Knowledge Society are considered fundamental changes in the current social arrangement. Nations conceive information, trade and politics in a broader manner, which means, in a wider scope, considering aspects that take place outside their boundaries (Cogburn 2003). It is patent that the first concern in this area is about the economic interdependence and the deepening integration of countries. Although these issues on globalization are valid, numerous other complex interactions are defining our historic period. Besides exchanging products, technology and knowledge, nations interchange people. This assumption gives rise to social, political, economic, technological and cultural implications.

Immigration refers to the movement of people between countries. While the movement of people has existed throughout human history at various levels, modern immigration implies long-term, legal, permanent residence. For this reason, short-term visitors and tourists are considered non-immigrants. Seasonal labor migration, while generally non-permanent in nature - typically for periods of less than a year -, is often treated as a form of immigration. Also refugees are considered immigrants. The arguments to make someone to move to another country can help to define the profile of the immigrant:

- **General arguments**: free labor market, and cultural arguments appealing to the value of cultural diversity. Some countries also support immigration as a way to raise small population numbers, as in New Zealand and Canada, or, in Europe, to reverse demographic aging trends. Also, other issues are pointed such as healthcare reasons, academic achievement, economic development, and environmental safety;
- **Economic arguments**: some individuals leave their native countries due to economic crisis and the difficulty in finding a job. Also, well-qualified professionals look for better salaries and better work conditions;
• Political, religious and/or social fear: a refugee migrates owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, belonging to a particular social group, or political segment, according to all the 1951 United Nations Convention Relating to the Status of Refugees (UnitedNations-UN 1951).

During the last centuries, immigration has been seen as an actual plague, as a problem that most countries have to deal with, and even as a contentious issue in election campaigns (Limbajee 2005). Nations, such as France, England and Italy, have treated this issue with high priority actions: elaborating new laws, principles and specific norms. Nationalist conflicts and urban battles have exposed the disharmony and incompatible ideas and interests that exist between the local community and the immigrant’s community. As a natural consequence, with racial and ethnic diversity there are also differences in terms of gender roles, socioeconomic status, educational achievements, and age groups that make the immigrant situation still more complex.

Moreover, these pressure points reveal that the whole society has to solve this question in a wide perspective, trying to (1) perceive the high existing diversity of the immigrant community, (2) pursue the integration of its members, and (3) recognize the real importance of the immigrants as fundamental components of the social and cultural complex composition, and as key sector workers.

Immigration across national borders in a way that violates the immigration laws of the destination country is termed illegal immigration. Under this definition, an illegal immigrant is a foreigner who either illegally crossed an international political border, be it by land, water, or air, or a foreigner who legally entered a country but nevertheless over stays his/her visa in order to live and/or work therein.

In general, immigrants have to struggle with common stereotyping (Li and Teixeira 2007; Rumbaut and Ewing 2007). For instance, some host country citizens regard immigrants as the main reason for high criminal rates and accuse immigrants of draining their national resources - using and taking the benefits of the public services. Yet some scientific evidences state the contrary: for instance, cities with large immigrant populations such as Los Angeles, New York, Chicago, and Miami have experienced declining crime rates while the immigrant population rises.

Historically, immigrants have tended to be seen as able-bodied, poorly-educated and low-skill laborers migrating from less-developed countries in the hope of making a living in the destination countries, while sending money back to their family in their home countries. Traditional international migration is considered to be a combination of “push” factors from countries of origin - including economic desperation, political or religious persecution, and/or population pressure - and “pull” factors from destination countries - including economic opportunities and/or political or religious freedom. It should be noted that there is sometimes a “circular” dimension to this process in that immigrants often send remittances home to support their families and communities; with some period of alternation between origin and destination countries during their lifetime and/or eventually retiring in their countries of origin (Li and Teixeira 2007).

However, contemporary globalization and economic development have increasingly transformed these traditional distinctions between emigrant-sending/immigrant-receiving countries (Hugo 2006). In some cases, traditional emigrant-sending countries have transformed into immigrant-receiving countries as the result of domestically accelerated economic development and decreasing population natural growth, as in some Southern European countries including Italy (Mudu 2007). In other cases, traditional immigrant-receiving countries have also evolved into emigrant-sending countries, creating new diasporas across the world as in the case of Israel (Cohen 2007) or New Zealand. In still other variations, some developing countries have positioned themselves in terms of both sending emigrants and receiving immigrants - sometimes former expatriates - in large numbers, as in the cases of both Brazil and India (OECD 2003).

Many developing countries have experienced rapid economic growth in recent decades, transforming their economies from agricultural into manufacturing and capital-intensive industries, and even into knowledge-based economies. These countries have similarly modernized their education systems through domestic growth and/or international exchange (Cheng and Liu 1994). As a result of these processes, these countries are producing increasingly large numbers of capitalists, small entrepreneurs, and well-educated middle class professionals. In some countries, these populations cannot be fully absorbed by the domestic economy.

This trend suggests that contemporary international migration has become much more complex than in earlier periods of history, and that immigrant profiles have been increasingly diversified. As a result, there is a divergence of immigrant profiles and migration destinations even among migrants from the same country.
These dramatic changes pose opportunities as well as challenges for all countries involved in this global circulation of population.

Two of the key changes in contemporary policies and practices in international immigration are: 1) from assimilation to integration; and 2) assimilation versus transnational connections. Traditionally, immigration was assumed to be a unidirectional process: upon arriving in destination countries immigrants were supposed to move upward socio-economically and move out of their neighborhoods while being assimilated into mainstream society. Traditional immigrant receiving countries, such as Australia and Canada, have officially adopted “Multiculturalism” as a national policy, to allow for the preservation of immigrant, minority and indigenous cultures.

Relationships and trust between distinct groups and cultures do not develop overnight, and, while many scholars have advocated multi-racial/multi-ethnic coalitions and alliances as a powerful strategy to prepare for the future (Lee and Calvin 2006), few have identified and described the resources required to support such collaboration.

2.2 Identifying Services Provided to Immigrants in Different Countries

After producing the literature review about immigration and related concepts, we searched the Web for official websites specifically conceived for helping immigrants. As a rule, these websites should be developed and maintained by governmental departments. We have found some initiatives that obey these impositions. The following countries provide relevant electronic services for the immigrant community: Argentina, Australia, Brazil, Bulgaria, Canada, Chile, China, Finland, Hong Kong (in fact, a Chinese special region), Japan, Mexico, Romania, South Africa, Switzerland, United Kingdom, and USA.

When visiting these websites, we produced a list of significant services or features provided by each website, as shown in Table 1.

Rapidly, we could confirm that certain services/features appeared in two or more websites in a different frequency, depending on the national strategy adopted by the country concerning immigration. For instance, some countries – such as Canada – disseminates information about getting a job, while other countries emphasize news related to the immigrant community. Sections about Legalization – living with legal documents – and Citizenship – becoming a target nation citizen – is the most frequent feature in the visited websites. Another widely found service is providing information about basic resources, such as education (76.5%), employment (76.5%), public transportation (35.3%), culture (29.4%), health (23.5%), and housing/accommodation (23.5%).

The support to different languages is a very important feature that must be considered when designing websites addressed to users that speak distinct languages (Nielsen 2005). A little more than half of the visited websites presented this feature (68.7%), but in the case of Argentina, Bulgaria, Mexico and Romania, only part of the website supported this feature and the foreign language was only English.

Half of the websites provided information and news related to the immigrant community. The Media Center feeds user with different formats of data – such as video, text and sound – that can be interesting for immigrants. Finally, the rarer category Aid/Assistance programs, which include governmental assistance for

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2 http://www.immi.gov.au
3 http://portal.mj.gov.br/data/Pages/MJ33FCEB63PTBRIE.htm
6 http://www.extranjeria.gov.cl
7 http://english.gov.cn/services.htm
8 http://www.migri.fi/netcomm/default.asp
9 http://www.immd.gov.hk/ehtml/home.htm
10 http://www.mofa.go.jp
11 http://www.inm.gob.mx
13 http://www.home-affairs.gov.za
15 http://www.ukba.homeoffice.gov.uk/ukresidency/
16 http://www.uscis.gov/portal/site/uscis
leaning the native language, immigration process, list of what to do before and after arriving in the target nation, and leisure.

Table 1. Services offered for immigrants in official websites

<table>
<thead>
<tr>
<th></th>
<th>Legalization (governmental assistance, native language course, leisure, list of what to do before/after arrival)</th>
<th>Aid/Assistance Programs</th>
<th>Citizenship</th>
<th>Media Center News</th>
<th>Multi-language content</th>
<th>Basic resources (public transport, health services, educational services)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Australia</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Brazil</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Canada</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Chile</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>China</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Finland</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Japan</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Mexico</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Romania</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>South Africa</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Switzerland</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>USA</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

This pattern-finding technique is largely used in Designing User Interfaces and Requirements Engineering domains (Golden 2009). Discovering services/features patterns can help since the first phases of the development of software applications – specially pointing out relevant requirements –, during the design and implementation, until the software evaluation.

2.3 The Point-Of-View of Professionals, Researchers and Specialists in the Immigration Area

In the third phase, we looked for people that were engaged with actions and researches in which immigration was the most important theme. We preferred contacting these professionals first rather than contact immigrant individuals mainly because finding and interviewing immigrants is a hard task. Most of them are afraid of exposure, obviously fearing problems with the immigration department, and even because they are shy to communicate. That is why, strategically, talking first to a professional can provide the opportunity of getting expertise about immigrants. This way, we could prepare ourselves to the further contact with our target-audience.

We interviewed 7 experienced individuals in the immigration arena: 2 governmental bureau staff, 1 psychologist, 2 language teachers, and 2 sociologists. In general, questions were about the way of life of immigrants, their needs, public services that are already available in Brazil for this community, and the current public policies adopted for immigrants.

Summarily, the main contributions of this professional about the scenario in Brazil are:
- All actions addressed to the immigration’s community must reflect the social, cultural and political values of the Brazilian society;
- All actions should lead to the resemblance, rather than the difference between immigrants and natives, or immigrants themselves;
- The main groups of immigrants living in Brazil are: Africans and South Americans;
Most of immigrants invite relatives and friends to also immigrate;
The main problems faced by immigrants are: legalization, health assistance, education (specially for their children);
Some practical problems: where to live, how to communicate, how to find a job, how to legalize documents, how to study, how to get health services;
There are some problems rising within the immigrant’s community, such as alcoholism, depression, mental disorders, etc.:
Most of the time, the government does not help immigrants in their first periods in Brazil. This kind of aid is supplied by friends, family, non-governmental organizations (NGOs), university, general-purpose associations, and churches;
Mostly, immigrants use lan-houses and free-access centers to access the Internet;
The immigrants community usually integrate their member in typical parties;
Immigrants use mobile phones (specially Africans), Internet, consulates and friends to get informed;
Most immigrants are not aware of their rights and duties.
Most immigrants prefer to continue living in Brazil;
This list that was elaborated with the perspective of different agents – sociologists, psychologists, teachers, and administrative workers. But it is interesting that all opinions lead to the need of providing more efficient ways of communication.

2.4 The Real Immigrants Needs

With the aspects gathered in the previous phases, we had enough elements to contact immigrants and to efficiently conduct and experiment with them. The objective of this phase was to confirm whether the needs signalized by the literature, official websites, and the opinion of professionals that work with immigration match the true demands of the immigrants living in Brazil.

A questionnaire containing 17 questions – each question with 5 alternatives - was elaborated and given to immigrants aimed at collecting information on the following areas:
- Use of ICTs;
- Communication habits;
- Requirements and needs.

Forty-eight volunteers (28 male and 20 female), coming from South America (34) and Africa (14) participated in the experiment. All of them were enrolled in the Portuguese course that is offered by the NGO Cibernarium. Most of them (90%) had already used computers.

Concerning to the use of ICT, the most popular communication tools were Internet (75%) and mobile phone (57%). Only 28% choose fixed phone as their preferred communication tool and 14% indicated television. An amount of 45% uses VoIP applications, such as Skype, and 77% had already used instant messaging services, such as MSN and ICQ.

When considering how they got informed, 70% indicated that the main way of getting informed was browsing the Web (blogs, chat, news portals, discussion groups, wikis, etc.). About keeping in touch with family and friends abroad, 68% had a profile in digital social networks (such as Facebook and Orkut), but 93.7% had already heard about these tools.

About immigrant’s requirements and needs, the volunteers answered that the most needed services/features were aid/assistance (89.7%), job (78%), health (67.4%) and legalization (65.9%). Other services/features had a minor appeal: education (34%), media center/news (18%) and security matters (12%).

To summarize, the results brought up by real immigrants confirmed the set of requirements pointed by the literature and professionals of the immigration subject. Moreover, this phase of the study indicated the priority that immigrants living in Brazil give to the subjects of their interest.

3. RESEARCH OPPORTUNITIES

We understand that social and policy interventions will have a greater impact for the immigrant’s community. More abundant assistance for getting a job, long-term programs to address education and health,
clear actions for legalization, and appropriate treatment for mental illnesses are all first-order problems that continue to demand creativity and leadership. We believe, however, that thoughtful technological interventions can be deployed as part of the larger effort to reduce problems faced by immigrants and help members of one of the minorities of our society.

The immigrant’s needs pointed in the previous sections can be seen as technological challenges and research opportunities. Different areas, such as Human-Computer Interfaces, Software Engineering, Artificial Intelligence, Networking, and others can work together to provide information and communication to the community of immigrants. There is no simple answer, but the analysis conducted shows that the following disciplines have a great potential to help the immigrants:

- Universal Access
- Digital social networking
- Urban computing
- Multilingual interfaces
- Multimodal interfaces
- Use of semiotic concepts to develop website interfaces

4. CONCLUSION

Immigration is getting more and more into the center of discussions in most nations. Our work is the first that we are aware of to take a systematic look at whether technologies might empower immigrants in their lives. Before contacting them, we made an extensive literature review, discovered patterns of services/features provided by official websites of other countries, and discussed with professionals and researchers that work on the immigration subject.

Through the results of the conducted experiments, we confirmed the needs of the community of immigrants that lives in Brazil. Based on these demands, we showed a number of themes in how technology could play an essential role to change the reality of this community. Our findings lead us to believe that there are opportunities for productive technological interventions in the lives of immigrants, such as universal access policies and strategies, use of digital social networking, distribution of computational resources related to urban computing discipline, development of multilingual and multimodal interfaces, as well as applying the semiotic concepts to develop website interfaces.

A deeper regard over these themes and the development of applications driven to immigrants are recommended as future works.

REFERENCES


BUSINESS MODEL CHANGE DUE TO ICT INTEGRATION: AN APPLICATION TO THE ENTERTAINMENT INDUSTRY

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ABSTRACT
This paper deals with the change of business models (BMs) due to Information and Communication Technologies (ICTs). Recent advances in ICTs have caused BM change to be indispensable in all businesses. This is even more essential in the industries, where there is a significant diffusion of ICTs, such as the entertainment and gaming industry. In the context of our analysis, we apply a specific methodology of managing BM change to Regency Casinos, i.e., the leader in the Greek gaming market. The case study shows that each step of this methodology fits to the business transformation plan of the company; hence it arises that the applied methodology, supplemented by a series of factors favoring scenarios for BM development, can be applied to an unstable business environment, as the environment of our study.

KEYWORDS
Business Model, Information and Communication Technologies, Reengineering

1. INTRODUCTION
The evolution of ICTs during the last decade has significantly altered the business landscape on a worldwide scale. The integration of ICTs in the business processes resulted in numerous examples of enhanced organizational performance both in developed and developing countries.

The International Development Association (IDA), which is the part of the World Bank that helps the world’s poorest countries, suggests that the growth in access to ICTs is boosting economic productivity, raising incomes of families and small businesses and providing an important source of government revenue (IDA, 2009). On an operational level, the World Bank (2006) implies that firms that use ICTs grow faster, invest more, and are more productive and profitable than those that do not. Furthermore, many studies conclude to a positive relationship between ICT use and superior performance (Baldwin and Sabourin, 2002). The positive effects of ICT integration brought up the issue of BM change for a number of companies that wanted to stay ahead of the competition. The transition to a new, more effective BM can only be achieved, if there is a sound understanding of the current BM. However, as discussed by Al-Debei et al (2008), understanding the BM domain by identifying its meaning, fundamental pillars, and its relevance to other business concepts is by no means complete. Furthermore, creating a radically new BM is a high risk strategy, as the probability of getting it right is acknowledged to be low (Kalakota and Robinson, 2001). As technology evolves and new solutions emerge in the business practices, the necessity of BM change becomes greater and companies are faced with the dilemma of change versus their traditional business architecture. Therefore, it is of great interest to study the effect of ICTs to BM transformation in all businesses and more specifically in the entertainment and gaming industry, where there is a significant diffusion of ICT tools during the last years.

This paper is presenting the basic concept of the BM while focusing more on the BM change process using as a case study a leading company that operates in the entertainment and gaming industry in Greece. It is divided into three main parts, the presentation of the BM theory, the management of models of change and the application of the theory to the case study of Regency Casinos.
2. RELATED WORK

2.1 The Concept of Business Model

The term “business model” appeared for the first time in an academic article in 1957 (Bellman et al) and it was first used in the title of an academic article in 1960 (Jones). It is more widely spread from the 1990’s onwards in an Internet context (Afuah and Tucci, 2001; Osterwalder, 2004). The BM term becomes even more popular and is used widely by academics, analysts, businessmen and journalists who interpret it widely and approach it from different angles, leading Rappa (2001) to conclude that it is perhaps the most discussed but least understood aspect on the Web.

Since 1998 there are approximately eighteen published definitions of BM, which focus on similar or different aspects of the BM. Timmers (1998), defined BM as an architecture for products, services and information flows, including: (i) a description of various business actors and their roles, (ii) a description of the potential benefits for the various business actors, and (iii) a description of sources of revenues. We will adopt the most comprehensive definition of Al-Debei et al (2008), who define the BM as “an abstract representation of an organization, be it conceptual, textual, and/or graphical, of all core interrelated architectural, co-operational and financial arrangements designed and developed by an organization presently and in the future, as well as all core products and/or services the organization offers, or will offer, based on these arrangements that are needed to achieve its strategic goals and objectives”.

2.2 Business Model Frameworks

A short literature review on BM theory shows that various authors have tried to describe and present the framework of a BM, mainly by decompressing it into separate model components (Hamel, 2000; Petrovic et al, 2001; Weill and Vitale, 2001; Alt and Zimmermann, 2001; Methlie, 2001; Linder and Cantrell, 2000; Osterwalder, 2004). The ontology approach of Osterwalder (2004) integrates all the important elements of a BM and is used in this study as an adequate representation of the developed theory on BMs (Table 1).

Table 1. Osterwalder’s business model design template: nine building blocks and their relationships

<table>
<thead>
<tr>
<th>Pillar</th>
<th>Building Block of Business Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product</td>
<td>Value Proposition</td>
<td>A Value Proposition is an overall view of a company’s bundle of products and services that are of value to the customer</td>
</tr>
<tr>
<td>Customer Interface</td>
<td>Target Customer</td>
<td>The Target Customer is a segment of customers a company wants to offer value to</td>
</tr>
<tr>
<td></td>
<td>Distribution Channel</td>
<td>A Distribution Channel is a means of getting in touch with the customer</td>
</tr>
<tr>
<td></td>
<td>Relationship</td>
<td>The Relationship describes the kind of link a company establishes between itself and the customer</td>
</tr>
<tr>
<td>Infrastructure Management</td>
<td>Value Configuration</td>
<td>The Value Configuration describes the arrangement of activities and resources that are necessary to create value for the customer</td>
</tr>
<tr>
<td></td>
<td>Capability</td>
<td>A Capability is the ability to execute a repeatable pattern of actions that is necessary in order to create value for the customer</td>
</tr>
<tr>
<td></td>
<td>Partnership</td>
<td>A Partnership is a voluntarily initiated cooperative agreement between two or more companies in order to create value for the customer</td>
</tr>
<tr>
<td>Financial Aspects</td>
<td>Cost Structure</td>
<td>The Cost Structure is the representation in money of all the means employed in the business model</td>
</tr>
<tr>
<td></td>
<td>Revenue Model</td>
<td>The Revenue Model describes the way a company makes money through a variety of revenue flows</td>
</tr>
</tbody>
</table>

Osterwalder’s conceptualization allows the organization to identify and describe its BM. It acts as a photo camera, giving the tool to the company to take a snapshot of its current operations. But as Linder and Cantrell (2000) suggest, BMs do eventually wear out. Given the increasing pace of ICT advances, leading companies should effectively manage BM change, which is the purpose of this paper.
2.3 ICT and Business Model Change

Having reviewed the theory on BMs, it is evident that understanding and communicating the architecture of the company is an essential task, yet sometimes it is proven insufficient in a turbulent and dynamic technological environment. As Gunzel and Wilker (2009) suggest, the BM is not static. Start-ups, as well as existing businesses must revise their BM over time to keep up with changing technology, market and regulatory conditions, etc. Existing literature mainly examines the BM and its components as a static representation of how the company creates and delivers value to its customers. However, the need to inter-relate ICT developments and BMs started to express through the work of Venkatraman (1994) and his “five levels of IT-enabled business transformation” model (Figure 1), and Poon and Swatman’s (1997) “Internet-to-internal applications systems integration” model (Figure 2).

![Figure 1. Venkatraman’s five levels of it-enabled business transformation](image1)

Venkatraman’s (1994) first approach to IT integration, examines the range of potential benefits in relation to the adoption of IT-enabled business transformation through a sequential five-stage process. This stretches from the evolutionary level of localized exploitation all the way to the revolutionary level of business scope redefinition.

Poon and Swatman’s (1997) work on adoption and exploitation of ICTs by small businesses produced a model, which was based on Venkatraman’s variables identifying the levels of Internet integration, starting from the inter-organizational level to the full benefits of full organizational integration. The authors however, suggest that the business transformation process starts with the inter-organizational dimension, rather with local exploitation. The suggested model is relevant but also limited as it focuses only on the effects of Internet integration to small businesses, while it does not present a specific BM change methodology.

![Figure 2. Poon and Swatman’s internet-to-internal applications systems integration](image2)

Linder and Cantrell (2000) identified that most BMs are under constant pressure to change. Innovations in technology, changes in the law, competitive moves, or shifts in consumer tastes can sap an operating model’s profitability. Based on empirical data they presented four basic types of change models: realization, renewal,
extension, and journey models (Table 2). They define a change model as “the core logic for how a firm will change over time to remain profitable in a dynamic environment”. However, their approach is rather generic and does not address specifically the issue of BM change due to ICT integration. Furthermore, there is no reference to the management of the change process, an issue discussed thoroughly by Pateli and Giaglis (2005).

Table 2. Linder and Cantrell’s basic types of change models

<table>
<thead>
<tr>
<th>Realization Models</th>
<th>Renewal Models</th>
<th>Extension Models</th>
<th>Journey Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brand maintenance</td>
<td>New service offerings</td>
<td>Backward integration</td>
<td>Commoditization: from product to price</td>
</tr>
<tr>
<td>Product line extensions</td>
<td>New brands</td>
<td>Forward integration</td>
<td>Globalization</td>
</tr>
<tr>
<td>Geographic expansion</td>
<td>Untouched markets</td>
<td>Horizontal integration</td>
<td>Avoiding commoditization: from product to solution</td>
</tr>
<tr>
<td>Penetration</td>
<td>New retailing formats</td>
<td></td>
<td>Up market in products: from price to speed and agility</td>
</tr>
<tr>
<td>Incremental product or service line expansion in one-stop shops</td>
<td>Disruptive new product or service platforms</td>
<td>Externalizing an internal capability</td>
<td>Up market in services: from price to brand or expertise</td>
</tr>
<tr>
<td>Additional sales or service channels</td>
<td>Roll up</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In their paper, Pateli and Giaglis (2005) proposed a stepwise methodology, which allows companies to design alternative scenarios for BM evolution or extension under the impact of technology innovation (Figure 3). Having identified the limitations of previous methodologies for BM change (Petrovic et al, 2001; Kulatilaka and Venkatraman, 2001; Pramataris et al, 2001), the authors constructed a 3 phase comprehensive methodology, which is supplemented by a series of factors favoring scenarios for BM development. The advantage of this methodology compared to other BM change models is that, it can be applied to unstable business environments as it incorporates scenario planning, which aims at reducing the level of risk in BM transformation. The first phase is a detailed documentation of the current business model. Tools, such as Osterwalder’s (2004) design template, can be used to provide a complete understanding of the operations and the relationship between the key elements comprising the BM. The second phase is decomposed into two different steps, the assessment of the influence of technology innovation and the identification of the missing roles. Those two factors are combined to identify the technology’s influence to the current BM. Change is completed in the third phase of the methodology, which comprises three distinct steps, defining scenarios, describing the new BMs and evaluating the impact of changes. However, Pateli and Giaglis (2004) admit that although the aforementioned steps define a well-grounded methodology for BM change under the impact of technology innovation, they are by no means sufficient on their own to guide the BM design effort. This is why they add a series of industry-related and firm-specific factors that help the company to assess scenarios more effectively (Table 3).

Table 3. Factors favoring scenarios for BM development

<table>
<thead>
<tr>
<th>Industry-Related Factors</th>
<th>Firm-Specific Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry structure</td>
<td>Strategic objectives</td>
</tr>
<tr>
<td>Balance between transaction costs and costs of internal development</td>
<td>Firm capabilities and assets</td>
</tr>
<tr>
<td>Type of players</td>
<td></td>
</tr>
</tbody>
</table>
The firm and industry’s unique characteristics are balanced carefully, helping the organization to choose the right scenario to evolve into its future BM. The methodology suggested by Pateli and Giaglis (2005) allows the company to identify its current BM, evaluate its ICT options, move safely to the realization of the new BM through scenario analysis, and evaluate the effectiveness of the new BM. As the authors suggest, its real value lies in the fact that it incorporates two novel features. First, the design of future BMs is based on the identification of a set of scenarios for alternative cooperation schemes among the involved parties and second, it includes a thorough analysis of the resulting BMs. The authors use as a real life case study, involving the commercialization of a mobile application, but it would be quite interesting to test if the theory can be applied to other industries as well, in our case the entertainment and gaming industry and more specifically to a land based casino.

3. THEORY APPLICATION TO A GAMING ORGANIZATION OPERATING IN THE ENTERTAINMENT INDUSTRY

Founded in 1994, Regency Entertainment S.A. focuses its business activity on the establishment, operation and management of casinos (Regency Casino Thessaloniki and Regency Casino Mont Parnes) and luxury hotel complexes (Hyatt Regency Thessaloniki). As leader in the Greek gaming market, Regency Entertainment has faced the challenge of incorporating ICTs in its operations, significantly evolving its BM. ICT advancements, such as the transition from analog to digital recording, the introduction of new processors in slot machines, the installation of the CasinoLink and TITO (Ticket in-Ticket out) systems, the introduction of the automatic card shufflers, the operation of automated touch bet roulettes, as well as other ICT developments, have gradually changed the organization’s BM to its current situation.

The transformation was based on rather operational than theoretical grounds, and under the light of Pateli and Giaglis (2005) suggested methodology, it would be useful to test if the theory applies to our selected case study. Owing to space limitations, we will use the example of the Slots Accounting System (SAS) protocol implementation, an automated system for reporting, event logging, player tracking, ticketing and cashless
A SAS networked slot machine, using the TITO system, prints out a bar-coded slip of paper, which can then either be redeemed for cash, or inserted for play into other TITO machines. The machines utilize a barcode scanner built into the bill acceptor, a thermal ticket printer in place of a coin hopper, and a network interface to communicate with a central system that tracks tickets.

3.1 Step 1: Document the Current BM

The first step would be to create a blueprint of current operations. Using a BM analysis framework, such as Osterwalder’s (2004) design template, would provide a clear picture of the current business environment. The identification of the key actors operating in the current BM could act as the basis for the forthcoming change. More specifically, regarding slots operations, the key actors were:

1. Slots attendants, who were attending the customers, carrying out hand pays, and making sure the slot machine operates optimally (hopper fills, etc.).
2. Slots supervisors, who would supervise and direct the attendants to carry out hand pays.
3. Cage staff, who exchanged tokens with cash and provided the cash for attendants’ hand pays.
4. Hard count department, who counted and prepared the rolls of tokens.
5. Security staff, who escorted the attendants for the hand pays.
6. Surveillance, who monitored the hand pays.
7. Customers, who had to interact with attendants for hand pays, or with the cage staff to exchange tokens with cash.

3.2 Step 2: Assess the Influence of Technology Innovation

This step aims at defining the benefits arising from the introduction of SAS and identifying the elements of the current BM which would be most affected by technology innovation (Table 4).

<table>
<thead>
<tr>
<th>Key Actors</th>
<th>SAS Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slot attendant</td>
<td>Reduced-eliminated hopper fills, simplified hand pays</td>
</tr>
<tr>
<td>Slot supervisor</td>
<td>Enhanced reporting through central accounting system</td>
</tr>
<tr>
<td>Cage staff</td>
<td>Less workload, no tokens buckets, ease of pay through bar-coded tickets and ATMs</td>
</tr>
<tr>
<td>Hard count dept</td>
<td>Withdrawal of tokens, elimination of the department</td>
</tr>
<tr>
<td>Security staff</td>
<td>Reduced escorting for hand pays</td>
</tr>
<tr>
<td>Surveillance</td>
<td>Reduced monitoring for hand pays</td>
</tr>
<tr>
<td>Customer</td>
<td>Increased play time with reduced wait time, resulting in greater player satisfaction. Ease of pay through ATMs</td>
</tr>
</tbody>
</table>

3.3 Step 3: Identify Missing Roles

If the organization planned to exploit the SAS technology, it would have to identify the missing roles in its operations. Those were:

- Hardware related, as the organization did not have the know-how of building a SAS system.
- Software related, as the organization could not develop the right application to support the hardware.
- Installation, configuration and maintenance issues.
- Operating issues and reporting, that would involve training from the system vendor.

All the above missing roles would have to be supplied by a new actor, either developed internally or through outsourcing.
3.4 Step 4: Define Scenarios

At this stage, the organization is called to define all possible scenarios for BM change, having already defined the emerged missing roles. One of the novelties of Pateli and Giagli’s model (2005) lies exactly in this phase. The organization minimizes the risk of a deficient BM change by simulating different scenarios, which are based on a combination of industry-related and firm-specific factors.

In our case, the market in which the redesigned BM would operate would still be oligopolistic and the costs of internal development of a SAS system would dramatically exceed the costs of outsourcing. The market is dominated by private organizations, which would probably mean low chances of long-term differentiation, as a competitive me-too strategy would wait just around the corner.

Regarding the firm-specific factors, the organization would follow a combination of a differentiation strategy through the provision of value-added services and a cost effective strategy through the reduction (or even elimination) of costs, as well as the reallocation of resources. Furthermore, the organization’s capabilities would allow the operation of advanced ICTs, if those were acquired by a partner.

Following the decision to outsource the SAS protocol to International Game Technology (IGT), two scenarios emerged. The first scenario would include the installation of the E-Z Pay system (TITO system described above) vs. the second scenario, which would use the Advanced Funds Transfer (AFT) technology, also known as cashless gaming, which is a secure technology incorporating players debit card accounts.

3.5 Step 5: Describe the New Business Models

Both alternative scenarios would lead to different configurations of the new BM. According to the proposed methodology, a detailed description of the emerging BMs would have to be given in terms of actors, their roles and responsibilities, the market scope, the relationship model, the revenue model, and the critical success factors (CSFs) for the BM implementation.

Since it was decided to outsource, a new actor entered the BM, in the form of a partner, leveling the cost factor for both scenarios. Nevertheless, the relationship between the organization and the new actor would have to be described analytically in the new BM construct. Both BMs are changing the role of the actors, enhancing the customers’ experience and creating important benefits for the organization. The main difference between the TITO and the AFT system is the number of cash transactions, as the cashless system introduces a debit card account offered to the customer, thus reducing the printouts and the use of physical cash notes. This fact, as well as the legislation, which allows the government to monitor the accounts on the AFT system, led to the selection of the TITO based BM.

3.6 Step 6: Evaluate the Impact of Changes

The impact of TITO implementation in the Greek market is difficult to measure, as it was only allowed by the Greek government in 2008 and Regency Casinos were the first (and only so far) to adopt it. Furthermore, the effect of the economic crisis can lead to misleading conclusions. Nevertheless, the fact is that Regency has changed its BM and all key actors are currently enjoying the benefits of ICT integration mentioned in Table 4, even though they are not yet quantified.

4. CONCLUSION

This research aimed at describing the change of BMs under the influence of ICT integration. Business practice has proved that there is a positive correlation between ICT integration and BM effectiveness, henceforth there is great interest on how new technologies contribute to BM transformation. A comprehensive definition was provided, as well as conceptualization models to define and describe the BM and its components. However, the dynamic nature of ICT development could not be depicted in the static BMs. As a result, new models had to be designed adopting the new technologies. Complementing the previous generic frameworks, Pateli and Giagli’s contingency approach was used to describe the management of change into a new BM, taking into consideration additional industry and firm factors. In
order to verify this comprehensive framework, a case study of a leading entertainment company was employed. The findings suggest that a BM change process can follow the stepwise approach of Pateli and Giaglis, resulting in risk minimization and efficiency maximization in the newly emerged BM.

REFERENCES


INFORMATION AND COMMUNICATION TECHNOLOGIES (ICTs) AND CITIZEN PARTICIPATION: A CASE STUDY INVOLVING THE BRAZILIAN NATIONAL HEALTH COUNCIL

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ABSTRACT

The objective of this article is to present a case study on the process of constructing public health policies in Brazil aiming at the opening up of spaces for citizen participation supported by Information and Communication Technologies. As such, an analysis of Brazilian health councils was developed for the years between 2005 to 2008. These councils are deliberative bodies responsible for formulating and implementing public health policies in Brazil. Here, a methodology of social network analysis for identifying possible communication failures was utilized. Additionally, a conceptual model of citizen participation based on Information and Communication Technologies (ICTs) was developed which makes possible an increase in the participative spaces in the realm of Brazilian health councils. This study presents specific features such as, being a virtual participative space that understands the interactions among all of the actors, thus guaranteeing a greater opening for demands from the population.

KEYWORDS

Information and Communication Technologies (ICTs), Citizen Participation Spaces, Social Network Analysis, Brazilian Health Councils, Public Policies

1. INTRODUCTION

Studies about Information and Communication Technologies (ICTs) in Brazil are still incipient and there is not a strong propagation of initiatives and practices that confirm ICTs’ potential use in expanding the space for democratic debate. In regards to this subject, the general aim of this paper is to introduce an analysis of the Brazilian experience in citizen participation for constructing public policies starting with a case study involving the Sistema Único de Saúde (SUS) or the Brazilian National Public Health System. This paper presents, through social media analysis, the interaction between government and society in order to expand citizen participation spaces based on ICTs.

For there to be significant change in organization structures, new paths for the better use and contribution of electronic means may be presented with the goal of increasing democratic participation in the country. One of these mechanisms is the organization of political networks, supported by technology. In order to reach this level, it is necessary to take into consideration the expansion of participative space and the improvement in conditions where information transactions are already efficient. The main focus of this research is undertaken from the perspective of expanding citizen participation in the debate about constructing public policies in the National Health Council and the National Public Health System in Brazil between the years 2005 to 2008.

Today, Brazilian Health Councils are bodies where there is an institutionalized space which foresees citizen direct participation in public policy construction. They act in formulating strategies and in controlling the execution of health policy in corresponding bodies. This is inclusive of the financial and economic
aspects and also whose decisions will be ratified by the head of the legally constituted power in each sphere of government, meaning within each of the government’s spheres – municipal, state and federal government (BRASIL, 1990).

The health councils were created to assure the necessary support for the National Public Health System’s actions. This system aims to promote the health of Brazil’s population. It also gathers all social and political decisions taken regarding this subject in Brazil.

With the aim of improving the existing communicative flux and the opening up of citizen participation space, a study on citizen participation based on ICTs which enabled the expansion of participatory spaces within the Brazilian health councils was developed in this paper. The study introduces network analysis and takes into consideration the relationships among actors who participate in the process that seeks an analytical model that aggregates some features such as: being a space with virtual participation that understands the interaction among all actors, assuring a greater opening for the demands of the population.

2. PARTICIPATIVE SPACES IN THE REALM OF BRAZILIAN HEALTH COUNCILS: A METHODOLOGY OF SOCIAL NETWORK ANALYSIS

Information and Communication Technologies (ICTs) are catalytic vectors for expanding participative spaces and in the context of representative democracy; they make the insertion of citizens in public policy construction easier. This research analysis comes from the observation that an understanding of the environment involving the National Health Council and state and municipal councils cannot take place without the task of constructing and critically examining those participation spaces. These spaces are institutionalized and defined by law as key spots for citizen participation in constructing public policies and in exercising social control in Brazil.

There are some factors necessary for having conditions for participation, such as: the opening of possible communicative channels; information access and transparency; continuing education development; and the insertion of information and communication technologies. In the case of Brazilian health councils, there are huge barriers related to the lack of a balance of powers among the participating actors in this process, in relation to information access and the attributions defined for each actor involved. The actors referred to in this study are citizens belonging to nongovernmental organizations who directly participate in constructing public policies, government leaders and healthcare professionals.

Two methods were used based on the critical systemic methodology, constructing a relationship map, in order to identify the complex structure introduced by the Brazilian government, and a Social Network Analysis, as a way of pursuing an understanding of the relationship between the two sides. The methodological analysis is divided into three parts described below.

The first step addressed the system’s limits under which the analysis was made. References proposed by Ulrich (2002) served to define the system. The Critical Systemic Theory prioritizes the task of identifying the actors who participate in this process. After the system, which involves flows of communication between health councils and related government bodies, has been defined, we go on to stage two where a description of relationships among the actors was made so as to verify their bonds and to understand the Brazilian health councils’ situation. In addition to this, identifying the channels that exist between government and citizen was also sought. In the third step, analyzing the balance of power among the actors with the aim of expanding participative spaces through ICTs was undertaken.

2.1 System Identification

The first step of the analysis is divided into two complementary phases. The first one is related to defining the actors who make up the system in order to delineate the political network. Essentially it delimitated the boundaries of the analysis system which includes the Brazilian healthcare system and its decision-making bodies. The second one is about comprehending relationships among the actors involved. It explains how citizen participation happens in this context.

According to Ulrich (2002), there are three classification types concerning the actors involved in the policy formation process: the clients; the decision makers; and the experts. The clients demand the necessities and in this case study they are citizens; the decision makers have the power to make the decisions and are
identified here as politicians; and the experts know the processes technically so that the process exists, and in the situation of Brazil, they are the bureaucrats. All of these actors have participatory power.

Managers represent the decision makers in the system. But there is the assurance that citizens who participate in Brazilian Health Councils will also take part in this process, thus legitimizing the actions taken. From assessing documents that institutionalized SUS and from the history of its formation, the chosen system should serve the purpose of defining policies closest to citizen’s daily life, considering features such as more humane assistance, minority health, equality, in addition to providing health services for all citizens.

Politicians and bureaucrats control a greater part of the system. In general, these are the actors that determine which policies will be established in all cities and who control Brazilian city and state health planning. This shows that the Ministry of Health, a federal government executive body, is the major decision making center despite the fact that the country has characteristics of a decentralized State where any federal, municipal or state body has decision-making power concerning its own reality.

To analyze the Brazilian council situation, 11 actors were identified who participate in the construction process of Brazilian health policies: the Ministry of Health, the State Departments of Health, the City Departments of Health, the National Council of Health Secretaries (Conass), the National Council of City Departments of Health (Conasems), the Tripartite Inter-management Commission (CIT), the Bipartite Inter-management Commission (CIB), the National Health Council (CNS), the State Health Councils, the City Health Councils and the Regional Management Collegiate (CGR). Identifying the actors made it possible to formulate explanatory charts regarding the composition and tasks of each part of the Brazilian public health system. Table 1 presents the classification of actors that take part in making public health policy in Brazil.

<table>
<thead>
<tr>
<th>ACTORS</th>
<th>MOTIVATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ministry of Health</td>
<td>Decision maker</td>
</tr>
<tr>
<td>State Departments of Health</td>
<td>Experts</td>
</tr>
<tr>
<td>City Departments of Health</td>
<td>Experts</td>
</tr>
<tr>
<td>Tripartite Inter-management Commission</td>
<td>Experts</td>
</tr>
<tr>
<td>Bipartite Inter-management Commission</td>
<td>Experts</td>
</tr>
<tr>
<td>National Council of Health Secretaries</td>
<td>Decision Maker</td>
</tr>
<tr>
<td>National Council of City Departments of Health</td>
<td>Experts</td>
</tr>
<tr>
<td>Regional Management Collegiate</td>
<td>Experts</td>
</tr>
<tr>
<td>National Health Councils</td>
<td>Decision Maker</td>
</tr>
<tr>
<td>State Health Councils</td>
<td>Decision Maker</td>
</tr>
<tr>
<td>City Health Councils</td>
<td>Decision Maker</td>
</tr>
</tbody>
</table>

Having set up this information in the proposed system, there is still a crucial point for analysis: inserting citizens into the policy formulation process. This means analyzing the real conditions for citizen participation.

The citizen has his place assured by federal law within the National Health Council. His participation must respect an equality established by the national health council’s statute which foresees 50% of places for citizen entities, 25% for health worker entities and 25% for government representatives and service providers.

An analysis of the number of citizens that take part as health counselors shows that in many Brazilian cities equality (types of participants per percentage) is not respected. In the state of Amazonas, for instance,
only 49% of city councils fulfill this equality in relation to the number of citizens. In Roraima, another Brazilian state in the north of the country, it is only 40%.

States like Rio Grande do Sul (10% of councils do not respect the number established by law for citizen occupation), São Paulo (15.5%) and Rio de Janeiro (6%) are the states with the lowest rates of such occurrences, and therefore they are the ones that keep citizen participation more active. This data is not final, but it is very symbolic of citizen participation in health councils.

2.1.1 Relationships among Actors

From identifying actors and their relationships, a map of relationships was drawn which enabled the flux of activities to be seen. This allowed for the blank spaces and flaws in the flux of communication among actors to be found, and above all verifying citizen participation in council spheres.

The relationship map was made based on health planning in Brazil using the year 2009 as a base. Due to the complexity of setting up a structure that incorporates so many instances and actors at such varying moments of action, the set up was divided into three parts. The first part took into account formulating the guidelines for health policies until the moment this information gets to the Ministry of Health. The second shows how strategic planning happens in relation to the health policies. Based on the health schedule, the flux shows the process of the strategic plan. The third demonstrates the tactical-operational planning executed from the national health plans and represents the practice part of health actions. Besides this, the actors that participated and the quadrants in which they are included were overlayed on the map taking into account their functions and the communicative link among them. This flux is concerned with the entries and outputs regarding the formulation of public health policies.

![Figure 1. Relationship map](image-url)

The two managing bodies, the Tripartite Inter-management Commission (CIT) and the Bipartite Inter-management Commission (CIB), end up breaking or disrupting the communicative fluxes where there is
citizen participation. Such a factor leads us to visualize a network formed by actors acting in a highly hierarchical way and centralized with bureaucrats and politicians as the main actors with roles that command the decision making processes in public health policy construction and formulation in Brazil.

### 2.1.2 Network Indicators

The collected data aims to evaluate the size of the network, in terms of participations realized by its integrants. This data was the starting point to figure out various network measures: network centrality, betweenness centrality. Each actor’s centrality measure, in addition to measuring one person’s accessibility also measures the quantity of communicative paths that pass through it. Based on those measures, it was possible to make inferences regarding actors that had been performing critical roles, in other words, important roles in the network. Signifying: central connector, transactional content corrector and boundaries extender. After collection, the group relationship and each individual’s role in the mapped network were analyzed.

Accordingly, the first drawing formed by all actors and their complete relationships can be verified. The blue squares indicate the ties/nodes (or actors), the arrows show the flux (bi or uni-directional) and the lines between the arrows represent the links.

![Figure 2. Networks formed by all actors and their relationships](image)

An inherent relationship among the parts is clear. The density degree is calculated by dividing the existing number of relationships by the number of possible relationships and multiplying by 100 \[D = \frac{ER}{PR} \times 100\]. The total of possible relationships is calculated by the number of ties minus 1, so for this network the possible relationship number is \[PR = NTN \times (NTN-1)\]. We have, then, a total of 11 ties and 64 relationships. Possible relationships (PR) = 11 x (11 -1) = 110. Density calculation (D) = (64/110) x 100 = 58.2%.

This network’s connectivity is a 58.2%. It is not wrong to say that it has an average tendency and it can have greater connectivity, depending on how the relationships are drawn.

### 2.1.3 Network Centrality

Here the entry and exit degree of each actor can be confirmed, depending on the direction of fluxes created. The entry degree is the sum of interactions the ties maintain with the actor, so if 5 ties interact with the City Health Council its entry degree is 5.
In this network, the Comissão Intergestora Tripartite has the highest centrality degree, equal to 9. That means this actor’s centrality is 90% and he maintains the highest number of interactions meaning the greatest network connection. On the other hand, the City Health Councils maintain the lowest relationship degree, equal to 4, with the other actors, a percentage of 40% network insertion. This value is well below the network’s density, which indicates it has a lack of connections.

### 2.3 Contributes to opening up Participation Spaces

Through the above analysis, it was confirmed that the network, made up of all the system’s actors, presents an average density and the connections are concentrated especially in a specific actors’ group, that of the managers. The interaction is low and rare, mainly in the case of City Health Councils. That situation describes how the established relationships are organized around a central actor who commands a greater part of the interaction flux among actors. The illustrated networks suggest the system’s environment is marked by elements of power and by patterns that obviously split what the center is and what is at the system’s boundary. It may be stated that this is not a cohesive network, for it almost totally excludes its clients from the participative process. On the contrary, it is established especially as a way of fulfilling the manager’s will. So, the deliberation and control instances are totally commanded by restricted groups, where the citizen does not have space to demand his needs. It is understood that in the City Health Council context, there is the biggest gap but also a greater opportunity to change this reality.

A greater degree of electronic democracy (and the most idealistic) is in promoting direct participation, using ICT resources. The ICTs would have the role of opening up possibilities for interactive communication, where there is a movement on the rise responsible for promoting such a situation. But, for there to be this movement, the structures cannot be rigid, they must be flexible in a way that embodies such communicative aspects. This optimistic approach insists on the fact that there cannot be a single sovereign entity, but a variety of actors whose network interactions may result in new forms of participative management.

There are many types of problems to be overcome in order to arrive at that reality, starting with the operational structure that should be changed. Primarily, in order to have greater density, it is necessary to interconnect the actors in a more balanced way. The proposal is to hypothetically re-draw part of the system, in an effort to reformulate some of the network’s positions, so as to expand citizen action in decision-making.

The structural change must be done with the aim of flattening relationships and expanding participation spaces. As a way of allying with citizen interests, we thought about another way of coordinating the parts that would make up a deliberative body, which would keep the existing equality.

Information and communication technological resources, especially the internet, enable the distance between citizen and government communication to be reduced. Besides this, these resources solve a big
representative democracy problem related to the impossibility of direct consultation for citizens, which is due to the immensity of Brazilian territories and the population increase. In this proposed model ICT use is essential, be it through more common channels like telephone or e-mail as well as taking into account the opening of new channels through internet, where information can be exchanged with all actors participating. Those channels could give communicative support to the structure.

We became concerned about presenting a view from which the citizen did not lose the rights he acquired in Brazil’s 1988 Constitution. Even so, it is believed that the study may show that there are ways of expanding participation and furthermore we should think about how to embody such changes. This is due to the fact that the intensive incorporation of ICTs, responsible for maintaining a network’s working conditions, is able to promote access to a greater number of participants.

3. CONCLUSION

Information and Communication Technologies occupy a central spot when the subject is citizen participation in decision-making processes, within health councils. The opening up of channels’ for communication, access and information transparency in addition to developing and continuing education are determining factors so that there are conditions for participation in those places. These factors influence not only decision-making, but all democratic and participative construction processes in society. The use of ICTs refers to the way through which a technological device may be used to support the development of goals, particularly those related to social, political and economic development.

It is considered that policies by the Brazilian Ministry of Communication are necessary as a way of providing all Brazilian cities with infrastructure and broadband access. This is fundamental in order for citizen participation spaces to evolve. It is still necessary to implement actions as a way to build integrated information systems which facilitate the complete pursuit of information which provide support to the decision-making of all actors. Finally, it is pointed out here that it is not enough just to make the information public; it is necessary that it be accessible, so as to promote the comprehension of information by any actor that takes part in this process, regardless of having technical knowledge or not.

REFERENCES

SECURITY CYNICISM: TRAVELERS' EXPERIENCE OF SECURITY IN ENCOUNTERING AIRPORT SECURITY

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ABSTRACT
Based upon a study of travelers' subjective experience of security in encountering airport security, this paper argues that the ICTs used in airport security contribute to heightening travelers' awareness of the shortcomings of the security checkpoint. Travelers therefore experience existing security measures as tokenistic security. Caught in the tension between the existing security measures and increased awareness of potential dangers, travelers grow cynical of the intentions and effects of airport security. This is called security cynicism. The paper discusses the implications of security cynicism to ICT policy-making.

KEYWORDS
Social implications of ICT, security, airport security, technology policy, grounded theory.

1. INTRODUCTION
Security technologies have become a ubiquitous part of everyday life. Ranging from closed circuit television cameras, key card access systems, to tag-and-alarm antitheft systems and burglar alarms, security technologies permeate both public and private spaces. Through advances in fields such as biometric identification systems (de Luis-García et al., 2003), radio-frequency identification (Want, 2006), and data mining (Popp et al., 2004), information and communication technology (ICT) is becoming a driver in the evolution of new security technologies. There is a significant body of research aimed at developing new security technologies. Little research exists on the effects of security technologies in use have on human beings, though. Existing research on the social implications of security technologies typically focus on issues such as privacy concerns and problems related to specific technologies (Brasch, 2005). While important, it is also important to supplement with research on the effects security technologies have on human beings.

Security devices, the part of security technologies people interact with, often look and function differently from the information systems (IS) and software applications commonly studied by ICT researchers. Many of these devices, like access card readers or antitheft detection systems used in retail stores, do not offer monitor and keyboard based interfaces. Rather, they belong to a class of systems often labeled embedded systems: microprocessor-based systems designed to perform one or a few dedicated functions (Heath, 2002). We should not let this confuse us, though. Like the more familiar ISs and software applications, the security devices are also ICTs: a combination of software and hardware technologies dedicated to collecting and processing data (Lyytinen and King, 2006).

While security devices diverge from the typical technologies we study, this class of ICTs should be relevant for those of us interested in the social study of ICTs. There are two main reasons for this. First, computerized security devices in use offer new venues for studying the effects ICTs have on human beings and the societal implications of their diffusion and proliferation in everyday life. Bringing these technologies into our analyses therefore contributes towards furthering "a research agenda addressing substantive (…) issues regarding the ICT and social change in contemporary society" (Avgerou, 2005). Second, Lyon (2007) observes that the increasing computerization of security "go beyond conventional sociological analysis" (p.161). The theoretical developments within the social studies of ICTs over the past decades make us "ideally placed for considering the relationship between technology and its wider social / organisational
setting” (Whitley and Hosein, 2007). The social studies of ICT can therefore offer relevant contributions to
the emerging cross-disciplinary field of security and surveillance studies.

To this end, we have studied travelers’ subjective experience of security in encountering airport security. There have been significant investments in airport security over the past years. In 2007, the International Air Transportation Association estimated that annual expenditures on airport security had increased by 5.6 million US dollars worldwide since 2001 (IATA 2007). A significant part of these investments were new ICT-based security technologies. Airport security is therefore an information-rich case (Patton, 2002) that is well-suited for studying the effects of security technologies in use have on human beings.

We view airport security as an ensemble (Orlikowski and Iacono, 2001) of technologies, organizations, laws, and regulations. The ICTs used in the security checkpoint between the check-in and boarding areas are the most visible security technologies for travelers. Here we find devices like the signature electromagnetic archway, handheld metal detectors, the x-ray luggage scanner, and explosive detection systems. However, in trying to bring these ICTs into our analyses, we face a theoretical shortcoming with existing conceptions of the human-computer interface: that of the relationship between a computer and the human operator. While security guards are operators of most security devices in the checkpoint, the relationship between travelers and the devices can hardly be conceived in the above terms. We therefore draw upon Ciborra’s (2002) use of the phenomenological term encountering: travelers encounter the security devices used in the security checkpoint. While acknowledging the constitutive character of these ICTs in travelers’ subjective experience of security, the term encountering also emphasizes the inherently non-operational relationship travelers have with these ICTs. We also draw upon McCarthy and Wright’s (2004) theory of technology as experience for scaffolding our analysis of travelers' subjective experience of security in encountering airport security. In particular, we draw upon their distinction between how human beings experience technology and how they make sense of the experience. With this in mind, we ask the following question: How do travelers experience security and make sense of this experience in encountering airport security?

Through a substantive theory we argue that the ICTs used in the security checkpoint contribute to heightening travelers’ awareness of the shortcomings of the security checkpoint. Travelers therefore experience existing security measures as tokenistic security. Caught in the tension between the existing security measures and increased awareness of potential dangers, travelers grow cynical of the intentions and effects of airport security. We call this security cynicism.

The substantive theory and the following discussion of the implications of security cynicism to ICT policy-making is the main contribution of this paper. The primary audience for this paper is ICT researchers engaged with social change. We believe that our focus on the problematic aspects of ICT diffusion is an important contribution to our collective reflections and debate on ICT policy for furthering human potential. We also hope this research is a contribution to the broader inter-disciplinary debate on social implications of airport security.

The remainder of the paper is organized as follows. Section 2 outlines the research setting and method. Section 3 presents the analysis. Finally, the paper is concluded with a discussion in Section 4.

2. RESEARCH SETTING AND METHOD

We have interviewed travelers at an international airport in Norway to study their experience of security in encountering airport security. We simply call the research site the Airport out of confidentiality reasons. The physical layout of the Airport is similar to that of most other international airports the world over. It is divided into several zones that are physically segregated with different admission control systems. Travelers enter the Airport through the check-in area. To board their flights, travelers have to pass through the security checkpoint between the check-in and boarding area of the airport.

There has been a steady increasing of security measures in international airports since the 1970s. This has been particularly visible by the security checkpoint constructed between the check-in and boarding areas. Yet, Norwegian airports only implemented random checks of travelers passing between the check-in and boarding areas. The September 11 attacks changed this. Today, security at the Airport is at the same level as that of any international airport the world over. It is subjected to a rigid scheme of security audits by national as well as international civil aviation bodies. The security checkpoint has become a permanent barrier
between the check-in and boarding areas. It is fully equipped with electromagnetic archways, x-ray hand luggage scanners, handheld metal detectors as well as an explosives detection system.

Our research draws upon the grounded theory (GT) method as formulated by Charmaz (2006) towards an interpretive epistemology. Conceptualization, understood as the process of developing a theoretical rendering of a delimited or generic issue, lies at the core of GT (Glaser, 2002). Our purpose with studying travelers' subjective experience of security is to engage in research and debate on a substantive issue of political and moral nature. Conceptualizing the relationship between ICTs and their wider social context is a key contribution we as ICT researchers may offer in the public debate (Whitley and Hosein, 2007). GT, with its emphasis on conceptualizations, therefore suits the purpose of engaging with the broader public debate well.

There exist multiple formulations of GT (Bryant and Charmaz, 2007). Instead of seeking an authoritative presentation of GT, we will instead elaborate how we have been doing GT in this study. Table 1 summarizes the key techniques we have used.

### Table 1. Summary of GT techniques used in the study

<table>
<thead>
<tr>
<th>Techniques</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant comparative method</td>
<td>A method of analysis for constructing successively more abstract categories, properties of these categories, and relations between categories and their properties.</td>
</tr>
<tr>
<td>Theoretical sampling</td>
<td>The process of purposefully seeking data that will elaborate the properties and dimensions of emergent concepts and categories constructed during analysis.</td>
</tr>
<tr>
<td>Coding</td>
<td>The process of defining what the data is about by assigning emergent codes to blocks of data.</td>
</tr>
<tr>
<td>Categorizing</td>
<td>The process of abstracting key codes into an analytic categories and concepts, and define their properties and dimensions.</td>
</tr>
<tr>
<td>Memo writing</td>
<td>The activity of recording and analyzing ideas about codes and emerging categories throughout the analysis process.</td>
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</table>

We have performed 29 semi-structured interviews with travelers at the Airport. The interviews have been performed over the course of three rounds of interviewing. Each interview lasted approximately 30 minutes. After each of the first two rounds of interviewing, we identified common topics and themes to explore further in the next round of interviewing. In addition to line-by-line coding and extensive memo writing, we developed analytical categories by exploring the dimensionality of the categories we had developed. We explored the dimensionality of the categories by comparing codes within individual interviews and between interviews. To support cross-interview comparison we sampled travelers along the dimensions of age, gender, and travel frequency.

### 3. SECURITY CYNICISM

We have developed the term security cynicism as an integrative concept to describe how travelers reflect upon and give meaning to the experience of security in encountering airport security. The concept reflects the prevailing sentiment that travelers have grown disillusioned with airport security. When reflecting upon their experience of security in encountering airport security, travelers typically responded like this frequent flyer:

_I have been travelling for 30 years. Went offshore for the first time in '67. (...) I have never felt unsafe at an airport. (...) If they [potential terrorists] want to, they will always be able to get through [the security checkpoint] (...)_

Another traveler put it more bluntly:

_I think it [the security checkpoint] is completely unnecessary._

These statements are illustrative of the prevailing sentiment that we call security cynicism. The Oxford Dictionary offers two definitions of the term ‘cynic’. The first definition is "a person who believes people are motivated purely by self-interest, rather than acting for honorable or unselfish reasons". This definition alludes to a mismatch between stated reasons and intent. This definition may shed light on travelers' view of airport security. However, it does so in a more roundabout way. We will revisit this in a few moments.

Turning to the second definition, we find that a cynic is "a person who questions whether something will happen or whether it is worthwhile". In this latter definition, cynicism is a form of disillusionment. We find this an appropriate description of the prevailing view among travelers on airports security. Security cynicism
is therefore lack of faith in whether airport security has any practical function. It is such sentiments we find expressed in the two statements introducing this section. As such, the meaning of security cynicism also draws upon the first definition of the term 'cynic'. Travelers find airport security to be acting by a form of self-interest, regulations for the sake of creating an illusion of security, rather than out of the honorable reason of making air travel more secure. Travelers experience airport security as symbolic rather than objective. The ICTs used in the security checkpoint contribute to heightening travelers’ awareness of the shortcomings of the security checkpoint. Travelers therefore experience existing security measures as tokenistic security. Caught in the tension between the existing security measures and increased awareness of potential dangers, travelers grow cynical of the intentions and effects of airport security.

We will now elaborate three major properties in the way travelers reflect upon and give meaning to the experience of security: symbolic security, mismatch between threat and response, and inconsistent security measures.

3.1 Symbolic Security

Many of the travelers we have interviewed find airport security to be symbolic. In particular, they emphasize that the security check is aimed at catching obvious security threats. However, these travelers have little confidence that the security check will prevent serious security threats:

*It [the electromagnetic archway] detects a lot, often more than it needs to [laughs]. But if someone is really interested in causing harm, you can do significant damage with non-metal items, too.*

Similarly, an off-duty policeman we interviewed at the Airport said:

*The security is so that you eliminate those who are mentally disturbed, but if someone truly wants to do something… [trails off, thinking] I would have succeeded if I set my mind to do some mischief. Obviously, I do know a thing or two, but anyone who are somewhat bright would be able to do mischief.*

Disillusionment with airport security therefore arises from the reflection that the security checkpoint seeks to catch obvious security threats, while neglecting what travelers themselves consider real security threats: unknown and unexpected plans.

3.2 Mismatch between Threat and Response

The question many travelers ask themselves is whether existing security measures are appropriate for the threat level. Travelers reflect upon this in two different ways. First, some question the severity of the threat level, finding the terror threat more of a scare than a reality:

*I don’t feel any safer because of the increased airport security. This is a process the Americans have set in motion in response to the 9/11 attacks. I don’t think it is any more dangerous to travel today than before [the 9/11 attack], except that it takes a hell of a lot more time.*

While several travelers believe that the threat level is exaggerated, they also believe it is appropriate for other countries outside of Norway. Other travelers find the whole terror threat widely exaggerated and a product of some form of fear mongering.

The other way of reflecting upon the mismatch between threat and response is to reflect upon the shortcomings of the technologies in the security checkpoint. They will reflect upon items that the ICTs in the security checkpoint will not detect, and how the security checkpoint itself is too limited to stop someone intent on causing harm:

*Well, you see, there is a fence around the perimeter of the airport like here (makes a hand gesture and looks at the fencing on the other side of the airstrip). Getting through that fence should not be too difficult, I think.*

3.3 Inconsistent Security Measures

Travelers often reflect that the main weakness of airport security is that it is never more secure than the weakest link. When travelers experience inconsistencies in the security check, they start losing faith in the effectiveness of the security measures. Many travelers have first-hand experience with inconsistent security measures. Travelers’ reflections upon inconsistent security measures along two primary dimensions: *within the airport, and between airports.*
Many travelers have experienced that the security guards have confiscated small metal objects they have carried in their hand luggage or on their person. Both the electromagnetic archway and the x-ray hand luggage scanner will indicated the presence of very small metal objects. The explanation the security guards offer is that regulations prohibit metal objects onboard airplanes. Yet, as one traveler observed:

*They confiscate your nail cutter before you can travel, but aboard the aircraft serve the food along with metal cutlery. Where's the logic in that?! With knife and fork and the whole nine yards... But they confiscate your nail cutter.*

Travelers question the intentions of the security checkpoint when they experience such inconsistencies:

*It [the security checkpoint] is too inconsistent. You are picked apart in the security check, then you enter the boarding area, and you have access to... can get access to almost anything once inside. It seems completely brain dead.*

Similarly, travelers find it odd that the ICTs used in the security checkpoint are able to pick up metal objects, "but you are able to do a lot of harm with plastic weapons, too", as one traveler observed.

Many also tell stories about inconsistencies between airports. One traveler, for instance, said he had forgotten a small knife in his rucksack. The traveler passed through the security checkpoint at three different airports before the security guards were able to detect the knife with the hand luggage scanner. "It makes you question the purpose of the three other checkpoints", the traveler reflected laconically.

## 4. DISCUSSION

We will now discuss some aspects of the analysis above. We will first discuss whether security cynicism should be interpreted as travelers' resistance to the inconveniences caused by airport security. The purpose of this discussion is to delineate between discontent over particular security measures on the one hand, and disillusionment with the system on the other hand. This subsection finds security cynicism to stem from disillusionment with the system. Second, we will draw implications for ICT policy-making. Finally, the section is concluded with a brief discussion of the transferability of the findings presented in this paper.

### 4.1 Discontent: Cynicism or Simply Resistance to Inconveniences

Civil aviation authorities are aware of travelers' discontent with airport security. We have interviewed both national aviation authorities and security personnel in connection with the reported research. Many of them relate travelers' discontent to the inconveniences of the security checkpoint. But is travelers discontent simply resistance to inconveniences?

Resistance to new technology is well known within the computing literature. New technology may be met with active resistance like counter-implementations (Keen, 1981). When active resistance is not possible or convenient, users often meet new technology with passive resistance. Passive resistance may take the form of quiet opposition (Kling and Iacono, 1984) or discontent simmering beneath the surface (Howcroft and Wilson, 2003). Anyone wanting to travel by air has to go through the security checkpoint. Not travelling by air is therefore the only practical form of active resistance available to travelers.

Our research does indeed show that travelers are discontent with the inconveniences of the security checkpoint. Yet, this discontent is qualitatively different from security cynicism. The following statements exemplifies the difference.

*I regard the whole security check as a complete waste of time. Once you're through, you have access to knives, forks. If you want something sharp, all you have to do is to snatch a plate and break it. That's all you need.*

This statement exemplifies the typical sentiment of security cynicism as the traveler shows little faith in the practical effect of the security checkpoint. Now, compare that to a statement exemplifying resistance to the inconveniences of the security checkpoint:

*For me, traveling frequently, going through the security checkpoint every time is a major hassle. It takes a lot of time. I think it would have been more efficient if there was a pre-clearance for frequent flyers.*

We see here that resistance to the inconveniences are related to the means of securing air travel, not the end itself. However, security cynicism is related to a loss of faith in the effect of the endeavor of securing air travel. It is related to the disillusionment with the security measures themselves. Security cynicism, however,
arises from a situation where overt resistance is not an option. Travelers have no other options than going through the motions of the security checkpoint if they want to travel by air. Having no alternative, travelers resign and turn cynical.

In answer to the question above, we do not find travelers discontent with the security checkpoint to simply be resistance to inconveniences. Yet, travelers do often express discontent with inconveniences as well as disillusionment over the effect of airport security. It is therefore not an either-or situation.

4.2 Implications for ICT Policy-Making

Democracy is, somewhat simplified put, a political system where people participate in influencing the decisions that affect them (Ringen, 2007). With its focus on participatory design (PD), the Scandinavian tradition of computing research has focused on participation to achieve greater working life democracy (Bjerknes and Bratteteig, 1995). It is fruitful to draw upon this body of research to outline some societal implications of ICT use in airport security, as well as to discuss possible ways of addressing security cynicism.

Howcroft and Wilson (2003) argue that ‘pseudo participation’ has become a problem for realizing PD’s democratic potential. Pseudo participation is the situation where users are excluded from key decision-making processes through tokenistic participation. Participation is symbolic, serving the purpose of legitimizing decisions that have already been made (Robey and Markus, 1984). Users are likely to reveal such managerial insincerity. As disillusionment from pseudo participation settles within the organization, users are less likely to engage with future design processes (Howcroft and Wilson, 2003). Over time, pseudo participation may breed a form of organizational apathy, the sentiment that they have no real influence. Like end-users’ disillusionment with pseudo participation, security cynicism breeds a form of apathy. This apathy may become a democratic problem. Like pseudo participation, the result of security cynicism is that people are less likely to engage with political issues when they experience having no real influence on the decision-making process. The danger is therefore that people become apathetic to important issues related to ICT use in airport security because they have no real influence on the decisions being made. ICT use in airport security raises issues about privacy and of how to handle sensitive passenger data used for screening. While important in themselves, these are related to issues such as social exclusion and increased surveillance (Lyon, 2006).

A societal implication is therefore that security cynicism may contribute towards a lack of broader popular engagement with technology-related issues that are relevant for society at large. This is problematic, as these issues are far too important to be left in the hands of a limited group of technological experts.

Having outlined a possible societal implication of ICT use in airport security, we need to ask ourselves how to amend the situation? It is not so that domestic and international aviation authorities are unaware that travelers lack confidence in airport security measures. On the contrary. The representatives of domestic aviation authorities we have spoken with acknowledge the problem. They typically ascribe this to travelers’ lack of knowledge about how secure airports really are. Based on our own experience from a guided tour of airport security facilities, we acknowledge that we as ordinary travelers have limited knowledge of the extent of airport security.

However, experiences from PD show that there is a persistent identification of those who are in on the effort and those who are not (O’Connor, 1995). User participation is therefore caught in the struggle between those who support the effort and those against it. Disagreement and conflict is considered resistance to be resolved through education and training (Howcroft and Wilson, 2003). Yet, equaling resistance to an issue of education and training reduces opposing views to uninformed and inconsequential to the overall effort. Rather than fostering participation, training and education may in fact contribute to stifling legitimate concerns with existing civil aviation security policies. Again, the result may be a form of apathy, as travelers find what they consider legitimate dissent being disregarded.

Increased understanding of the extent of airport security may indeed contribute to reducing security cynicism. However, drawing upon experiences from PD, it is dangerous to reduce travelers’ lack of confidence in existing security measures to an issue of education and knowledge. In so doing, we stand the risk of further alienating travelers. This in turn may contribute to exacerbating the security cynicism. Rather than seeking to silence dissent, we suggest that aviation authorities are well advised to take ordinary travelers’ views into account when assessing the design of airport security.
Inconsistent security measures are another aspect of security cynicism (see 3.3 above). International aviation authorities acknowledge that this may cause a lack of confidence in existing security measures (BBC News 2007). Their response is to harmonize security across national boundaries. While this may address part of travelers’ concerns with existing security measures, it fails to capture the complexity of the problem. Another aspect of security cynicism is the mismatch between threat and response (see 3.2 above). Travelers we have interviewed do not find the threat profile that existing security measures respond to, to be relevant for Norwegian circumstances. Harmonization of security measures may at worst scale up the threat profile, and consequently the response. At best, the threat profile will remain as it is. Either way, harmonization fails to address the mismatch between threat and response.

Rather than seeking harmonization, we suggest that a practical measure to address security cynicism is to seek towards differentiation. Many of the travelers we have interviewed actually acknowledge the need for increased security on international departures. Yet, for domestic departures they find existing security measures to be exaggerated. As such, differentiating domestic and international departures may contribute towards reducing the mismatch between threat and response. Such a proposal is likely to meet resistance. Much has been invested in airport security. Disposing of or reducing existing installations is therefore unlikely to be considered good business management for airport operators. Seen from a societal perspective, however, disposing of or reducing existing security installations may make sense. Yet, the political resistance may prove significant. In 2007 the Norwegian government sought to ease Norwegian airport security. European aviation authorities brusquely brushed the Norwegian efforts aside. Norway is caught in a complex web of international aviation treaties and regulations. This reduces national sovereignty on issues related to airport security.

4.3 Research Evaluation

We have interviewed 29 travelers at an international airport in Norway. The Airport is among Norway's largest airports. 11 percent of all domestic travelers travel to, from, or via the Airport. Yet, only 4 percent of Norway's international travelers depart from or arrive at the Airport. Approximately 3 million travelers pass through the Airport every year. In comparison, 15 million travelers pass through Norway's national airport every year, and 67 million travelers pass through London Heathrow, the world's busiest airport, every year. The question about the transferability of the findings therefore needs to be discussed. As the reported research is based on interpretive epistemology, we draw upon Klein and Myers' (1999) set of principles for evaluating interpretive research. In particular, we draw upon the principle of contextualization.

While we have interviewed travelers at only one airport, we are fairly confident that security cynicism is a prevalent sentiment among Norwegian travelers. Two of the travelers we interviewed did state that they believed airport security to be essential for preventing terror attacks on civil aviation. Among the rest of the travelers interviewed we found limited variation in the experience of security along the dimensions of age, gender, and travel frequency. It is therefore relatively safe to say that the travelers we have interviewed share similar sentiments about airport security. A central characteristic of security cynicism is that travelers have little trust in the claims that airport security makes air travel more secure. In their survey of risk perceptions connected to different modes of transportation, the Norwegian Institute of Transport Economics finds that 78 percent of air travelers believe that inadequate airport security does not contribute to less secure flights (TØI 2007). We therefore find it reasonable to assume that security cynicism is a sentiment shared by many Norwegian travelers.

What about travelers outside of Norway? Airport security in the Norwegian context is somewhat particular. Norway did not follow the general increase in security measures at international airports in the rest of Europe and the United States until 2001. The level of security measures at domestic airports is therefore a relatively new experience for Norwegian travelers. While travelers we have interviewed are becoming used to the security measures, they are frequently talking about how things used to be before 2001. On the other hand, the International Air Transportation Authorities stated in 2007 that existing airport security measures inconvenience travelers without any significant increase in security (IATA 2007). It may therefore seem that airport security's inability to make travelers more secure is a sentiment held outside of Norway. An aspect of security cynicism, however, is the discrepancy between security measures and the threat level. Norway is a small country on the outskirts of Europe with no history of domestic or international terrorism. Norwegian travelers’ experience of the threat level may stem from this historical context. It is worth noting that several
of the travelers we interviewed believe the security measures are inappropriate for the Norwegian threat level, but appropriate for the threat level in other parts of the world. While it may seem that sentiments about the deficiencies of airport security is shared outside of Norway, it is still difficult to make any claims about the transferability of security cynicism outside the Norwegian context. For comparative purposes, it would therefore be interesting to interview travelers in countries that have experienced terrorism about their subjective experience of security in encountering airport security.

5. CONCLUSION

We have presented a substantive theory of how travelers experience security and make sense of this experience in encountering airport security. Through this substantive theory we argued that the ICTs used in airport security contribute towards heightening travelers’ awareness of the shortcomings of the security checkpoint. Travelers therefore experience existing security measures as tokenistic security. Caught in the tension between tokenistic security and increased awareness of shortcomings with existing security measures, travelers grow cynical of the intentions and effects of airport security. We called this security cynicism.

With basis in this theory, we drew three possible implications for ICT policy-making. The general, societal implication is that security cynicism may breed a form of apathy that contributes towards a lack of broader popular engagement with technology-related issues that are relevant to society at large. With this as our point of departure, we offered alternative responses to two solutions proposed by civil aviation authorities for meeting travelers' discontent with existing airport security measures: the need for educating travelers and the need for harmonizing security across national boundaries.

First, we emphasized the danger of reducing travelers' lack of faith in existing security measures to a matter of education and knowledge. This, we argued, stand the risk of silencing legitimate dissent. Instead we proposed that aviation authorities are well advised to take travelers' views into account in assessing existing aviation security policies. Second, we pointed out that harmonizing security measures fail to address travelers' concerns about the mismatch between threat and response, which is a major property of security cynicism. Instead, we suggested that differentiating between domestic and international departures is a more practical response to travelers' concerns over the mismatch between threat and response.

We believe our focus on the more problematic aspects of ICT diffusion is an important contribution towards our collective reflections and debate on ICT policy for furthering human potential. We also hope our research may contribute towards the broader inter-disciplinary debate on the social implications of airport security.

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THE ETHICS AND INDIFFERENT BEHAVIOUR OF YOUNG DIGITAL CONTENT CONSUMERS – ANALYSIS OF AN INTERVIEW STUDY

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ABSTRACT

Digital piracy has been a proliferating problem during the last ten years. New technological innovations in the areas of telecommunication and social media have provided a myriad of opportunities to use digital content illegally. Unauthorized use of music and videos that can be downloaded or directly streamed from the Internet has changed the traditional forms of piracy like duplicating software or burning music CDs. The Internet provides almost endless resources of illegal digital contents that can be acquired easily, rapidly and with low risk to be caught. Explanations and solutions for the piracy problems have especially been sought from two directions: (1) technology (e.g. P2P, DRM) and (2) the ethics of consumer behaviour. In this paper, we provide an interview study that explores the ethical thinking and actual behaviour of digital content consumers. The study consisted of fourteen interviews. All interviewees were young adults (19-31 years), seven of them were male and seven female. The study reveals incoherence in the interviewees' ethical thinking. Given that ethical behaviour is assumed to be correlated with ethical attitudes and thinking, we argue that (1) there is a chance to improve consumers' ethical behaviour by increasing their ethical consciousness and (2) this potential should also be capitalized since fighting digital piracy requires multiple actions of which improved ethical consciousness is one.

KEYWORDS

Consumer behaviour, digital content, ethics, piracy.

1. INTRODUCTION

Digital piracy is a complex problem and its causes and consequences form a broad field of study (Hill 2007). Although the actual impacts of digital piracy on the content industries are controversial (e.g. Liebowitz 2008 vs. Oberholzer-Gee and Strumf 2007) and may vary from industry to industry (Peitz and Waelbrock 2006), it is obvious that piracy is an issue that requires much attention in the future. With respect to music industry, for example, piracy has been regarded as the greatest threat (Chiou et al. 2005).

Digital piracy has been widely seen as a result of the easiness by which copying and sharing files, especially on the Internet, can be done, (e.g. Frattolillo and Landolfi 2008). Peer-to-peer (P2P) networks which emerged in the end of the last millennium made illegal file sharing very effective (Einhorn and Rosenblatt 2005). Another major piracy problem can be expected if individuals start to use P2P networks for sharing printed products like books in an electronic form (Hill 2007).

Piracy has been widely studied in the contexts of software (e.g. Siegfried 2004; Holsapple et al. 2008) and music (e.g. Lyonski and Durvasula 2008; Chiang and Assane 2007; d’Astous et al. 2005; Huang 2005). Digital piracy at a more general level has been studied by Hill (2007), for example.

The findings on factors affecting piracy are not always parallel. Although pirating is generally assumed to belong to younger people’s activities (e.g. Coyle et al. 2009), some studies (e.g. d’Astous et al. 2005) show that ethical awareness tends to decrease by aging. This finding combined with another proposition that moral intention leads to moral actions (Huang 2005; Shoham 2008) seems conflicting. If young people are ethically more aware then they should apparently pirate less than older people. However, they tend to pirate more. Lyonski and Durvasula (2008) explain this with the fact that there is a gap between ethical thinking and behaviour.
In general, a fertile ground for piracy can be found when people either do not feel guilty when pirating or find pirating – despite being illegal - ethically acceptable. When the illegal behaviour is not ethicallly doomed and pirating is technologically easy, it is hard to find means to avoid pirating. Besides technological and ethical explanations, economic arguments for piracy can be easily found. Concerning digital products, for example, low prices mean a lot to consumers (Chiang and Assane 2007; Al-Rafee and Cronan 2006). This favours the use of illegal contents that tend to be free of charge.

While fighting digital piracy seems to be difficult, some constructive suggestions can be found among research literature. These include, for example, business models that better accommodate consumers’ expectations (Chiou et al. 2005; Amberg and Schröder 2007). Battachharjee et al. (2003) note that a piracy reduction strategy should be different from revenue-maximizing strategy which indicates that content providers should not solely concentrate on increasing revenues. Shoham et al. (2008) argue that piracy should be marketed as unethical. This is an important point since to some consumers ‘illegal’ does not mean same as ‘unethical’. Because music piracy, for example, may lead to serious ethical consequences, the government and marketers should also promote group consensus within the society on the issues of music piracy behaviour (Chiou et al. 2005). In addition to these consumer-oriented approaches, some researchers have called for public policy and enforcement of IP protection (Peitz and Waelbrock 2006).

Digital piracy research can be categorized into four schools: ethics, information systems, economics and legal (Holsapple et al. 2008). Since the primary target of our study is to comprehensively discover the ethical thinking and behaviour of the consumers, our analysis combines all these four aspects. Hence, we attempt to explain consumer ethics in a field where information systems form the technological ground, economics explains a major part of consumers’ preferences, and juridical issues tend to be very complicated and open to interpretations from the consumers’ point of view.

The rest of the article is organized as follows. In the next chapter, we present the objectives and methods of our study in detail. In chapter 3 we provide the main results of the empirical study. In chapter 4 we discuss the main findings of the study and compare them with earlier research. Finally, a brief conclusion is provided in chapter 5.

2. OBJECTIVES AND METHODOLOGY

Although quite a lot is known about consumers’ behaviour and ethical thinking in the context of using digital contents illegally, research findings seem to be partially conflicting. One explanation to this could be the fact that certain key concepts, like ‘illegal’, ‘unauthorized’, ‘immoral’, and ‘unethical’ are used unsystematically. Thus, when a consumer talks about an illegal matter, does not mean that (s)he sees that matter as unethical or unauthorized. Another explanation, a very natural one, is that a consumer’s way of thinking and his/her behaviour are not always conscious, nor are they coherent. For example, when the opportunity to pirate is appealing enough, the consumer can explain the illegal choice with ethical arguments although basically it would be against the consumer’s ethics. This kind “technique”, which helps people to insulate themselves from self-blame, is called neutralization (Shang et al. 2007). We suppose that the more unconscious or incoherent the ethics, the more room there is for neutralization and, therefore, the easier it is to slip to illegal behaviour.

When analysing piracy issues it is necessary to estimate what the corresponding legal acquisition channels are and how they work from the consumers’ point of view. Apparently, few studies of digital piracy take into account the rapid development of social media and the consequent changes in consumer behaviour, for example. We suppose that only few people are dedicated pirates. Rather, a majority of people are indifferent to the sources where they can obtain the interesting digital content. In our opinion, using illegal acquisition channels can result from this indifference.

In this study our objective was to have a comprehensive picture of consumers’ ethical thinking and behaviour, and the relationship between these two. Using this picture, we aimed to gain a deep understanding of the complex issue of using digital content illegally.

The research was carried out as an interview study. The interviews were performed as open discussions based on a number of themes (Usage of computers and the Internet; Usage of the Internet for acquiring products; Usage, acquisition and sharing of digital contents; Communality and social media; Recommending digital contents and rewarding for it; Piracy; Free comments). The themes were typically discussed in the
same order, although minor deviations from this order were also accepted when it was more fluent from the interviewee’s point of view. The themes covered intentionally aspects of both illegal and legal content. In addition, general aspects to online shopping were also covered. The aim was to capture the diversity of consumer behaviour and thinking.

The invitations to participate in the study were sent to two student organizations. The required number of seven females and seven males was attained very quickly, and there was also an opportunity to select the interviewees to cover the targeted age range evenly (the actual age range was 19-31 years). During the interview, the interviewee was informed first about the themes and procedure of the interview. The discussions mostly followed the structure of the beforehand prepared set of questions, though the interviews were encouraged to present their ideas in their own ways and in such an order they felt comfortable. A typical interview took about one and a quarter hour.

The interviews were recorded and they were also transcribed for the relevant parts. In the analysis the answers were classified into four large categories: (1) what were seen as reasons for digital piracy and indifferent use of copyrighted digital material, (2) what kind behaviour was considered illegal/unethical by an interviewee, (3) what are the interviewee’s attitudes towards piracy, and (4) what could be the means to fight digital piracy. After this, the individual answers of each category were analyzed first. Then the answers to each category were grouped into two subgroups: females and males. Next, a summary of each category was made, and finally, cross-analysis of each interviewee’s answers to all questions was conducted. The results are presented in the next chapter.

3. RESULTS

In this chapter we provide findings regarding both actual use of and attitudes towards using different sources of digital content. When necessary to refer to an individual interviewee’s views, comments and statements, it is done by using the following codes: F is the symbol for female interviewees and M for male interviewees. Since seven females and seven males were included in the study the codes are F1…F7 and M1…M7 respectively.

3.1 Prevalence and Causes of Indifferent use of Copyright Protected Digital Contents

In this consideration, P2P networks have a special role. Although they are not illegal as such, they are a main source of illegal digital content (e.g. see Goel et al. 2010). Consumers who use P2P networks for acquiring digital material are often careless of the possible legal restrictions of such material. In other words, they are not concerned whether or not their actions are legal. Many of them might consider their behaviour from either a legal or an ethical viewpoint but this seems to have no real effect on their behaviour.

All interviewees except one had used P2P networks for acquiring digital content (music being the primary type of content). Although the current use of P2P networks was not inquired in details, it was found that 9 persons still used P2P networks for acquiring digital content, to at least some extent. However, only 6 (2 female and 4 male) of 14 used them actively to get their digital material.

The most common type of digital content used by the interviewees was music. Actually, all interviewees consumed digital music to at least some extent. Music was ever more often acquired by using Spotify. As one can see in the frequency table (Figure 1), the use of Spotify seemed to decrease the use of P2P networks. The qualitative analysis revealed that several persons who had started to use Spotify had since abandoned the usage of P2P networks.

Other digital contents consumed by the interviewees were videos, at the second place, and games, at the third place. For a few interviewees, videos or games were the primary digital contents that were acquired from the Internet.

1 Copying CDs, DVDs or other types of digital media were also considered but they have a minor status in this study
2 Spotify is a service that provides free and legal access to extensive library of music. Besides Spotify Free there are two other products available, Spotify Premium that is based on a monthly charge and Spotify Day pass that is based on a daily charge.
3 Note the small sample due to which statistical significance can not be calculated
When asked about reasons for using P2P networks, the following three issues were prevalent among the answers. First, getting the material for free was most frequently mentioned as the primary reason. The next two reasons were the easiness of acquisition and use, and the wide selection of music available. In general, the male users of P2P networks gave more arguments for their behaviour than their female counterparts. All active male users mentioned that the primary reason for using P2P networks was that the material was free, but they also mentioned the easiness of access to the digital content and the wide scope of material available on the Internet. M5, for example, put it: “Man is weak when the price is low.” However, he also thought that the illegal or indifferent use would diminish if the use would be more difficult and the risks to get caught higher. Although only one male interviewee mentioned that the primary reason for the spread of the P2P networks could be the fact that the commercial counterparts are so awkward, several other interviewees could obviously have endorsed this opinion if it had been asked. This can be concluded from the answers given later on during the interviews (means to fight digital piracy).

3.2 What is believed or considered to be (a) Legally or (b) Ethically Right or Wrong

In general, it seemed to be quite unclear to most interviewees what is legally right or wrong. Usually, people knew something about copyright laws, but the knowledge was often inaccurate and confused by (1) the fact that there are different national versions of copyright laws and (2) ethical interpretations. Most interviewees understood that using P2P networks to acquire copyright protected material is legally wrong. Although there were different ideas about the illegality of using vs. distributing such material, it was quite clear to most interviewees that when downloading material by using a P2P network one always acts as a distributor, too. Thus, the majority of the interviewees were aware of the illegality of such use of P2P networks.

On the ethical side, there were, however, different stances. Although most interviewees did not want to distribute the downloaded material further, they did not see sharing it with friends, for example, as any major problem either. Professional-like delivery and distribution of copyright protected material was, instead, widely doomed. The most common ethical argument for “small scale piracy” was that the music industry was so grasping. So, it can be stated that “Robin Hoodism” received sympathy to at least some extent, whereas piracy as an economic crime was denied. The further the discussion went, the more obvious it became that legal alternatives would be preferred to illegal ones, if both of them worked equally well and user friendly (compare with the Spotify example presented in Figure 1). Money, of course, has a prominent role at least when younger consumers are in question.

When comparing female interviewees’ opinions to their male counterparts, it can be noticed that women are more explicitly against piracy than men who might have said that they “would not become sleepless” (M5) or “feel guilty” (M6) because of using digital material illegally, nor did they find digital piracy a very bad thing (M7). Some male interviewees also bound the immorality of piracy to the aspects of economy: M2,
for example, found piracy quite acceptable if someone (the interviewee referred to media mogul Rupert Murdoch as an example) had too a dominant role on the market and the pricing of products was therefore incorrect. M3, instead, considered the issues from a different perspective when he said that pirating high value products (like large programs) is more condemnable compared to the piracy of products with lower development costs.

Of the female interviewees five (F2–F6) was clearly against piracy although they did find some positive impacts of piracy, too (like increasing the visibility of unknown artists). The remaining two (F1 and F7) had vacillating attitudes towards piracy. It seemed that F1 had not formed her stance yet, whereas F7 was feeling more comfortable being on the pirate side, although she simultaneously recognized the wrongness of large scale piracy. Despite condemning piracy quite explicitly several female interviewees hurried to say that they, nevertheless, did not want to moralise. It is an interesting question, why this footnote was uttered. One reason might be the fact that piracy is so wide-spread that moralising it does not help anything. The interviewees might also have the feeling that moralising would not be possible without self-criticism at the same time. This, in turn, would not have been psychologically easy.

3.3 Means to Fight Digital Piracy

In general, the interviewees considered piracy as a harmless, easy, and extremely cheap way to get digital content. The risk to get caught is low, no specific skills are needed, and acquisition is possible without logging in, a credit card etc. Security risks were not considered high either, although viruses and other malware occupied some.

From what is said above, it could be inferred that if pirating would be more difficult, its popularity could decrease. However, only a few believed that forcing alone could solve the problem of piracy. Monitoring and controlling illegal use of digital contents were mentioned by some as a way to fight digital piracy but these interviewees also regarded DRM and similar systems as a supplementary means only. DRM systems were widely resisted by many and they were quite openly considered rather as a cause to piracy than a tool to inhibit it. Forcing was seen as a necessary means against “big fishes” who cannot be affected by education, which was suggested by many interviewees to be a potential means in fighting digital piracy. Many interviewees believed that by improving legal alternatives the use of illegal sources would decrease. According to them the prices of commercial products and services should be lower and the services should be simpler and easier to use.

When asked whether a levy or a tax-like common charge for using the Internet would help to solve the problem of digital piracy (i.e. more legal content financed this way would be available to everyone), the opinions basically fell into two categories: (1) some of the interviewees did not believe in, or tolerate, such a solution at all and (2) the others found it an interesting alternative though it should be more accurately allocated (i.e. everyone should not have to pay for everything).

3.4 Coherence of Interviewees’ thinking and Behaviour

It was interesting to notice how much inconsistencies the interviewees’ thinking and behaviour included. A primary cause for this might be that the legal issues were confused with the ethical ones. For example, behaviour that was known illegal was accepted and adopted, because it was seen ethically justified. In the sector of digital music this kind of “Robin Hoodism” is, however, based on questionable arguments since it often means “robbing from someone and giving to self” due to which the prices for paying consumers can even rise. The interviewees actually had no clear idea who was robbed, although some of them strongly criticized “the grasping music industry”. Rather few had thought the situation from the viewpoints of average artists or of the fellow consumers who pay for the content. Furthermore, when the impacts of piracy on artists’ living were considered, the interviewees found more benefits than drawbacks.

It can be concluded that a typical, young consumer of digital content often acts like a pirate but wants see her/himself more like Robin Hood. This gives a good reason to assume that a typical consumer would, deep inside, like to behave ethically right. It can be even asked whether this “ethical consciousness and argumentation” is partly an attempt to calm down bad conscience from behaving illegally (i.e. neutralization discussed earlier in this paper). Here, it must be remarked that most interviewees, especially the male ones, denied feeling guilty about the illegal use of digital content. However, both their argumentation and their
quick change from using P2P networks to using the Spotify service show that legal issues had not been neglected by the interviewees. However, it can be asked what happens when the large masses of young generations get used to illegal sources of digital contents. How easy is it to change their behaviour to the legal side, if everything has been cheap, quick and convenient on the illegal side? Nonetheless, legal products have their strengths, too. A majority of the interviewees presented such strengths. For example, thirteen interviewees found CDs having so many positive features that they did not like to totally dispense with them.

When considering the interviewees’ attitudes towards a levy or common charge for using digital contents, it was surprising to discover how unfair such a solution was seen. Also in case in which this alternative was presented as very similar to the monthly charged version of Spotify and limited to the actual users of digital content, it was quite strongly resisted. Thus, it seems that at least young consumers resist all kinds of strict systems and demand freedom of choice.

4. DISCUSSION

Although our empirical data is based on a limited number of interviews providing, thus, too little material for generalizations, some interesting findings for further study can be highlighted.

Indifferent attitudes towards using illegal digital content seem to be common among young consumers. This is not a surprise. Some previous studies have suggested the same thing (e.g. Lyonski and Durvasula 2008). Explanations can be many. Our findings support the view that the price of digital content is a main factor affecting the extent of piracy (see Bhattacharjee et al. 2003). However, price alone cannot explain the phenomenon of the wide-spread infringement of copyright. Easiness to obtain the wanted material without actual risks to be caught (also noted by Hill 2007 and Al-Rafee & Cronan 2006), and wide range of contents available on the Internet were the two other main arguments for using digital content illegally. These findings are also in line with earlier research that has argued for lowering the prices and extending the selection of legal digital content (Chiang and Assane 2007).

In respect to price, our study supports the view that at least very low prices (e.g. small monthly charge for unlimited use) could allure pirating consumers to the legal side. The change from using P2P networks to using Spotify to acquire digital music may indicate this trend. It is, however, uncertain how eager consumers are to pay for using Spotify. At the moment all Spotify users in our sample were using the advertisement supported version of Spotify. Although relatively few of the interviewees resisted the chargeable version of the service, it would not be automatic that it would have similar success to what the free one has had. Two questions need to be considered in the future. First, are consumers that are used to get products for free ready to pay for the same products? Second, what is the pricing system that would be preferred by consumers?

Chiou et al. (2005) call for improving the quality of legal digital content. In our sample, quality did not emerge as a key factor for the consumers. The quality of digital music and videos seems to be generally good enough, and in cases where the quality really matters, the consumers still tend to choose the physical counterpart of the product. Nevertheless, improving the quality of the digital products would be highly beneficial when the primary factors (price, ease of acquisition and use, and extensive selection etc.) are sound first.

Although most interviewees found digital piracy legally and often ethically wrong, a major part of them had pirated. As we have presented above, the ethics of using illegal digital content seems to be fuzzy to many young adults. They have some ideas of what is wrong and what is right, but they, excluding some exceptions, are quite indifferent to the legal and ethical issues. Furthermore, they also tend to have a weird interpretation of “Robin Hoodism”, according to which it is right to rob from the wealthy music industry and give to oneself. So, illegal behaviour is tried to be justified by ethical arguments that are quite egoistic (see Shoham et al. 2008). If education of ethical thinking is considered as a means to fight digital piracy, it is necessary to ask how this education should be performed. It is necessary to ask whether younger generations that have often been accused of “easy life” are more selfish in their ethics, meaning that their ethics is different from older generations. Furthermore, it would be interesting to find out whether or not the pirating consumers...
consider that they are not only robbing from the music industry but also from the paying consumers. This “free-rider problem” is relevant to all products that can be considered as public goods (see Rayna 2006).

Although ethics pursue the truth of what is right and wrong, the implementation of it is always biased by the actual context of time and place. This “man is always deficient” limitation should not lead to a giving up mentality. Instead, despite its complexity ethics should be a great resource in building societies for the coming generations. Ethics cannot be taught and adopted in one night. Therefore, it should be a long term strategy that is imbedded in all parts of the societal development.

5. CONCLUSION

In this paper we have presented an interview study through which we aimed to gain information on digital content consumers’ ethical thinking and behaviour. In total, fourteen young consumers (7 female and 7 male) were interviewed. The themes covered both legal and illegal aspects of consuming digital contents.

The primary target of this study was to provide a deeper understanding of consumers’ ethical thinking and its possible consequences on actual behaviour. We believe that our study has brought out issues that can be used, for example, as a starting point for building hypotheses for further studies. In the future, it would be necessary to gather more information on how different pricing mechanisms, improved ease of acquisition and use, and a wide selection of digital material, for example, affect the consumers’ attitudes and, furthermore, actual behaviour in respect to legal commercial acquisition channels.

The main limitation of our study is related to the size of the sample. Fourteen interviews do not provide very much material for generalizations. However, as we noted above, our study was conducted to bring out relevant issues for further studies rather than testing some hypotheses.

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REFERENCES


EXPLORING THE INTERPLAY BETWEEN USERS AND THE EVOLUTION OF DRM

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ABSTRACT
The relationship between humans and technology has undergone several transformations over the years, from technology determinism, to human determinism to a more balanced approach where humans are viewed as influencing technological development and technology is viewed as influencing humans. However, while it is recognized that humans and technology have a mutual influence on each other, limited research has explored in detail the interactions between users and technology as both these elements evolve in an ongoing and intertwined process. This paper aims to address this gap through an in-depth exploration of the evolution of Digital Rights Management (DRM) systems within the music arena. Through this longitudinal exploration of one specific technology and the actions and interactions of users related to it, this paper aims to highlight the intricate and complex relationship between humans and technology, thereby informing future research within this area and the development of theories within the IS field in general.

KEYWORDS
Digital Music Services, User Behavior, Technology Appropriation, Human and Material Agency

1. INTRODUCTION
IT or ICTs and their relationship to society or organizations have undergone several transformations over the years. Original research within this domain tended to follow a technology deterministic perspective where technology was viewed as having an influence on humans. This type of perspective resulted in research focusing on, for example, the use of technology as a driver for organizational change or as a tool to increase competitive advantage (e.g., Hammer, 1990; Porter, and Millar, 1985; Venkatraman, 1991). This perspective was later replaced with a socially grounded view whereby technology was seen as being shaped by humans and society. Science and Technology Studies (STS) with efforts such as the Social Construction of Technology (SCOT) (Bijker, Hughes, and Pinch, 1987) emphasized the impact of humans and their multiple perspectives of technology on the very shape and form of that technology. This approach, however, was later criticized as placing too much emphasis on the social.

During the 1980’s more balanced approaches were introduced whereby the technical and social were treated more equally. The groundbreaking work of Kling and Scacchi (1982) with their “web model” for example, emphasized that technology is situated within a social context and that this context is an important part of understanding the technology. This gave birth to the “social informatics” research sub-field and other efforts and approaches related to the dual emphasis of technology and humans. However, in 2001, Orlikowski and Ioacono (2001) examined the state of research within the IS field to explore how IS research had progressed from deterministic models following the work of Kling and Scacchi mentioned above. Unfortunately, they found that the core subject matter of our field, namely technology, was nearly nonexistent in our research. This prompted a call for more focus on the technology.

To date, however, research within the IS field still tends to prefer either humans or technology. Little analytical work has attempted to explore the interplay of both the technology and the use of the technology within one study as the technology itself evolves; an important point for the generation of theories within the IS field (Hanseth, 2005; Orlikowski et al., 2001). This paper will explore the evolution of Digital Rights Management (DRM) systems in the digital music arena and the actions and interactions of users related to these systems over the course of several years, from 2001-2007. Digital Rights Management is related to the
protection of copyright holder rights in the access and use of content. Due to issues of piracy of digital content online, DRM systems have been integral to online and mobile services offering access to and purchase of digital music. These systems began to be implemented commercially in 2001 and faced several updates and changes over the years until around 2007 when ‘DRM-free’ initiatives were pursued within the digital music industry. User behavior has been an important influence in these various transitions. Through this in depth exploration of DRM systems and the actions and interactions of users related to them, this paper illuminates the emergent and intertwined relationship between humans and technology over time as both elements evolve. By providing empirical evidence and a deeper understanding of the relationship between these two elements, this paper aims to assist in theory generation within the field (Sawyer, and Rosenbaum, 2000).

2. THEORETICAL INSIGHTS

When exploring the relationship between users and technology, a variety of theoretical perspectives are often used as highlighted above. On the one hand, there are technology focused studies which explore use or user behavior based on certain aspects or attributes of the technology. Of the most popular are various Technology Acceptance (TA) models. TA research is primarily variance oriented, focusing on how specific factors of the technology such as ease of use, intentions, etc. influence users in the technology acceptance process (Ajzen, and Fishbein, 1980; Davis, 1989; Venkatesh, 2000). Diffusion of Innovations (DoI) theory (Rogers, 1995), which focuses on how technology becomes adopted and diffused in society, is also often used. DoI and TA focus on general perceived technological properties and their potential impact on end user acceptance of technology. While fruitful, limitations to both DoI and TA research have also been documented (Lyytinen, and Damsgaard, 2001).

Other research has attempted to move focus away from properties of the technology specifically onto the users. Domestication research, for example, views humans as social actors (Lamb, and Kling, 2003) and highlights the ongoing and intricate process whereby a user adopts and appropriates technology into their daily lives (e.g., Lehtonen, 2003; Lie, and Sørensen, 1996; Ling, 2004; Silverstone, and Haddon, 1996). In the same vein, various ‘structural’ research (e.g., DeSanctis, and Poole, 1994; Orlikowski, 2000) based on Giddens Theory of Structuration (Giddens, 1984), has attempted to explore the emergent nature of structure and its ongoing influence on the use of technology in organizations. Orlikowski (2000), for example, focuses on how different users have different perspectives and understandings of the technology as they use it ‘in-practice’. She argues that focusing on the “technology-in-practice” allows for a deeper understanding of the emergent nature of structure and its role related to technology use in organizations (ibid).

While such structural research does contribute to a better understanding of user behavior of technology, it does so at the expense of the technology, viewing it as a fixed source while focusing only on user behavior. Nicolini et al. (2007), on the other hand take Orlikowski’s work to the next level by focusing specifically on the role of the technology in the change process. However this is done at the expense of the social. This is problematic when we consider that technology today emerges over time - its shape and form is evolving along with the social and material world around it (Orlikowski et al., 2001). Thus, in order to understand technology and use of the technology we need to consider the complex and intertwined relationship between both the technology and the technology in use as one ongoing process (Hanseth, 2005). Actor Network Theory (ANT) is considered by many an appropriate theory for doing just that (Hanseth, Annestad, and Berg, 2004).

ANT (Callon, 1991; Latour, 1987; Monteiro, 2000; Monteiro, and Hanseth, 1995) is focused on exploring the technology and the technology in use as a network. Both humans and non-humans can be a part of this network such that it can consist of organizations, technology and individual users. Through ANT, the focus is both on the social and on the technical together thereby offering agency not only to humans as in structural perspectives, but also to the technology (Rose, Jones, and Truex, 2005). ANT is therefore often considered useful in the exploration of the relationship between technology and humans. Hussnoots’ paper offers a novel approach, combining both elements of Structuration and ANT in the exploration of the adoption of technology. In his paper, several iterations of the adoption of an ICT are explored in detail through the ANT grounded elements of: Controversies, Role of Spokesperson, Intermediary objects and Compromises (p. 338, ibid). While Hussnoots’ paper is focused on various “appropriation paths” generated as the technology is
used, his use of the ANT grounded elements mentioned seems fruitful for an exploration of not just the technology or just the use of the technology, but both together as one evolving process. This paper will therefore adopt and adapt concepts from Hussenot’s paper in order to explore the interplay between the DRM and the use of the DRM. Through such an exploration, this paper aims to uncover the intertwined relationship between user behavior related to DRM systems and the DRM systems themselves in the overall evolution of DRM in the digital music arena.

3. CASE STUDY AND METHODOLOGY

This paper follows a case study approach (Benbaset, Goldstein, and Mead, 1987; Galliers, 1991) with primary data collection occurring through the use of documents (Silverman, 2001). Two main sources of documents were used for the collection of data. One is an online website dedicated to Digital Rights Management and the other offers a daily e-mail service which posts updates on news in the digital music arena in general. Data was collected from these two sources over the course of several years, with historical queries beginning from 2001. This marks the time when the music industry saw its first commercial uses of DRM systems in online and mobile services.

Data collection involved both keyword searches and other targeted exploration of these two primary sources. As such over 660 files with approximately 450 lines each and an entire website organized around various subject areas such as “DRM Standards”, “Online Content Services”, etc. where consulted. Data from these were compiled and organized chronologically according to actor focus (such as users, content providers, and regulation). Further, secondary sources such as various organizational websites, consumer organizations, industry alliances, etc. were consulted when necessary. Such secondary websites, including those from actors such as the Recording Industry Association of America and International Federation of the Phonographic Industry (IFPI) were particularly useful in the user behavior aspect of the study.

The aim through this exploration was to explore the evolution and role of the DRM technology and the role of various key factors such as the law, technology and users in this evolution. This paper focuses on the user behavior component of this study. While it is of course difficult to impose such rigid boundaries on the area of exploration and un-realistic to claim direct influences of one factor on another without also considering the co-influence of others, such delineation is often necessary in order to frame the research setting. The results of this research will now be presented.

3.1 DRM Transformations

In general, the progression of DRM in the digital music industry can be grouped into 5 main stages. The first is the no DRM/Piracy stage. This marks the birth of online music and was made possible by services such as the (illegal) Peer to Peer file sharing service Napster developed in 1999. Following this, the second evolution began when the first ‘legal’ online music services using DRM were developed in 2001. These were launched primarily by the record labels themselves and implemented the DRM in such a way as to limit actual distribution of content. For example, services such as Pressplay (Duet) and MusicNet offered streaming and downloading of music on a subscription basis. This meant that music could be played and accessed as long as the subscription was maintained. Thus DRM in this stage was focused on maintaining a rental model for content – content could be used and accessed but was not physically ‘owned’ by the user.

In April 2003, Apple’s iTunes was launched. This marks the third evolution of DRM and for many the beginning of feasible digital music services. Apple implemented their own proprietary DRM system called “Fairplay” which they did not license to other device manufacturers. Thus, the launch of the iTunes music service was intricately linked to the Apple iPod mobile music device, so much so that it has often been said that the iPod was what fuelled Apple’s success with iTunes (Gasser, Bambauer, Harlow, Hoffmann, Hwang, Krog, Mohr, Reidel, Slater, Wilson, and Palfrey, 2004). Music purchased through iTunes allowed for much more freedom of use as music was ‘owned’ by the user and did not expire with the subscription as with previous services. However, users were essentially locked into using Apple’s iPod. From 2003 to around 2005, the number of available music services with various DRM systems and devices expanded dramatically. With all these devices and non-compatible DRM systems, interoperability became a major issue and concern (IFPI, 2005; OECD, 2005). This led to the fourth stage of DRM with much focus on cross-device access and
partnerships between various online, mobile and device manufactures. DRM systems were thus implemented to facilitate partnerships and certain interoperability while still maintaining control and customer lock-in. The number of mobile music devices and DRM systems however continued to expand. In 2007, over 120 million mobile music devices were sold worldwide (IFPI, 2007). The lack of interoperability reached criticality and the market saw no other option than to begin to explore DRM-free/relaxed music initiatives (IFPI, 2008). This marks the fifth and final transformation of DRM discussed in this paper.

3.2 Use of Services and DRM

When the first online music services became available in 2001, only .2% of music was purchased through digital downloads (RIAA, 2008). By 2009, more than 25% of record companies’ revenues came from digital sources (IFPI, 2010). And between 2003 and 2007, the value of global digital music sales went from $20 million to $2.9 billion (IFPI, 2008). Thus it is clear that at a very high level, users did use digital downloads including DRM more as these services matured and the years progressed. In order to delve deeper into the behavior of users during this period, the actions of specific users and user groups will be presented in the remainder of this section.

From 2001 to 2003, limited legal music services were available and use of digital music in general was still developing. As such, sharing music files over P2P networks on the internet gained popularity. Already in 2000 69% of users who downloaded music through the internet did so through either Napster or MP3.com (Lenhart, and Fox, 2000). The record industry, however, was determined to combat this illegal sharing of music. In September 2003, individual users were targeted when the RIAA took its first mass legal action against users illegally sharing music files over the internet (Borland, 2003). In 2003, Apples iTunes was also launched. By 2004, users used legal music services such as Apples iTunes enough that record companies were able to post their first gains from sales of digital content (IFPI, 2005). Apples iTunes was fortunate to have not only positive user acceptance when it was launched in 2003 but it also became the world’s largest music retailer in 2008. However, much of this has been attributed to user popularity of the iPOD device (Gasser et al., 2004) rather than necessarily user acceptance of the DRM. Both consumer research at that time indicated that strict DRM systems limiting freedom of use were not desired by users (Jupiter, 2003) and individual users themselves looked for ways to avoid the existing DRM systems. For example, “QTFairUse” was developed and made available by Jon Lech Johansen (DVD Jon) in November 2003 aimed at circumventing Apples “FairPlay” DRM.

Interoperability and lock-in concerns continued to surface more widely. In January 2005 an individual consumer filed suit against Apple due to the iPOD lock-in (BBC, 2005). This was followed by actions by consumer groups in France (Smith, 2005) and consumer agencies across Scandinavia and Europe in early 2007 (Forbrukerombudet, 2007) specifically related to limitations imposed on users due to strict DRM schemes. These efforts continued until January 2009 when Apple released their new iTunes store with DRM-free downloads. Users also joined forces with each other and established various user groups targeted at removing or at least making DRM more user-friendly and less restrictive. One of the most well known is the Electronic Foundation Frontier, which was started already in 1990. While DRM is not the only focus of such groups, it plays an integral role in the freedom of use of content. Other user groups have more directly focused on removing DRM [46] or facilitated free use of music through the establishment and maintenance of various file sharing websites such as The Pirate Bay. DRM concerns have also entered political arenas with activists lobbying against strict content control. In 2006 the Swedish Pirate Party was established as a political party, which has spread to many other countries across the world, to deal in part with fair use of content and DRM.

4. DISCUSSION

As discussed above, DRM went through several transformations or iterations from 2001 to 2007. Through each of these iterations, use of the services and DRM developed and changed to influence further iterations. To explore this in more detail, user behavior within each DRM transformation will be discussed through the ANT grounded elements of use: Controversies, Role of Spokespersons, Intermediary Objects, and Compromises (Hussenot, 2008). Controversies and Compromises are those elements which refer to the actual
experiences and use of the DRM. Spokespersons can be thought of as those ‘super users’ which bring use by ‘average’ users to the forefront. And finally, Intermediary Objects refer to specific elements or attributes of the technology that are of particular concern within that iteration and the next. See table 1.

Table 1. User Behavior and DRM Iterations
Adopted and adapted from p. 343 (Hussenot, 2008)

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<tr>
<td>Controversies</td>
<td>Piracy of digital music and lack of control</td>
<td>Limited music catalogs through legal sources, difficult to use</td>
<td>Lock-in to specific services or devices such as iPod</td>
<td>Lack of interoperability between devices and services</td>
<td>Loss of control of digital content vs. freedom of use</td>
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<tr>
<td>Role of Spokespersons</td>
<td>Use of P2P services; launch of market for digital music</td>
<td>Sampling of services yet continued use of P2P’s</td>
<td>Blogs and other medium to inform and educate public about DRM</td>
<td>Continued momentum towards non.DRM</td>
<td>Ongoing efforts for freedom of content use</td>
</tr>
<tr>
<td>Intermediary Objects</td>
<td>Broadband proliferation and ability to copy CD’s onto PC</td>
<td>Lawsuits and legal actions against file sharers</td>
<td>Portable devices such as iPod</td>
<td>Large proliferation of services and devices available</td>
<td>Bundling of services with ISP’s/mobile operators</td>
</tr>
<tr>
<td>Compromises</td>
<td>Patchy levels of service, limited users, security</td>
<td>Not all music available, P2P’s easier</td>
<td>Legally controlled use scenarios</td>
<td>Service bound to specific device or service provider</td>
<td>Price or music bound to device or provider</td>
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Stage 1- No DRM/P2P: Before the first digital music services were developed in 2001, P2P services set the stage for the future of digital music. As more and more users became connected to the internet and discovered P2P services and the ability to copy and share music, an entire industry was born (Alderman, 2001). During this time, users were just being introduced to the concept of internet and PC based music.

Rights management was still a minor element of this iteration and the record industry was not yet aware of the power the internet and P2P would have on their business. By the time the industry realized what was happening, it attempted to stop P2P file sharing activities through legal action against Napster and regain control of their content. This resulted in publicity for Napster and even more activity on the network until it was eventually forced to shut down. While Napster was fairly user friendly, there are in inherent security risks with P2P networks and transferring material between users through such a system. In addition, while there was generally a fair amount of music available through the original Napster, it of course did not offer full music catalogs, etc. as was available through bricks and mortar record stores. Use of the service in its early days was also clustered to specific user groups, such as college students who were both highly interested in music and had high speed internet access through college campuses. Despite this, the novelty of being able to access music online from home or a dorm room for free was alluring for many people.

Stage 2 – Rental/Subscription Models: The record industry struggled to catch up to P2P services and launch their own ‘legal’ music services. Combined with this, they also began to facilitate legal action against not only the P2P networks themselves but also individual users. These two efforts were aimed at taking back control of content and the digital music market. As such, the first music services launched were based on the concept of strict usage rights. Music could be listened to through streaming services or through subscriptions. However, once users ended their subscription, the music could no longer be played. The original services of Pressplay and MusicNet also offered users a limited catalog of music. Each service was started by rival recording studios and as such only offered music from their own catalog (it was not until the second half of 2002 that music from all 5 major labels was available in one place). Thus, a user might have had to search several legal services to find the music they were looking for. Users also found the services difficult to use and restrictive. All of this resulted in a poor comparison to P2P services offering track after track of music without a cost.

Stage 3 – A-la Carte Models: Following the relative failure of their initial venture into the digital music market, the recording industry began to adopt a more balanced perspective between content control and content use. With the launch of music services with DRM allowing for the downloading of digital music to PC’s and the transfer to portable devices like the iPod, legal digital music services were finally able to
compete with free. The iPOD as a portable device attracted many users to the digital music arena yet the iPOD coupled with the iTunes service is what won many users over. At the time, Apple was claimed to have struck a “revolutionary” agreement with the record labels in terms of their use of DRM and corresponding user experience with regards to use of music purchased through iTunes. Among the main differences is that users were able to purchase music which they owned ‘forever’ (with DRM) and they were able to purchase both individual songs and full albums. Once the novelty wore off, however, users began to look more and more towards the limitations of DRM, specifically related to lock-in to music formats with corresponding rights management systems and devices. Blogs and various user groups began to surface and DRM in general gained more publicity specifically related to it limiting users legal fair use of content under Copyright Law. The law suits from the RIAA initiated towards illegal file sharers also contributed to a more heightened awareness and publicity surrounding DRM in general. Users began to look for options around restrictive DRM implementations in order to gain more freedom of use of music.

Stage 4 – Alliances: More and more players entered the digital music arena including device manufacturers, service providers, ISP’s, mobile operators, etc.. Various DRM schemes and music formats provided a compatibility nightmare and users became overwhelmed with choices. Confusion around DRM and compatibility of music formats and devices also began to heighten. Various actors attempted to form alliances and ease some of the use issues associated with non-compatible DRM systems. Users continued to use various legal music services, however lock-in continued to be an issue. As did the inability for some users to transfer and use music files the way they had anticipated. The concept of DRM as well as the actual term began to enter mainstream. Users began to take action both individually towards their service providers but also, and perhaps more importantly, they began to mobilize. Consumer groups began to address the issue of DRM incompatibilities and restrictions of use of content under Copyright law.

Stage 5 – Non/Relaxed DRM: The sheer number of DRM schemes and formats lead to an interoperability nightmare. Consumer demand towards freedom of use reached criticality and the industry saw no other way forward than to begin to relax DRM schemes. The pressure to remove DRM or at least make it more user friendly finally paid off for users and services began to be launched with less DRM restrictions. Industry players attempted to balance their interests of remaining in control of content use with user expectations and desires related to use of the content. This resulted in compromises related to price and use of content. The new services launched tended to offer various versions of the same product, some with higher prices which included better quality of the content and less DRM along with existing ones which included DRM. Others ventured towards new models of bundling music downloads with, for example, mobile services and devices. This offered more freedom of use, yet still controlled content use to a certain extent as it was bound to the service provider and device. Consumer response to these services has been varying and the anti-DRM movement continues. Where DRM is heading in the next stage remains to be seen.

5. CONCLUSION

As is evident from the above, Digital Rights Management has progressed through several stages over the years as has use of services involving DRM. The industry was caught off guard with the development and success of early P2P file sharing networks such as Napster. Before the entertainment industry had a chance to react, music files where copied and made available without DRM protection on the internet. When the record labels and service providers did finally pursue digital music initiatives, they proceeded in a cautious manner with strict DRM implementations. This was a mismatch, however, to user expectations of content use without restrictions which were formed due to their references (Blechar, Constantiou, and Damsgaard, 2006) both with their previous experience with CD’s and their early tastes of P2P services.

As an overall trend, users thus became more and more concerned with the restrictions of DRM systems as they became more aware of the services available and savvier users of the technology. While use of the very first legal digital music services was limited, Apple brought the use of digital music services into the mainstream with the launch of the iPOD. Yet, once users became more familiar with the inner workings of such digital music services and specifically became aware of DRM, a general dissatisfaction with DRM limiting freedom of use was registered. This continued to build as more and more portable devices were developed and more actors entered the market until finally the only next step was to relax DRM schemes to move closer to use without restrictions.
By exploring user behavior in detail within each DRM transformation through the ANT inspired elements of Controversies, Compromises, Roles of Spokesperson and Intermediary Objects, there appears to be a constant adjusting of the technology and user behavior with each progressive iteration of the DRM technology; as users become familiar with the technology, use evolves. Then so does the technology, which again spurs adjustments and influences to use, etc. This reflective and progressive process seems to be continuously ongoing as various actors make sense of their environment.

While there are of course many influences in this environment, user behavior being just one, this paper has highlighted the complex and intricately linked relationship between user behavior and technology. And while we of course cannot claim specific causal items such as certain user behavior alone resulting in a change to the DRM, we can see how DRM transformations and user actions align and relate. This paper has also illustrated the usefulness of applying the ANT inspired elements of Controversies, Compromises, Roles of Spokesperson and Intermediary Objects in order to explore both these elements in tandem.

While this paper has focused on user behavior and technology, there are of course several other actors and elements which could have been named in the transformations including the regulatory regime surrounding Digital Rights Management and the DRM systems themselves. However, by black boxing the elements of user behavior and DRM we are able to bring the humans and the technology to the forefront. Research in this domain should be continued to further explore the role and evolution of technology along with varying other influences within the environment.

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HOW ADULTS VIEW VIRTUAL COMMUNITY? – FROM THE PERSPECTIVE OF SOCIAL CAPITAL, COMPARISON WITH REAL COMMUNITY AND LOAN ACTIVITY

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Assistant Professor*, Department of Information & Electronic Commerce, Kainan University, No. 1, Kainan Road, Luchu, Taoyuan County, Taiwan

ABSTRACT
This study compares virtual and real communities (formed by kin, friends and social entities in the real world) via the perspective of social capital and focuses on lending activity, a type of instrumental social support. Adults who are 20 year old and above are of interest to this study. This study shows that social capital of virtual community is lower than real community. Compared to real community, virtual community also does not perform well in instrumental social support. Social capital (through number of different positions accessed) in the real world is influential when loan amount is small.

KEYWORDS
Social capital; loan activity; real community; virtual community.

1. INTRODUCTION
Web 2.0 encourages Internet users to provide online content and join virtual communities (Rheingold, 1993). Social networking websites (e.g. MySpace and Facebook) are highly popular (Lipsman, 2007). Users can engage in online social activities, build and maintain social capital (Ellison et al., 2006; Ganley and Lampe, 2009), and in the process be rewarded with socioeconomic resources.

People rely on social networks for social support (Lee et al., 2005; Vaux, 1988). Social support can come as emotional support (e.g. caring and sympathy), instrumental support (e.g. material aid and behavioral assistance), information support (e.g. information and advice), affectionate support (e.g. expression of love) and social companionship (Leung and Lee, 2005).

Given that there are plenty of talks about the growing importance and mobilizing power of virtual community, its active role in building and maintaining relationship, co-existence of real and virtual community, and array of social support, who or which network to turn to for what type of social support and how virtual community fares in this context are thus interesting research topics. Many studies on virtual community focus on social support in the form of sociability, fun and information seeking (Leung and Lee, 2005) and college students or emerging adults are often the subjects of investigation (e.g. Arnett, 2000; Steinfield et al., 2008; Boyd, 2008). More studies can be done on how adults view virtual community, especially how virtual community fares when compared to real community in terms of social capital and provision of instrumental support.

This study hopes to address this issue. This study considers adults who are 20 year old and above, and compares the virtual and real community formed by them. The comparison is through the perspective of social capital (Lin, 1999), and focuses on lending activity, a form of instrumental social support. As this study deals with adults and not the more computer literate teenagers, technology readiness (Parasuraman, 2000) is used to factor in adults’ receptiveness to technology.
2. LITERATURE REVIEW

Social capital, trust and social network are three dimensions of the same social phenomenon (Ferrary, 2003). Social capital (Bourdieu, 1985; Van Der Gaag and Snijders, 2004) refers to the advantages and opportunities accrued to people by belonging to certain community. It is a set of social resources embedded in relationships (Burt, 1992; Loury, 1977) and is accumulated through relationships (Coleman, 1988). Social capital can be the property of communities and nations (Fukuyama, 1995; Putnam, 1993). At the individual level, its importance lies in the benefit of social support (Requena, 2003) and is widely felt in many facets of life such as job search (Granovetter, 1973) and income differences (Carroll and Teo, 1996).

Social relationship generates trust that in turn glues community together and enforces norms of behavior (Anderson and Jack, 2002; Granovetter, 1985). It is an important lubricant of social activities (Arrow, 1974). A kind of reputation effect (Milgrom and Roberts, 1992), trust is the extent to which people find strangers trustworthy and is based on “a sense of confidence that others will respond as expected and will act in mutually supportive ways, or at least that others do not intend to do harm” (Onyx and Bullen, 2000). Higher level of social capital is associated with higher level of trust (Banfield, 1958).

Social network is closely related to the social support a member may get in time of needs and emergency (Bian and Ang, 1997; Levy and Pescosolida, 2002; Lin, 2001). Social support involves the flow between people of emotional concern, instrumental aid, information, or appraisal (House, 1986). Earlier studies have shown that networks are not equal in provision of social support. Social support is more forthcoming from neighborhood solidarities (Wellman, 1999) where members are more tightly bounded and possess stronger relationship. Chinese societies are found on human relationships (Hwang, 1987). Real community formed by families, friends and neighbors is a major resource for one to achieve its personal goals (Chuang and Chuang, 2008; Lee et al., 2005) and is also a critical component when doing business (Hamilton, 1996). Kin ties are more involved in instrumental support while non-kin ties are for emotional support and social companionship (Freeman and Ruan, 1997; Wellman and Wortley, 1990). Friendship can be a source of support for single young adults (Bellotti, 2008). Making use of the social affordances of Internet, virtual communities are “mediated social spaces in the digital environment that allow groups to form and be sustained primarily through ongoing communication processes”, and most virtual communities are organized around some distinct interest, members feel a “consciousness of kin”, create and use shared conventions and language, create Internet content actively and membership is driven by volitional choice (Bagozzi and Dholakia, 2002).

Lending is a trust intensive activity and comes with adverse selection and moral hazard (Ferrary, 2003; Shapiro and Stiglitz, 1984). Whether lending takes place depends on the extent financier trusts financee (Guiso et al., 2004). It is also closely related to social capital and intensity of relationship. The same study suggests that one will resort to institutional credit rather than informal loan in country with high level of social capital. Getting a loan from relative or close friend is more likely in low social capital area. Good relation is a lubricant leading to a loan. Firms with embedded relations are more likely to receive credit at lower cost (Uzzi, 1999). Availability and terms of bank loan to small and medium-sized firms is also influenced by social interactions between loan officer and bank manager (Lehmann and Neuberger, 2001).

Online social networking sites involve whether users are mentally receptive to technology. Hence, technology readiness (TR) is used to handle this aspect. TR refers to the “propensity to embrace and use new technologies for accomplishing goals in home life and at work” (Parasuraman, 2000). It comprises inhibitors (discomfort and insecurity) and contributors (optimism and innovativeness). TR has been used in a wide-range of consumer market and technology-related issues (Massey et al., 2007).

3. RESEARCH METHOD

A questionnaire-based survey was administered through a series of interpersonal interviews. Only adults (20 year old and above) were included. The survey comprised four parts. First part dealt with demographic profile. Second part probed their views on technology and to what extent they used Internet. The former was obtained via 21 Likert-like statements covering the different dimensions of TR, with ‘1’ indicating ‘strongly disagree’ to ‘5’ indicating ‘strongly agree’. Respondents were asked how often they accessed Internet and used email. They were also asked to provide the extent they used 16 online applications through Likert-like statements with ‘1’ indicating ‘very little’ to ‘4’ indicating ‘very often’. The third part covered social capital.
Respondents were asked whether members of real world and virtual world were trustworthy, willing to help and took advantage if opportunities arose. Position generator method (Lin and Dumin, 1986; Lin et al., 2001) was used to measure individuals’ access to social capital. It is suitable to characterize networks helpfulness in instrumental actions (Bantilan and Padmaja, 2008). Using a list of 24 occupations with occupational prestige varying from 22 (cleaner) to 85 (legislator), and followed the Standard International Occupational Prestige Scale (Ganzeboom and Treiman,1996), respondents were asked if they knew any of them in the real and virtual world. If a person was known initially in the real world and was now extended to the virtual world, that person was categorized as real world. Four indexes were then constructed: extensity of accessibility (number of different positions accessed), upper reachability of accessed social capital (highest prestige occupation accessed), lower reachability (lowest prestige occupation accessed) and range of accessibility to different hierarchical occupations (distance between the highest and lowest accessed occupations). Through a list of 12 loan-seeking methods from the real community (e.g. family members, relatives, neighbors, close friends), virtual community (friends on the Internet) and financial institutions (e.g. banks, credit or cash cards, insurance policy loans), the fourth part asked respondents to state the first and second top choice to seek loan amounting to 1-2 months and more than 3 months of their current or last drawn salary.

4. RESULTS

Ninety-six (96) interviews were conducted (Table 1). All the respondents were adults (20 year old and above), 57 (59.4%) were male, 77 (80.2%) received tertiary education and 41 (42.7%) were married. The respondents were generally familiar with computer and Internet (Table 2) and used them in their jobs. Eighty-nine (92.7%) respondents accessed Internet once or more per day, 90 (93.8%) had at least an email account and among them, 77 had 2 or more email accounts.

Table 1. Profile of respondents

<table>
<thead>
<tr>
<th></th>
<th>No.</th>
<th>%</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>57</td>
<td>59.4</td>
<td>27</td>
<td>28.1</td>
</tr>
<tr>
<td>Female</td>
<td>39</td>
<td>40.6</td>
<td>45</td>
<td>46.9</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>55</td>
<td>57.3</td>
<td>24</td>
<td>25</td>
</tr>
<tr>
<td>Married</td>
<td>41</td>
<td>42.7</td>
<td>6</td>
<td>6.3</td>
</tr>
<tr>
<td>Employment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>81</td>
<td>84.3</td>
<td>13</td>
<td>13.5</td>
</tr>
<tr>
<td>Unemployed</td>
<td>15</td>
<td>15.7</td>
<td>77</td>
<td>80.2</td>
</tr>
</tbody>
</table>

Table 2. Access to Internet

<table>
<thead>
<tr>
<th></th>
<th>No.</th>
<th>%</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of Web</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Once or more per day</td>
<td>89</td>
<td>92.7</td>
<td>0</td>
<td>6.2</td>
</tr>
<tr>
<td>Two-three time per week</td>
<td>2</td>
<td>2.1</td>
<td>1</td>
<td>24</td>
</tr>
<tr>
<td>Once every week or less</td>
<td>5</td>
<td>5.2</td>
<td>2</td>
<td>47</td>
</tr>
<tr>
<td>Email Account</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>90</td>
<td>93.7</td>
<td>3</td>
<td>10.4</td>
</tr>
<tr>
<td>No</td>
<td>6</td>
<td>6.3</td>
<td>4 or more</td>
<td>9</td>
</tr>
</tbody>
</table>

Factor analysis, using principal axis factoring with varimax rotation as the extraction method, was applied on questions related to the 16 online applications. KMO statistics was 0.789 with Bartlett Test of Sphericity being significant (758.58, \( p=0.00 \)), hence factor analysis was appropriate. Four factors were extracted (Table 3) and named appropriately as information seeking, socializing, transaction (merchandise) and transaction (financial). Cronbach’s alpha showed acceptable or high reliability. ANOVA test showed that the mean of these 4 groups were significantly different (F=163.99, \( p<0.05 \)). Information seeking was the most popular (Table 3), followed by transaction (merchandise), socializing and transaction (financial).

Factor analysis was also conducted on questions related to TR. KMO statistics was 0.790 with Bartlett Test of Sphericity being significant (930.47, \( p=0.00 \)). Five factors were extracted (Table 4) and named as innovativeness, optimism, insecurity, discomfort (technology) and discomfort (social). Cronbach’s alpha for each factor indicated acceptable or high reliability. ANOVA test showed that the mean of these five factors (Table 4) were significantly different (F=58.872, \( p<0.05 \)). Optimism has the highest mean (3.90).
Table 3. Factor analysis (online applications)

<table>
<thead>
<tr>
<th>Factor</th>
<th>Description</th>
<th>Mean</th>
<th>SD</th>
<th>Eigenvalue</th>
<th>Variance</th>
<th>Cronbach Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor 1: Information Seeking</td>
<td>[Mean = 3.51, SD = 0.806]</td>
<td>3.51</td>
<td>0.806</td>
<td>5.251</td>
<td>32.822%</td>
<td>0.821</td>
</tr>
<tr>
<td>Email</td>
<td>.520</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surf for Information</td>
<td>.767</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transmit Information</td>
<td>.789</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classify Information</td>
<td>.869</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blog</td>
<td>.598</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multimedia (e.g Youtube)</td>
<td>.544</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factor 2: Socializing</td>
<td>[Mean = 2.28, SD = 1.182]</td>
<td>2.28</td>
<td>1.182</td>
<td>2.443</td>
<td>15.269%</td>
<td>0.800</td>
</tr>
<tr>
<td>Chit-chat</td>
<td>.859</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Make Friend</td>
<td>.789</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instant Messaging</td>
<td>.649</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factor 3: Transaction (Merchandise)</td>
<td>[Mean = 2.39, SD = 1.079]</td>
<td>2.39</td>
<td>1.079</td>
<td>1.891</td>
<td>11.821%</td>
<td>0.842</td>
</tr>
<tr>
<td>Buying via e-tailers</td>
<td>.875</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bidding at e-auction platform</td>
<td>.906</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selling via Internet</td>
<td>.548</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factor 4: Transaction (Financial)</td>
<td>[Mean = 2.19, SD = 1.244]</td>
<td>2.19</td>
<td>1.244</td>
<td>1.255</td>
<td>7.842%</td>
<td>0.637</td>
</tr>
<tr>
<td>Online Share Buying/Selling</td>
<td>.716</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Online Banking</td>
<td>.726</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotating Credit Association</td>
<td>.689</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Table 4. Factor analysis (technology readiness)

<table>
<thead>
<tr>
<th>Factor</th>
<th>Description</th>
<th>Mean</th>
<th>SD</th>
<th>Eigenvalue</th>
<th>Variance</th>
<th>Cronbach Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor 1 Optimism</td>
<td>[Mean = 3.90, SD = 0.86]</td>
<td>3.90</td>
<td>0.86</td>
<td>5.855</td>
<td>27.882%</td>
<td>0.882</td>
</tr>
<tr>
<td>I like to use computer for work because there is no time restriction</td>
<td>.780</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I like to use advanced technology</td>
<td>.723</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>I like the idea that software is accommodative to my requirements</td>
<td>.786</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technology can improve efficiency in what I am doing</td>
<td>.827</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New technology can stimulate me intellectually</td>
<td>.675</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technology offers me more freedom</td>
<td>.761</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning technology can bring me new benefits</td>
<td>.659</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factor 2: Innovativeness</td>
<td>[Mean = 3.26, SD = 1.00]</td>
<td>3.26</td>
<td>1.00</td>
<td>2.910</td>
<td>13.857%</td>
<td>0.896</td>
</tr>
<tr>
<td>Others will come to seek my opinion on new technology</td>
<td>.792</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am often the first one among my friends to obtain new technology</td>
<td>.854</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can follow technology of those domain which I am interested in</td>
<td>.761</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am able to accept the challenge brought about by new technology</td>
<td>.803</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When using technology, I don’t face as much problem as others</td>
<td>.710</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factor 3: Insecurity</td>
<td>[Mean = 3.72, SD = 0.958]</td>
<td>3.72</td>
<td>0.958</td>
<td>2.307</td>
<td>10.987%</td>
<td>0.742</td>
</tr>
<tr>
<td>Keying in my credit card number into the computer is not safe</td>
<td>.686</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I don’t think doing financial transaction online is secure</td>
<td>.772</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am worry that online information I sent out can be seen by others</td>
<td>.746</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I want written confirmation for any online transaction I make</td>
<td>.736</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factor 4: Discomfort (Technology)</td>
<td>[Mean = 2.97, SD = 0.963]</td>
<td>2.97</td>
<td>0.963</td>
<td>1.456</td>
<td>6.932%</td>
<td>0.685</td>
</tr>
<tr>
<td>New technology is not meant for general population</td>
<td>.744</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factor 5: Discomfort (Social)</td>
<td>[Mean = 3.70, SD = 0.904]</td>
<td>3.70</td>
<td>0.904</td>
<td>1.302</td>
<td>6.199%</td>
<td>0.680</td>
</tr>
<tr>
<td>After I use the new technology, I discover that it can bring me harm</td>
<td>.792</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New technology allows government and enterprises to monitor us</td>
<td>.797</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
Respondents felt that people in the real world were more trustworthy than the virtual world (Table 5). Seventy-one (73.9%) thought that about half or more in the real world could be trusted but it was only 44 (45.9%) in the virtual world. Eighty five (88.6%) and 78(81.3%) thought that more than half of the people in the real world would extend a helping hand and not take advantage of them respectively. However, the corresponding figures in the virtual world were only 49 (51.0%) and 63(65.6%). Overall, social capital in the real world was higher than virtual world. Position generator analysis also showed that virtual community possessed less social capital than real world (Table 6). Independent t-test showed that the three indexes: extensity, range, upper and lower reachability were significantly different across real and virtual community.

<table>
<thead>
<tr>
<th>Do you think people can be trusted?</th>
<th>Real World</th>
<th>Virtual World</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almost all cannot be trusted</td>
<td>9</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Most cannot be trusted</td>
<td>16</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>About half can be trusted</td>
<td>29</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Most can be trusted</td>
<td>39</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Almost all can be trusted</td>
<td>3</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Do you think people will extend a helping hand?</th>
<th>Real World</th>
<th>Virtual World</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almost all will not</td>
<td>2</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Most will not</td>
<td>9</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>About half will</td>
<td>34</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>Most will</td>
<td>42</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Almost all will</td>
<td>9</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Do you think people will take advantage of you when opportunity arises?</th>
<th>Real World</th>
<th>Virtual World</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almost all will</td>
<td>2</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Most will</td>
<td>16</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>About half will not</td>
<td>26</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>Most will not</td>
<td>40</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Almost all will not</td>
<td>12</td>
<td>11</td>
<td></td>
</tr>
</tbody>
</table>

Table 6. Social capital (position generator analysis)

<table>
<thead>
<tr>
<th>Community</th>
<th>Real</th>
<th>Virtual</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean S.D.</td>
<td>Mean S.D.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extensity</td>
<td>8.83</td>
<td>5.519</td>
<td>2.975</td>
</tr>
<tr>
<td>Range</td>
<td>40.44</td>
<td>15.200</td>
<td>9.10</td>
</tr>
<tr>
<td>Upper Reachability</td>
<td>71.70</td>
<td>11.315</td>
<td>29.87</td>
</tr>
<tr>
<td>Lower Reachability</td>
<td>31.26</td>
<td>9.715</td>
<td>20.77</td>
</tr>
</tbody>
</table>

* p<0.05

Regardless of loan amount, loan from family members was the first and top two choices. Banks as a source of loan was the second most popular choice after family members, and banks were more popular if loan amount was 3 month and above. Close friends and relatives occupied the third and fourth position respectively. The result showed the importance of informal over formal credit sources in loan activity. In addition, online friend only played a very minor role as a source of loan.

Even though online friend had a very minor role in this form of instrumental support, this study proceeded with a logistic regression analysis to confirm whether social capital had a role in providing loan. In this case, analysis was done on two samples for loan amounting to 1-2 month of salary: respondents who selected parents and relatives as their first top two choices and respondents who chose banks as their first top two choices. The dependent variable was whether one approach parents and relatives, or banks for loan. The model significantly predicted with omnibus chi-square=19.256, df=8, \( p=0.014 \), and Hosmer-Lemeshow Test gave \( p=0.687 \) which met test’s requirement that \( p>0.05 \). The model accounted for between 25.6% and 40.5% of the variance and overall 86.2% was successfully predicted. Table 8 showed that the higher the extensity of real world, the more likely they would approach banks for loan. Another logistic regression analysis was conducted for loan amounting to 3 month or more and no significant result was found. A possible reason is increasingly, the loan amount starts to be beyond the ability of close kin.
Table 7. Top two choices to seek loan

<table>
<thead>
<tr>
<th>Loan amounting to:</th>
<th>1-2 month of salary</th>
<th>3 month and above of salary</th>
<th>1st Choice</th>
<th>2nd Choice</th>
<th>Total 1st Choice</th>
<th>2nd Choice</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2 month of salary</td>
<td></td>
<td></td>
<td>73</td>
<td>11</td>
<td>84</td>
<td>66</td>
<td>12</td>
</tr>
<tr>
<td>3 month and above of salary</td>
<td></td>
<td></td>
<td>13</td>
<td>30</td>
<td>43</td>
<td>26</td>
<td>55</td>
</tr>
<tr>
<td>Close Friends</td>
<td></td>
<td></td>
<td>7</td>
<td>28</td>
<td>35</td>
<td>3</td>
<td>18</td>
</tr>
<tr>
<td>Relatives</td>
<td></td>
<td></td>
<td>3</td>
<td>18</td>
<td>21</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>Credit or Cash Cards</td>
<td></td>
<td></td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Insurance Policy Loans</td>
<td></td>
<td></td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Neighbors</td>
<td></td>
<td></td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Friends on the Internet</td>
<td></td>
<td></td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Farmers and Fishermen Associations</td>
<td></td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Rotating Credit Associations</td>
<td></td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: No respondent chose Normal Friends and Pawnshops regardless of loan amount

Table 8. Logistic regression

<table>
<thead>
<tr>
<th>Factor</th>
<th>B</th>
<th>S.E</th>
<th>Wald</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>-.288</td>
<td>.865</td>
<td>.111</td>
</tr>
<tr>
<td>Year of Birth</td>
<td>-.063</td>
<td>.053</td>
<td>1.424</td>
</tr>
<tr>
<td>Marital Status</td>
<td>1.145</td>
<td>.995</td>
<td>1.324</td>
</tr>
<tr>
<td>Educational Level</td>
<td>.898</td>
<td>.558</td>
<td>2.587</td>
</tr>
<tr>
<td>Income Level</td>
<td>.352</td>
<td>.252</td>
<td>1.943</td>
</tr>
<tr>
<td>Extensity (Real)</td>
<td>.244</td>
<td>.117</td>
<td>4.366*</td>
</tr>
<tr>
<td>Upper Reachability (Real)</td>
<td>-.036</td>
<td>.055</td>
<td>.422</td>
</tr>
<tr>
<td>Lower Reachability (Real)</td>
<td>-.049</td>
<td>.092</td>
<td>.288</td>
</tr>
</tbody>
</table>

*p<0.05

5. DISCUSSION

This study clearly shows that even for a group who access Internet and use its applications, social capital of virtual community is lower than real community. Members of the virtual community are felt to be less trustworthy, less willing to extend a helping hand and more willing to take advantage when opportunities arise. The number of people known (measured through extensity index) and its diversity (measured through range index) in virtual community are also much lower than real community. People are also likely to know people of higher occupational prestige in the real world than in the virtual world. Hence, the total social resources, best resources available and its differentiation are poorer in virtual community. One key reason is Internet users tend to use pseudo name to hide their true identity, hence generating distrust and limits the usefulness of virtual community members when needs arise. Another reason is people use Internet to stay in contact with acquaintances already known in the real world (which is counted as part of the real community in this study). This is also prevalent in emerging adults (Subrahmanyam et al., 2008) where they use social networking sites to connect with people from their offline lives and do not look for strangers or add strangers to their virtual social network.

Virtual community also does not perform well in instrumental social support (in this case, loan) despite the hype about virtual community. Unlike family members, relatives and friends who are more likely to provide instrumental social support, online friends play a very minor role. With the exception of a few, virtual community are more associated with weak ties and bridging social capital (Granovetter, 1973; Putnam, 2000), i.e. loose connections between individuals instead of strong ties and bonding social capital.

Loan activity clearly shows the limitation of virtual community. Firstly, logistic regression analysis shows that social capital has an impact on loan of small amount. The higher the social capital, reflected through the more people one know (extensity) in the real world, the more likely they will go through formal credit institutions. This finding confirms earlier studies such as Guiso et al. (2004). When it comes to virtual world, its low social capital contributes to online friends playing a very minor role. The number of people and trust in the virtual world are simply not sufficient for people to seek loan or for lenders to offer loan.
Instead, people will resort to real world for instrumental social support (loan) or financial institutions for loan.

The results of this study can be used as a starting point to further understand the dynamic of virtual community and the provision of social support. One future research direction is to compare adult’s view of online communities with teenager’s view. This study focuses on loan activity, a form of instrumental social support which may be demanding to the providers. However, not all types of social support are demanding. Social capital needed may also be less for such supports. This will require confirmation in future study.

6. CONCLUSION

This study shows that social capital of virtual community is lower than real community. Compared to real community, virtual community also does not perform well in instrumental social support. Social capital (through extensity - number of different positions accessed) accumulated in the real world is influential when the loan amount is small.

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House, J. S., 1986. Social Support and the Quality and Quantity of Life. In Andrew, F. M. (ed.), Research on the Quality of Life, Survey Research Center, Institute for Social Research, University of Michigan, Ann Arbor, MI.
TRANSFORMING SPARE TIME INTO PRODUCTIVE TIME: INVESTIGATING TURKERS MOTIVATION TO WORK

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ABSTRACT
Every human being that has almost a basic literacy is able to accomplish simple routine information-processing tasks like categorizing objects, labeling and comparing images. These tasks are trivial and simple to describe for humans but challenging even for the most sophisticated computer. Therefore, for all this tasks human capital rather than computer capital seems to be more suitable and productive. Nowadays, in response to this need, we are experiencing the growth of new labor market intermediaries over the Web where businesses outsource routine work from remote locations to an indistinct mass of workers and people lend their basic information processing capabilities to employers. In this paper we focus on a new electronic market intermediary called Mechanical Turk and on motivations expressed by its workers (known as turkers) using the Grounded Theory methodology applied to attestations left by turkers in online forums and blogs. Above the others the core category emerging from our study is ”the transformation of spare time in productive time” that makes turkers different from teleworkers and therefore eligible to be studied. Turkers don’t have a fixed employer, they have time to spend and they want it to be the more productive possible. And Mechanical Turk is at present the best tool to invest spare time.

KEYWORDS
Mechanical Turk, electronic labor market, crowdsourcing, Grounded Theory, distributed human computation

1. INTRODUCTION
Every human being that has almost a basic literacy is able to accomplish simple routine information-processing tasks like categorizing objects, writing simple sentences or labeling and comparing images. In the nineteenth century, technological innovations fostered the demand for these kind of tasks as testified by the sharply increase of clerking occupations. More recently, computerization substitutes for workers in executing routine tasks given rise to an increase in the demand of more educate workers (Autor et al., 2003). Nevertheless, there is a boundary to the substitution carried on by computer capital towards routine work. This boundary is given by the existence of tasks that are trivial and simple to describe for humans but challenging even for the most sophisticated computer program like image recognition, natural language processing or scenes understanding in presence of varying degrees of background noise, incompleteness and distortion (Ahn, 2008; Kenaw, 2008). Therefore, for all this tasks human capital rather than computer capital seems to be more suitable and productive. Nowadays, in response to this need, we are experiencing the growth of new labor market intermediaries over the Web (Autor, 2001) where businesses have the chance to outsource routine work from remote locations to an indistinct mass of workers and people could lend their basic information processing capabilities to employers (Zittrain, 2008) becoming “processors in a distributed system, each performing a small part of a massive computation. In this work we will focus our research on electronic labor markets in which routine tasks are exchanged. We motivate this choice by our research problem, that is: we want to explore why workers participate voluntarily and actively in a new working environment that appears to be the worst possible case scenario: routine cognitive tasks rather than non routine cognitive tasks, that is service work instead of knowledge work and no fixed relationship with an employer, that is no assurance of a wage. We will focus on a new electronic market intermediary called Mechanical Turk (www.mturk.com) and on motivations expressed by workers (known as turkers)
participating in it. Since there is no academic literature, to the extent known by the authors, which directly address the problem of explaining turkers’ motivation then we will refer to distributed work arrangements literature and particularly to the telecommuting or teleworking strands of research that study motivation of people working at least part of the time at home. Yet there is still no research on what constitute the motivation of people participating in new electronic routine labor markets where the allocation of work and pay are directly and continuously contracted and where there is no fixed relationship between employers and employees. Therefore, the purpose of this paper is to fill this research gap by providing an exploration of what constitutes the motivation of people working in mechanical Turk. Given the exploratory purpose of this research we decided to use the Grounded Theory method applied to attestations left by turkers in online forums and blogs. This work outlines the motivation of people working from home in online electronic markets which exchange routine work (Mechanical Turk) differentiating them from teleworkers.

2. BACKGROUND LITERATURE

A common misassumption when applying Grounded Theory is that a researcher has to enter the field without any knowledge of what prior research has established during years or, also, that researchers have to read existing literature only after data collection and analysis has been completed (Suddaby, 2006). Consequently we decided to review, before collecting and analyzing data, both literature that specifically address Mechanical Turk as a new electronic labor market and literature about what motivates people to telework. We did this not with the aim to test hypothesis derived from literature review but to enhance our ability of observing and contextualizing the phenomenon (i.e., the motivation of people participating in Mechanical Turk). In this work, we will refer to telework as “working outside the conventional workplace and communicating with it by way of telecommunications or computer based technology” (Bailey & Kurland, 2002). This definition is useful because it specifies that we are not dealing with other forms of distributed work arrangements such as flexible work or hotelling. In Mechanical Turk the boundaries of the concept of workplace and of relationship employer-employee are more than ever blurry, indeed: “Mechanical Turk is a service that provides a virtual marketplace where requesters advertise micro tasks and human workers complete them […] is based on the idea that there are still many things that human beings do more efficiently than computers […] it gives businesses immediate access to a diverse, geographically dispersed, on-demand, scalable workforce and gives workers a selection of thousands of tasks to complete whenever and wherever it's convenient.” While such new intermediaries in electronic labor markets are not receiving much attention from literature, two recent proposals could help to conceptualize their properties and characteristics (Quinn & Bederson, 2009; Malone et al., 2009). We review here the work from Quinn & Bederson (2009) because it directly cites Mechanical Turk. The authors offer a taxonomy to compare key characteristics of distributed human computation systems. The taxonomy has been built around six dimensions, namely: motivation, quality, aggregation, human skill, participation time and cognitive load. Mechanical Turk is cited in this proposal as an example of mechanized labor, that is a form of crowdsourcing distinguished by the use of pay as a motivation to work; the use of expert review (review of work done by employers) to support quality; the presence of an high number of small independent not aggregable tasks; and variable human skills, participation time and cognitive load required.

<table>
<thead>
<tr>
<th>Table 1. Factors influencing people to telework</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor</td>
</tr>
<tr>
<td>Travel reduction</td>
</tr>
<tr>
<td>Time to commute</td>
</tr>
<tr>
<td>Distance to commute</td>
</tr>
<tr>
<td>Balance work and family duties</td>
</tr>
<tr>
<td>Gender</td>
</tr>
<tr>
<td>Family life cycle stage</td>
</tr>
<tr>
<td>Occupation</td>
</tr>
<tr>
<td>Work style</td>
</tr>
<tr>
<td>Lack of interruptions</td>
</tr>
<tr>
<td>Lack of noise</td>
</tr>
<tr>
<td>Computer proficiency levels</td>
</tr>
</tbody>
</table>
As indicated, we also conducted a literature review about the motivation of people who decide to telework and extrapolated a set of factors that guided our comprehension of this phenomenon while using Grounded Theory on the data collected (table 1). During the literature review the first thing that we noticed is the difference of methodological approaches and data sources. Furthermore, while factors used to explain the motivation of people to telework are more or less the same in all works, results are often contradictory and difficult to interpret. For example, the distance to commute and the balance of work and family duties do not appear to be the primary motives for telework in some works (Bailey & Kurland, 2002) while in others are considered as relevant in explaining the tendency to work at home (Doherty et al., 2000; Walls & Safirova, 2004).

As noticed above, because of the broad definition of telework and the application of empirical studies to sometimes very different realities with different methodologies, a problem of contradictory findings exists and a unique answer to the question of why some people opt to work remotely is still left open (Cooper & Kurland, 2002). Furthermore, the majority of the works analyzed here considered teleworkers that have in some way a direct relationship with an employer. Yet there is no research on what constitute the motivation of people participating in new electronic routine labor markets where an indistinct mass of people (the crowd) choose whenever and wherever to work and with whom. For this reason, in this paper, we address the following research question:

**RQ1:** What is the theory that explains the motivation of people to participate in Mechanical Turk?

### 3. METHOD

We used the Grounded Theory methodology to explore our research question due to the exploratory objective of this research and to the absence of a theory in literature which could describe the motivation of people participating in Mechanical Turk. Grounded Theory is an “inductive methodology developed by Glaser and Strauss used to generate theory through the systematic and simultaneous process of data collection and analysis.” (Goulding, 2002). Through Grounded Theory a researcher seeks to generate a theory to obtain a deep understanding of a phenomenon (i.e., social processes in human interactions). The theory is generated from empirical data collected from people who have experienced the phenomenon. Consequently, the first step is to collect data from these individuals. While analyzing data could emerge the necessity to include other units of analysis not pertaining to the original group. This is known as theoretical sampling and is “the process of data collection for generating theory whereby the analyst jointly collects, codes, and analyzes his data and decides what data to collect next and where to find the data, in order to develop his/her theory as it emerges” (Glaser, 1978). Therefore, sampling is not guided by statistical rules but is decided contextually with the data analysis and is influenced by the growing theory. As well as researchers are coding the data and categories and themes emerge from the analysis, they must also constantly compare those themes and categories to gain a deep understanding of their differences and similarities: this process, known as constant comparison, enhances the identification of concepts. Constant comparison is an ongoing feature of the process (Goulding, 2002) that ends when theoretical saturation is reached, that is when no additional insights emerge from data.

### 4. SAMPLE, DATA COLLECTION AND ANALYSIS

We decided to start our sampling by investigating the two largest turkers’ online forum known as “turker nation” and “mturk forum”. After reading some threads we noticed that the majority of annotations regarding the motivation to participate in Mechanical Turk where situated in the introduction section of both online
forums. Therefore, first we collected and started to analyze data from introductions sections for a total of 596 posts (table 2).

Table 2. Data sources and sample characteristics

<table>
<thead>
<tr>
<th>Data source</th>
<th>Posts</th>
<th>Link</th>
<th>Last visited on</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turker nation</td>
<td>235</td>
<td><a href="http://turkers.proboards.com">http://turkers.proboards.com</a></td>
<td>15th February 2010</td>
</tr>
<tr>
<td>Mechanical turk forum</td>
<td>361</td>
<td><a href="http://www.mturkforum.com">http://www.mturkforum.com</a></td>
<td>15th February 2010</td>
</tr>
<tr>
<td>Helium</td>
<td>6</td>
<td><a href="http://www.helium.com">http://www.helium.com</a></td>
<td>20th February 2010</td>
</tr>
<tr>
<td>Mechanical turk diaries</td>
<td>316</td>
<td><a href="http://mechanicalturkdiaries.com">http://mechanicalturkdiaries.com</a></td>
<td>06th March 2010</td>
</tr>
</tbody>
</table>

While contextually analyzing data and consistent with the concept of theoretical sampling, we decided to search the Web for every transcribed experience of people experiencing the phenomenon of working in Mechanical Turk. In this way, we were able to find the blog Mechanical Turk diaries and some articles on helium, a citizen journalism platform. We first analyzed six article from helium and then the 316 posts on mechanical turk diaries. We reached theoretical saturation nearly at the end of the blog “mechanical turk diaries”. For the last 30 posts we did not do any open coding because all the emerging categories and properties were already been coded before. The process of data analysis was conducted following the constant comparison method. According to Grounded Theory method we started the analysis using open coding defined by Goulding (2002) as analyzing “line by line in an attempt to identify keywords or phrases which connect the informant’s account to the experience under investigation”. For the open coding process we used in vivo coding, that is coding based on actual words used by turkers. As a result of this process we generated first-order categories (table 3) To move from open coding to axial coding (the process by which categories are related to subcategories at the level of properties and dimensions) and to selective coding (that is to identify the core category and link all the subcategory to it) we relied on two instruments described in Scott & Howell (2008): the conditional relationship guide for axial coding and the reflective coding matrix for selective coding.

Table 3. Open coding example

<table>
<thead>
<tr>
<th>In vivo codes</th>
<th>First –Order Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doing experience</td>
<td></td>
</tr>
<tr>
<td>Improving skills</td>
<td></td>
</tr>
<tr>
<td>Skill building</td>
<td></td>
</tr>
<tr>
<td>Better my skills in something (e.g., writing)</td>
<td>Practicing and improving skills</td>
</tr>
<tr>
<td>Mturk as a tool of practice</td>
<td></td>
</tr>
</tbody>
</table>

As stated in Chiovitti & Piran (2003) there are eight methods of research practice for enhancing standards of rigour in Grounded Theory research grouped in three categories, named credibility, auditability and fittingness. During this work we addressed all three categories. Nevertheless, because of the data source used (online forum discussion versus interviews) we didn’t have the opportunity to follow some proposed methods, like: modifying the interview guide during the process or checking generated theoretical construction by direct questioning participants.

5. FINDINGS

The selective coding matrix helped us to move to the final stage of the analysis: the interpretation of the theory in a storyline. A storyline is defined as a “narrative focused on the central categories, embodying the Grounded Theory of the phenomenon under study” (Garson, 2008). Therefore, we developed and tested on data a storyline that relates categories with a core category (i.e., the central idea, event or happening). Other categories had been then related to this core category as Processes (sequences of evolving action/interaction taking place over time) Properties (general or specific characteristics or attributes of a category), Dimensions (range along which properties of a category vary), Contexts (connot the environment or ecology of the processes) and Modes for understanding process outcome (Mello & Flint, 2009). To explain the storyline we present below six processes that relate to the core category. We would like to outline that a process is
meaningful only in that it builds on the previous one, in this way “the participants’ story is understood only through the evolution” (Scott & Howell, 2008). The storyline is the response to the research question RQ1.

5.1 Actual Working and Family Conditions

It all starts with the process of actual working and family conditions described by the property amount of time devoted to work (table 4). Our data indicates that some dimensions influence negatively the amount of time devoted to work during the day giving rise to the (planned or unplanned) generation of free time. Working full time, for example, augment the amount of time devoted to work unless that primary work is perceived as boring: this fact stimulates people to decrease working time. In the same way, a part time job or no job at all as well as having free time from kids it diminishes the amount of time that is devoted to work in traditional ways. As a consequence people cope with an increasing amount of free time. The context inside which this process is evolving is that of the recent USA financial crisis but it’s also made of real life work problems (with colleagues, with the chief, etc.) or events (like retirement) or people with disabilities or experiencing boring jobs. Even if we could argue here some similarity between motivation of teleworkers and turkers one distinctive feature appears to be recursive inside data: no one of the participants in online forums and blogs chosen actively to change their work condition and to telework. They all suffered the context and decided to face the growing amount of free time.

In our data the concept of free time is always connected to the word home except for free time generated while doing a boring primary job. Home is therefore the locus of free time: but how will people manage it?

Table 4. Actual working and family conditions

<table>
<thead>
<tr>
<th>Process</th>
<th>Actual working and family conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property</td>
<td>Amount of time devoted to Work</td>
</tr>
<tr>
<td>Dimensions</td>
<td>Employed Vs unemployed; Still productive Vs no more productive; full time Vs Part time; Working Vs studying; No free time from kids Vs Free times from kids; not boring Vs Primary work boring.</td>
</tr>
<tr>
<td>Context</td>
<td>Economic crisis; Real life work problems; Physical disabilities; primary work is slow</td>
</tr>
<tr>
<td>Mode</td>
<td>Generation of Free time</td>
</tr>
</tbody>
</table>

5.2 Transforming Spare Time in Productive Time and Manage It

As motivations to work in Mechanical Turk emerged during the data analysis a concept/process became more and more important (table 5): first, people refers to free time with the adjective spare, (i.e., unplanned free time) that justify what is said above about the choose to actively telework. Second, a problem emerged about how to manage spare time in order to face toward actual working and family conditions. For this activity to take place, a personal effort to be productive during spare time is needed. Consequently, the property of management of spare time is performed with various degrees depending on its dimensions. Indeed, people will manage spare time to give time a sense, to invest in free time, to not waste in free time, to not be pointless, to create profit, to pass the time to do something worthwhile and to reduce the sense of guilty associated with relaxing (especially when another family member is working). The outcome of this second process is the active will to transform spare time into productive time. There appears to be a connection here to what teleworkers experience during their work time: teleworkers and turkers have in common the possibility to manage their own time while working to increase their own productivity. Despite that, turkers show an absolutist approach in that they use every spare time available (it could be a day or a minute), also while doing other activities and they didn’t care for interruptions (the absence of which is factor motivating people to telework). Therefore, turkers show an incredible will to transform spare time in productive time which encompasses the boundaries of a normal working day. In the words of some of them: “every night while we watch TV, I turk during commercials”; “if I’m not doing anything or watching a movie I’ll pop on mturk and do a quick hit for some quick cash”; “a better way to use my spare minutes than freecell”; “much better than wasting time on blogs or Youtube”; “it keeps me from going to the mall everyday or watching daytime television, so it has been worth it”.

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Table 5. Transforming Spare Time in productive time and managing it

<table>
<thead>
<tr>
<th>Process</th>
<th>Transforming Spare Time in productive time and managing it</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property</td>
<td>Management of spare time</td>
</tr>
<tr>
<td>Dimensions</td>
<td>Don’t giving time a sense Vs Giving time a sense; don’t investing in free time Vs Investing in free time; Waste time Vs don’t Waste time; Pointless Vs not pointless; not profitable time Vs Profitable time; Annoying Vs Pass time; Sense of guilty associated with relaxing Vs not guilty; Do something not worthwhile Vs Do something worthwhile</td>
</tr>
<tr>
<td>Context</td>
<td>Personal effort to be productive during spare time</td>
</tr>
<tr>
<td>Mode</td>
<td>Generation of productive time</td>
</tr>
</tbody>
</table>

5.3 Working from Home

As turkers decide to invest in their spare time they start the process of working from home that has as its main characteristic the experienced freedom of choice (table 6). The freedom of choice has various dimensions along which it varies: the possibility to choose non formal clothing, no commute cost, the possibility to control working time, to not suffer sexual discrimination and to choose the tasks they like. This process shows the maximum similarity with the literature about teleworkers. It means that, even if the difference in the choice that brings people to telework or to use Mechanical Turk as discussed above, the fact to work from home has some shared advantages, like travel reduction, time to commute, distance to commute, lack of interruptions, lack of noise, flexibility.

Table 6. Working from home

<table>
<thead>
<tr>
<th>Process</th>
<th>Working from home</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property</td>
<td>freedom of choice</td>
</tr>
<tr>
<td>Dimensions</td>
<td>Formal clothing Vs non formal clothing; commute cost Vs No commute cost; No Control of your time Vs control of your time; Sexual Discrimination Vs No sexual discrimination; don’t choose a job Vs Choose Jobs I like; Background noise Vs lack of background noise</td>
</tr>
<tr>
<td>Context</td>
<td>Being at home; Transforming spare time in productive time</td>
</tr>
<tr>
<td>Mode</td>
<td>Freedom of organizing productive time</td>
</tr>
</tbody>
</table>

5.4 Earning Cash

At this point in the storyline, we observed the development of two subsequent and strong interrelated processes based on the organization of productive time: the possibility to earn cash and to reinforce the behavior through personal satisfaction. Earning cash brings economic satisfaction which could vary due to the amount gained (table 7).

Table 7. Earning cash

<table>
<thead>
<tr>
<th>Process</th>
<th>Earning cash</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property</td>
<td>Economic satisfaction</td>
</tr>
<tr>
<td>Dimensions</td>
<td>normal cash Vs Extra cash; normal family income Vs alternative family income;</td>
</tr>
<tr>
<td>Context</td>
<td>Doing experience; Practicing and improving skills; Mechanical Turk qualifications</td>
</tr>
<tr>
<td>Mode</td>
<td>Generating extra cash</td>
</tr>
</tbody>
</table>

Therefore, handling extra cash or the perceived possibility to have an alternative family income will generate economic satisfaction. Mechanical Turk qualifications allow employers to restrict the access to one or to a set of tasks only to those workers that match the required qualification. Doing experience and practicing and improving skills enable turkers to pass qualifications tests and to choose more tasks and consequently to earn more

5.5 Reinforce the Behavior

Together and interwoven with earning cash another process emerged from data (table 8). Indeed, while doing tasks turkers experience a sense of personal satisfaction that reinforces the behavior of transforming spare
time in productive time. Under the condition that tasks are not rejected by the employers or that working in Mechanical Turk is mental challenging, fun or instructive, turkers experience a wide range of dimensions that reduce or augment personal satisfaction. The possibility to participate to consumerism activities (like doing Christmas gift), the self assurance of own capabilities and the finding to be still productive in spite of actual working and family conditions or the independence from family income for personal needs and the possibility to relax and pass time while stimulating the brain. In the words of some participants: “I've paid for all of Christmas and home improvement projects”; “play money... money the wife can't dictate where money goes”; “rewarding feeling you get when you can take care of the financial needs of you family”; “turking it's fun, turking sessions together to my friends to see who earn the most money”; “After being off for 6 months from work at least I can feel a sense of accomplishment at the end of the day when I do work for requesters on mturk”; “it breaks the monotony and engage my thought process”.

Table 8. Reinforce the behavior

<table>
<thead>
<tr>
<th>Process</th>
<th>Reinforce the behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property</td>
<td>Personal Satisfaction</td>
</tr>
<tr>
<td>Dimensions</td>
<td></td>
</tr>
<tr>
<td>Not participating to consumerism activities Vs Participate to consumerism activities</td>
<td></td>
</tr>
<tr>
<td>No Self assurance in own capabilities Vs Self assurance in own capabilities;</td>
<td></td>
</tr>
<tr>
<td>Don’t feel productive Vs feeling productive; not Brain stimulating Vs Brain stimulating;</td>
<td></td>
</tr>
<tr>
<td>To not relax Vs To relax; to not pass time Vs To pass time;</td>
<td></td>
</tr>
<tr>
<td>dependence from family income for personal needs Vs Little personal monetary independence</td>
<td></td>
</tr>
<tr>
<td>Context</td>
<td>Learning; Sense of Fun; Mental challenging; Works done are accepted</td>
</tr>
<tr>
<td>Mode</td>
<td>Involved in Mechanical Turk</td>
</tr>
</tbody>
</table>

5.6 Becoming Addicted

In some cases, the process of reinforcing the behavior became so frequent that it creates addiction. Moreover, because most of the tasks are, in the words of a turker, “pretty brainless” the workload is perceived as low. Addiction, in the data analyzed, presents vary degrees (Table 9) and surely not all turkers experience this last process. Indeed, some of them have little or no personal satisfaction and use Mechanical Turk only to gain extra cash. Some of them dedicate only little spare time during the day to work in this electronic market and maybe only for fun. But some of them, and not so few, use the adjective addicted when describing their motivation about working in Mechanical Turk: “completely and hopelessly addicted”; “we are addicted to Mechanical Turk”; “I'm here at the 2 am switching between and doing hits”.

Table 9. Becoming addicted

<table>
<thead>
<tr>
<th>Process</th>
<th>Becoming Addicted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property</td>
<td>Addiction</td>
</tr>
<tr>
<td>Dimensions</td>
<td></td>
</tr>
<tr>
<td>Not Completely Vs Completely; with hope Vs hopelessly; Not Hooked Vs Hooked; Able to give up Vs Unable give up</td>
<td></td>
</tr>
<tr>
<td>Context</td>
<td>Perceived mturk workload</td>
</tr>
<tr>
<td>Mode</td>
<td>Participating constantly in Mturk for a long time</td>
</tr>
</tbody>
</table>

6. CONCLUSION

As it’s easy to perceive the storyline presented above could be told, through properties and their dimensions, in different ways and from different perspectives. Even if some turkers don’t go through all the six processes what is clearly visible, what is shared between them is what emerged from data as the core category: the transformation of spare time in productive time. This characteristic made turkers different from teleworkers and therefore eligible to be studied. Teleworkers depend most part from an employer and all their actions are devoted and directed to/by this relationship, the center of their activities is the primary work they already have. Turkers don’t have a fixed employer, they have time to spend and they want it to be the more productive possible. And Mechanical Turk is at present the best tool to invest spare time. To further investigate the motivation of turkers to participate in Mechanical Turk it could be interesting to overcome some limitations of this work: first, it should be useful to conduct deep interviews with some turkers to better
investigate how did they experienced the phenomenon. Second, the analysis could be expanded to other electronic markets that exchange routine tasks to better test the storyline developed here.

Indeed, there are many opportunities for future research for the fact that we are observing not only a different type of work but also a new electronic labor market. In fact, as stated above, there is little or no literature about turkers motivation and also about Mechanical Turk as a new kind of electronic market. Who are turkers, how they work, how Mechanical Turk supports the distribution of work over the Web, and what kind of tasks are delivered and how much are they paid and why, are all possible research questions. Despite limitations, our findings serve as a starting point and we hope they stimulate further research.

REFERENCES


INTERACTIVE LEARNING ACTIVITIES SUPPORTED BY WEB-BASED AND VIRTUAL REALITY RESOURCES

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ABSTRACT
This paper presents an educational work that has been carried out within a primary school environment. It has brought about individuals experiencing interactive learning and teaching activities that have stimulated young children and educators developing interdisciplinary knowledge and technical skills related to digital and visual literacy in combination with other curriculum’s sciences. Advanced technologies such as computer graphics, virtual reality, information visualization tools and web-based resources have supported the technical development and sustainability of this work in the context of designing, providing to and supporting individuals’ learning activities which have been expanded lifelong.

KEYWORDS
Digital and visual literacy, cognitive abilities, human computer interaction, communication, interdisciplinary learning.

1. INTRODUCTION

We have carried out educational work within a primary school with support of computer graphics, desktop virtual reality techniques, web-based and other diverse low cost multimedia resources since 2002 [Franco, et al. 2006]; [Franco et al. 2008]; [Franco and Lopes 2009a, b and c]. Through this work, we have attempted to decrease current problems of the e-society related to digital and social divide [Ronchi 2009] within a region in the city of Sao Paulo, in which individuals have been under socioeconomic disadvantage [Franco et al. 2006 and 2009]. There is also the challenge of improving underrepresented individuals’ low level of traditional and digital literacy skills [INAF 2005 and 2009]; [Rapunzel 2010] as well as contributing for increasing individuals’ access to high quality information technology and computer science education in all scholar’s levels [CSEDweek 2009]; [Tucker, 2003]; [Goode and Chapman 2009]; [Franco et al 2009].

We have achieved such goals via stimulating ones’ interdisciplinary traditional, digital and visual literacy skills as well as improving their digital culture, creativity and arts abilities towards hands on computer based learning activities supported by computer graphics knowledge based interactions [Alley 2008]; [Franco and Lopes 2009c] within a primary school context [Case and Cunningham 2009].

These learning activities have been developed based on providing to and supporting underrepresented individuals access and domain [Franco et al. 2009]; [Rapunzel 2010] game like advanced technologies [De Freitas 2006] and web-based three-dimensional 3D resources [Luckin et al. 2008]; [Bainbridge, 2010] such as learning how to program Virtual Reality Modeling Language – VRML [Ames et al. 1997]. Learning how to program has been associated to the learning of other curriculum’s sciences [Franco et al 2009].

In this paper we present an ongoing interactive educational work that has brought about individuals experiencing interactive learning and teaching activities. The work has stimulated young children and educators developing interdisciplinary knowledge and technical skills related to digital and visual literacy in combination with other curriculum’s sciences. In particular, we have used computers, 2D and 3D web-based information visualizing tools, interactive computer graphics and desktop virtual reality (VR) techniques on young children’s education.

It is a long term spiral and incremental educational work that has contributed for individuals’ domain the mentioned technologies. This work has also influenced ones’ cognitive and technical skills development for
creating 3D virtual worlds applying advanced and web-based technologies as well as information visualization tools lifelong with autonomy [Franco et al. 2009]; [VRCPAT 2010]; [ICT 2010]; [Chen 2006].

We have carried out the learning activities within the vision that “digital information and related technologies have the potential to make a huge impact on culture and society” and it is a key point for achieving such huge impact to reduce individuals’ inability to handle digital technologies [Ronchi 2009].

Communicating with as well as challenging and stimulating individuals engaging in learning activities [NMC 2009]; [Franco et al. 2009], in which ones can use “computers as paintbrush” [Resnick 2006] has been an effective and sustainable way for improving individuals’ abilities to handle advanced technologies.

Ones’ handle advanced technologies during learning activities have influenced their understanding about the current human computer interaction tendency, which is the convergence of the real and the virtual through 3D interfaces. For instance, we have observed such convergence in online and offline virtual worlds and their use as places for storytelling and interdisciplinary learning [Franco et al. 2007, 2008 and 2009]; [Bainbridge 2010]; [Childers 2010]; [NMC Virtual Worlds 2010].

In addition, this work’s approach has supported “an emerging view of the human-computer interaction that considers the human and computer together as a problem solving system” [Ware 2004]. For instance, it has contributed for reducing the problems highlighted during this introduction and for stimulating women’s domain and improve advanced technology skills since the primary school education [Franco et al. 2009]; [Franco and Lopes 2009c]; [Rapunzel 2010] as we will demonstrate during the case study section.

From here, we present related work, methodology, case study and conclusion sections.

2. RELATED WORK

The project real time programming for underrepresented students’ early literacy [Rapunzel 2010]; Flanagan and Nissenbaum [2007] has focused primarily on what motivates and individual to program computers. Researchers have tried to increase the appeal of computer programming by incorporating aspects of play that could appeal to girls’ interests. Rapunsel is designed to be a game that breaks social and technical stereotypes for both girls and boys. By using “strong role models, a mix of competition and cooperation, and an understandable relationship between cause and effect, the game is meant to foster an accessible, fun, and educational experience” [Rapunzel 2010].

The Laboratory for Virtual Reality, Psychology, Rehabilitation, and Social Neuroscience at the University of Southern California’s Institute for Creative Technologies has engaged in a broad program of research on the brain mechanisms that underlie neurocognitive functioning and emotion regulation in persons throughout the life course using as tools the combination virtual reality psychology and social neuroscience. The researchers believe that the use of virtual and augmented reality is essential component in the evolution of medical and psychological sciences in the digital age. As with any technology applied in these areas, both challenges and opportunities will emerge in how virtual and augmented reality are usefully applied and validated. For instance, the Virtual Reality Cognitive Performance Assessment [VRCPAT 2010] has made “use of virtual environments to create a battery of neuropsychological measures to assess the ways in which the structure and function of the brain relate to specific psychological processes and evident behaviors: attention-vigilance, effort, abstraction-flexibility, executive functioning, spatial organization, visual-motor processing, processing speed, visual memory, verbal abilities, and verbal memory and learning” [ICT 2010].

3. METHODOLOGY

The approach has consisted in mediating ones’ education, through offering to Ernani Silva Bruno Primary School’s individuals and surrounding community interactive formal and informal hands on learning/teaching activities supported by advanced technology [Franco et al 2009]; [WorldViz 2010]. We have carried out a long term spiral and incremental educational work similar to the paradigm that has been used in the software industry development [Pressman, 2006]. The work has used advanced and web-based technology for challenging and influencing individuals improving and sharing knowledge [Franco et al 2006, 2007, 2008 and 2009]; [NMC 2009].

Across learning by doing (trail, error and reflection), we have supported ones’ learning several sciences concepts through using the named advanced technologies within an interdisciplinary vision for problem solving [Franco et al. 2006 and 2009], taking in consideration simple and complex aspects related to the
combination between technology and pedagogy for supporting individuals’ mental models improvements and human development [Kay, 2007].

3.1 Methodology and Tools for Creating Content

Individuals’ creating content has been based on low cost and accessible information visualization tools that have allowed ones learning, integrating and using computer graphics principles and interactive techniques for supporting other sciences and various areas of education improvements as in [Preim and Bartz 2007]; [SIGGRAPH Asia Educators Program 2009].

Paraphrasing Preim and Bartz [2007] we have used the term information visualization based on computer graphics which has provided representations to store 3D geometry and efficient algorithms to render such representations.

During the learning activities individuals have read VRML tutorials such as [Kirner 2007]; [VRML source book on line 1997]; interacted with 3D VRML examples in [Dinos Virtuais 2010]; [Avantilles 2010]; [3D Page of the Week 2010] created 2D and 3D web-based 3D content [Franco et al 2007]; and developed programming skills [Wellington 2010]; [Franco and Lopes 2009a, b and c]; [Garrido 2010].

In addition, we have used other tools that have allowed individuals experiencing image processing (manipulation and creation) with low cost and high quality software programs such as Notepad™ for programming VRML script files; Paint™ and Gimp™ [2010] software for processing images and creating textures; including a 3D modeling tool called Blender™ [2010] also used for creating complex games when applied in combination with Python™ programming language. For visualizing 3D content we have used 3D web browsers such as Cortona 3D Viewer™ [2010]; Vivaty Player™ [2010] and BS Contact™ [2010].

4. CASE STUDY

This work has been developed at a primary school’s computers lab here called Ernani Silva Bruno – (ESB) that is located within a region in the city of Sao Paulo, in which individuals have been under socioeconomic disadvantage [Franco et al. 2006 and 2009]. By using the described approach our work has contributed for decreasing the problems highlighted during this text introduction as well as addressed an intriguing point that is using computer graphics in contexts that touch on real-world problems that affect real people and can be an important part of making a computer science program more effective in attracting and retaining women and students from underrepresented groups in the field [Case and Cunningham 2009]; [Rapunzel 2010].

This case study has support of author1’s participatory observation [ESED 2003]; [Walter 2004]; [PAR Wikipedia 2010] related to the evolution of an 8th grade level student and her interactions with the named advanced technologies. It includes her knowledge development and technical skills improvements for applying them. For instance, this case study shows the 8th grade student reusing, adapting and programming a 3D web based virtual gallery for a presentation based on the theme ‘Brazilian Black Samba Singers’.

It was a collaborative work that took part in a cultural fair at ESB School that happened in the school in June 2009. It was a learning activity, which supported the teaching of Afro-Brazilian Culture in primary and secondary schools in Brazil ruled by the [Law/ Lei No 10.639 2003].

A History’s educator asked to the 8th grade student and her team a research and presentation about the mentioned theme. After that, the 8th grade student went researching in ESB’s computers lab about Brazilians black samba singers from the sixties and seventies. And she asked to the Information and Communication Technology Facilitator (ICT facilitator) support for developing the research and presenting it.

Then, with support of computer graphics knowledge base interactions [Alley 2008] and conversation theory [Sharples 2002] he suggested her to present the research through a 3D virtual gallery simulation.

He suggested this kind of presentation, because since 2007 when she was in the 6th grade, she saw other primary school’s students and the ICT facilitator interacting and developing a 3D Virtual Environment (3DVE) using VRML. And she demonstrated interest in learning how to create 3D content using VRML.

After that, within a spiral and incremental way through regular classes and small scale workshops in the ESB School computers lab, collaborative interactions with her mates in informal learning situations [Franco et al 2009] and via visiting an interactive virtual reality VR game installation called “Projeto CienTec - Nave Mário Schenberg” [2010]; [Franco and Lopes 2008] developed by the Laboratório de Sistemas Integráveis – LSI’s researchers [LSI 2010], she and other ESB’s students learned basics on how to manipulate VRML’s scripts and ways of using advanced technology for developing VR applications.
Back to the school computers lab learning situation, the 8th grade level student said she would like to create a virtual gallery, but she could not remember how to use VRML. Then, the ICT facilitator directed her through a small scale interactive workshop related to VRML programming basic features such as how to open a VRML text file; to read it on a modular way identifying a VRML’s object characteristics such as its size, position, color and texture; as well as to save and to visualize it. This interaction served for improving ICT facilitator and student’s cognitive abilities such as attention, visual and verbal memory [ICT 2010].

As soon as he observed she was feeling comfortable for doing such actions, the ICT facilitator said to her that she could reuse and adapt a 3D virtual gallery that a former student developed for a Portuguese language work related to Charles Chaplin [Franco et al. 2007].

Then, she accepted the challenge based learning [NMC 2009] of reusing and transforming the virtual gallery. She began to do the adaptation by researching on the Internet, editing black singer’s images and put legends on them with the Paint™ software program and redesigning some parts of the 3D virtual gallery. After doing some work, she invited her team and the History’s educator for evaluating the work. They saw the work she did and accepted the idea of creating a multimedia 3D virtual gallery content encompassing still JPEG as well as move MPEG files images. It took about six hours for her researching, programming and editing the work during three afternoon sections figure-1.

Figure 1. A young girl from an 8th grade year in 2009 researching, editing and programming a 3D multimedia Internet-based interface using VRML scripts and Virtual Reality (VR) techniques and sharing knowledge with a classmate inside ESB Primary School’s computers lab (ESBlab)

The work was enhanced with a movie file related to the geography educator speech about Brazilian Carnival. The movie digital file was recorded in February of 2005 during another cultural event that occurred at ESB School. The work was presented on the black culture’s room within ESB’s cultural fair.

5. CONCLUSION

We have developed an interactive educational participatory research work [ESED 2003]; [Walter 2004]; [PAR Wikipedia 2010] that has been supported by the use of advanced technology as a base for interactive learning activities. We have applied the synergy among human’s knowledge, computer hardware and software, computer science and information and communication technology (TIC) as a problem solving system, which has supported to address the problems highlighted on this paper introduction. Through a long term spiral and incremental work, this work learning activities have engaged individuals in formal and informal lifelong learning interactions [Franco et al. 2006, 2007, 2008 and 2009]. The work has also contributed for transforming and sustaining ones’ knowledge and culture for using advanced technology with effectiveness for storytelling such as demonstrated in the case study section and improving ones’ cognitive abilities like spatial organization, visual-motor processing, processing speed, visual memory, verbal abilities, and verbal memory and learning as in the related work [ICT 2010].

This work contribution has achieved its goals at school and beyond. For instance, it has influenced individuals’ lifelong learning attitudes as we will show in the following examples related to two former ESB School’s students [Garrido 2010]; [Wellington 2010].

The first former student, Garrido, that left ESB School at the end of 2007, via an e-mail sent to the ICT facilitator in February 2010, informed that he has done a web designer course and developed further his artwork and creative skills [Garrido, 2010]. His artwork and creative skills have been influenced by improving his knowledge and technical abilities related to digital and visual literacy through the use of advanced 2D and 3D technologies within interdisciplinary combination with other sciences of the curriculum since the primary education. Garrido observed his brother, another former student, and other ESB School’s individuals researching advanced technology and developing 3DVE through reading, programming and
visualizing VRML scripts from 2003 up to 2005 [Franco et al 2006]. For instance, in a similar way that in the 3D VE work related to Chaplin’s artwork that Garrido developed in 2007 [Franco et al 2007] and was reused by the 8th grade student in 2009 as showed in the case study section.

The second former student, Wellington [2010], left school at the end of 2008 and also did a web designer course in 2009 [Franco and Lopes 2009b]. During 2009 he also visited the school several times. And within a volunteer and collaborative way he supported the ICT facilitator teaching other students from 5th, 6th, 7th and 8th grades how to use the named advanced and web-based technologies.

As the 8th grade level girl and the first former ESB’s student, the second former ESB’s student’s lifelong learning attitudes based on advanced technology have showed the relevance of using the named and related technologies for improving underrepresented individuals’ knowledge. For instance, he visited ESB’s computers lab, at the end of November 2009, and through an interactive workshop he showed to author1 his new skills related to using Blender™ software for modeling 3D characters and developing games, including researching and learning how to implement a joystick interface.

There have been limitations for the ICT facilitator supporting the diverse technicalities that involve using advanced technology in primary education. For instance, dealing with the great average number of students per educator, which is around 35 five and providing interactive and supportive learning activities for all; promoting educators training for understanding how the use of the “human-computer interaction that considers the human and computer together as a problem solving system” [Ware 2004] based on advanced technology can support students’ learning curriculum subjects better than in traditional and passive way. For instance, by seeing the use of advanced technology in practice the History’s educator could understand the relevance of developing curriculum content with support of computer graphics and VR techniques.

On the other hand, a sustainable way of reducing these limitations has been to develop collaborative work with other individuals and or institutions such as the examples in the case study section and with the second former student.

In addition, since 2003, due to an increase of advanced technologies within ESB School’s pedagogical practices, a long term collaborative work between Ernani Silva Bruno Primary School and the Laboratório de Sistemas Integráveis (LSI) of the Escola Politécnica from the Universidade of São Paulo has been developed and supported students and educators from ESB understanding how advanced technology can enhance and influence active learning situations. For instance, as showed in the case study section, LSI’s researchers provided and sponsored to ESB’s students and educators a visit for the interactive and immersive virtual reality and storytelling installation that has mixed real and virtual environments and interfaces ‘Projeto Nave Mário Schenberg’ [2010]; [Franco et al 2008].

On the other hand, via the collaborative work with ESB’s individuals, LSI’s researchers have learned how to use and develop advanced technology solutions for improving citizens’ knowledge in diverse learning and entertaining situations [LSI 2010]. And have impacted the e-society [Ronchi 2009] through providing underrepresented individuals opportunities for accessing up to date hardware and creating content handling game like technology [De Freitas 2006] and contributing for decreasing the social and digital divide.

An example of that is the ESB and LSI individuals’ collaborative participation in the project Um Computador por Aluno UCA – which is based on the one-to-one learning model from the Non Governmental Organization One Laptop Per Child [OLPC 2010]; [Franco et al 2009]; [Franco and Lopes 2009a, b and c].

The ongoing collaborative work between ESB and LSI through the UCA project has provided to ESB students and educators sharing knowledge with diverse Brazilian and diverse international researchers and created a collective intelligence for using better ICT resources [Franco et al 2007 and 2009].

Although, that similar to the related work [Rapunzel 2010], we have used in the case study section, the 8th grade level girl’s artwork example for addressing the problem of attracting the female gender to deal with technology, during the ESB’s computers lab regular classes we have attempted to offer equal opportunities for girls and boys direct manipulating advanced technology. Both boys and girls have handled VRML scripts and information visualization tools. And by offering such interactive learning situations we have stimulated underrepresented individuals learning how to program.

We have observed that boys have engaged and used technology more than girls. On the other hand, there has also been an increase on girls’ interest in dominating and using advanced technology with autonomy. For instance, some girls and boys that have not had access to internet at home, they have asked to the ICT facilitator for downloading 3D browser software and VRML tutorials as well as burning a CD at school computers lab.

Using advanced technologies for developing a 3D Virtual Environment has also brought about enhancing ones’ media literacy abilities and cognition’s skills such as “attention-vigilance, spatial organization, visual-
motor processing, visual memory, verbal abilities, and verbal memory and learning” [ICT 2010] such as in the interactive learning example highlighted on the case study section.

Our approach has consisted in mediating ones’ education, by offering to students and educators and school’s surrounding community formal and informal interactive learning/teaching situations for handling advanced technologies. It has provided for individuals learning activities, in which they have been challenged and supported to direct manipulating virtual reality, information and visualization tools, and 2D and 3D web-based technologies as well as used computers as paintbrush [Resnick 2006]; [Franco et al 2006]; [NMC 2009]. During the building of the learning activities and through human to human and human computer interactions, individuals can know, direct manipulate, reflect about and understand the use of the diverse technologies suggested for increasing ones’ knowledge building process.

This work approach is similar to the challenge based learning methodology that has been considered a “new teaching model that incorporates the best aspects of problem based learning, project-based learning, and contextual teaching and learning while focusing on real problems faced in the real world. This model must engage students’ curiosity and desire to learn. It must make the solving of real problems the center of the curriculum, give students access to 21 century tools, and require them to work collaboratively and manage their own time. It must allow students to direct the course of their learning and engage teachers in a supportive, very necessary role as guides” [NMC 2009].

Paraphrasing Papert’s ideas [1980], we have attempted to use computers as powerful and flexible instruments so that many children can each create for themselves something related to a 3D simulation. It has been a key point to support them creating 3D virtual content respecting the affective aspects in the heart and spirit of which one of them. And by doing such action, we believe that have used computers and 2D and 3D digital advanced technologies for stimulating students’ minds to think in a similar way which the gears that Papert [1980] manipulated during his infancy influenced him to improve himself and become a researcher and educator.

Papert’s ideas [1980] have also supported this long term work development. He has considered the computer as the Proteus of machines as well as the device of supporting individuals’ powerful ideas development. “Its essence is its universality, its power to simulate. Because it can take on a thousand forms and can serve a thousand functions, it can appeal to a thousand tastes” Papert [1980].

So, as has been showed in this paper through individuals’ lifelong learning and collaborative work attitudes, developing interactive learning situations supported by web-based and virtual reality resources worth it.

ACKNOWLEDGEMENT

We thank all the educators, students and researchers that have supported this work. God bless you.

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REUSING EXAMPLES OF GENERAL PATTERNS FOR INDEXING AND COMMUNICATING KNOWLEDGE

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ABSTRACT
Analogies can be used in most areas of human communication to highlight points of special interest. The creation of specific, specialised patterns, examples, or analogies for facilitating communication is resource consuming. We therefore hypothesize that there are universal patterns that can be used and reused more economically, compared to specialised patterns, for indexing and communicating knowledge. We have conducted empirical tests with altogether 204 students that each one was given 20 minutes to solve problems from six different scientific areas. The results of our tests show clearly an improvement of their problem solving skill when universal patterns were employed as cognitive aids. The average result of the test group that used universal patterns was 81 per cent higher than that of the control group.

KEYWORDS
Analogy, Problem-solving, Indexing knowledge, Patterns.

1. INTRODUCTION
In learning and problem solving a variety of human cognitive faculties are engaged. One very important cognitive tool is the ability to recognize patterns and using them for heuristic purposes. These patterns are contingent on the culture we grow up in, but, regardless of cultural influences analogies can be used in most modes of human communication to illustrate what is important in a complex or abstract message (Lakoff & Johnson 1980). Analogies can, for instance, be systematically used to focus on structural similarities of two pieces of knowledge, thereby facilitating learning. Research on the cognitive aspects of learning has shown that the situation in which the learning occurs is very important. People usually need a specific description of the context to be able to identify the essence of the knowledge that is conveyed (Salomon 1993). It is, however, often the case that the context in itself is difficult to understand. In such cases analogies can be utilised to create a pre-understanding that is similar to the type of support that is usually provided by an understanding of the context.

A librarian learns to index new books by extracting the most relevant information from the books. This information can then be used to form a metadata pattern that is compared with analogous and already classified patterns in books. Such a use of metadata illustrates how previously understood knowledge can be reused for understanding new knowledge (Day 1997). There are several indications that the cognitive mechanisms for storing and retrieving memories utilise similar classifications. The procedural memory outperforms the declarative memory and the matching of procedures is dominated by the logical relationship between the activity pattern and their effects (Berry & Broadbent 1984). It seems as if analogous patterns of disparate phenomena lend these very same phenomena: structure and credibility (Cohen & Squire 1980; Schacter 1996). Theories similar to that of the procedural memory being more efficient than the declarative memory can be seen in 1) the episodic memory being more efficient than the semantic memory (Tulving...
2002). 2) the differentiation between how human beings utilise implicit versus explicit knowledge (Nonaka & Takeuchi 1995).

Although it is well known that analogies are suited to convey a complex knowledge structure they are sparsely utilised in university teaching. In the scientific world reasoning by analogy has a lower status than rational reasoning, but reasoning by analogy does not have a low status when it is restricted to demonstrating examples of theories. Probably, the main reason for the limited use of analogies is that it is difficult to create suitable analogies. Indeed, it takes a poet to create a good and useful analogy.

We think that this search for good analogies could to some extent be made obsolete if we reused general patterns as contexts for knowledge. We suggest that general patterns can be reused for indexing and communicating a large number of diverse pieces of knowledge. The general patterns can be seen as archetypical instances of real world instances that can be used for the type of intuitive classification that is described in (Edinger & Elder 1999).

In our empirical study, the experiments have been carried out in order to verify/falsify the hypothesis that general patterns can be reused for many different subjects. The idea is that knowledge of a simple set of universal cognitive patterns, related to theoretical learning, linked together in a hierarchy, facilitates learning and problem solving in all theoretical fields. If this would be the case, learning would be easier. Instead of having to spend so much time painstakingly remembering apparently unrelated facts pertaining to each specialized field, students could focus their learning on a simple set of general patterns and ideas that would increase their real understanding of all subjects that could be related to these general patterns. In this way they would learn to see relations rather than just sets of facts. We also hypothesize that the general patterns could speed up the whole process of acquiring knowledge in any subject of choice – as memory is enhanced when new pieces of knowledge can be linked to already existent coherent systems of thought (Lakoff & Johnson 1980).

Our hypothesis was difficult to test since the nature of general patterns and analogies is subjective and intuitive. It is easy to prove that analogies can be used for specific teaching purposes (Chi et al. 1989), but it is difficult to investigate to what extent analogies can be used to create the foundations or principles of how knowledge can be structured in large bodies of knowledge, or be taught at universities.

We investigate to what extent patterns are well suited for creating memory structures or knowledge structures. The famous “restaurant script” (Schank & Abelson 1977) shows clearly how patterns can guide the users actions. It seems, however, as if nobody has succeeded in creating such structures of patterns that can be used on a larger scale. It seems that the major reason is that it is resource consuming to find good and useful patterns for supporting the communication of knowledge. If the range of a general set of patterns is too limited, one would have to develop specialised patterns for a large number of instances of knowledge, which would be a painstaking, and probably an unrealistic, task. Obviously, this indicates the value of our hypothesis, since there is a need for a more economical way to use general patterns to communicate knowledge.

In order to test our hypothesis we decided to investigate the use of general patterns for problem solving. To see whether the students really understood the use of patterns for problem solving or not, we created test problems where a general pattern was the key to the solution of the problem.

If our hypothesis is proven to be true, it will indicate the relevance of following hypotheses:
General patterns -
- can be used for indexing specific, but analogous, instances of knowledge that embody the same general pattern.
- provide a substitution for the context that is needed to understand the specific, specialised knowledge
- can support people in their endeavour to understand deeply, specific, specialised pieces of knowledge, for example, by affording references to instances of knowledge in other areas, exhibiting the same general patterns
- can be used in teaching
- can be used in indexing knowledge on the web
- can facilitate search for knowledge
2. METHODOLOGY AND RESULTS

2.1 Methodology

We selected subjects (topics) for our investigation that together would as much as possible reflect the full range of human intellectual and emotional abilities, and that we, ourselves, were acquainted with. The subjects we chose were mathematics, physics, aesthetics, literature, religion, psychology, and medicine, trying to diversify our choices as much as possible. We looked for simple, basic patterns or theorems, leaving more complex matters for future research. We did not want the patterns to be neither too general, as that would make them less powerful tools for problem solving, nor too detailed, as that would make the patterns applicable only to certain specialized cases. The ease with which we could find patterns in the different subjects varied. Religion and physics seem to abound with conceptual constructs, while, for example, medicine rather seems to be a set of facts connected to each other in a simple, concrete manner. A pattern we could apply to all subjects was that of two complementary qualities, for example, the wave and particle aspects of light in physics.

Having obtained a set of patterns for each subject, we started to look for interdisciplinary similarities of these patterns, i.e., universal patterns, and a unifying hierarchical structure that would link them together. When we had found or constructed such a general hierarchy, we used its constituent patterns and primitives to work out problems for a survey. We created a number of problems from six theoretical fields. We had 60 and then 144 students that we asked to solve the problems within 20 minutes. We wanted to see to what extent the general patterns could affect the understanding needed to find a solution to a problem. The test was specifically designed to see whether a set of general patterns would significantly help the students in solving problems containing structures analogous to those patterns.

For the control group we had a questionnaire prepared with positive affirmations preceding the questions, suggesting that the whole test was very easy and that they would easily come up with good answers. The reason positive suggestions were given to the control group was to make sure that both groups received the same amount and similar quality of instructions, thereby avoiding the Hawthorne effect (Brown 1992). This effect occurs when a group performs better just because they have been provided with more stimuli/information. The test group was given a set of patterns among which there were patterns that contained the structure or abstract idea of the solutions of the problems. The number of patterns outnumbered the number of problems to be solved three or four times. We started our fieldwork with two preliminary tests to see if the questions were suitable. We wanted the questions to be as difficult as possible, since that would show that the students had understood the patterns. We started our fieldwork on the premise that the general patterns had given the students a real understanding of the problems, and that they really had been used as problem solving tools.

In our first preliminary test with 60 students we realised we had made our questions too difficult to solve. Thus, we had to make them easier. As the original questions were creatively too demanding, involving both analytical skills and artistic sensitivity, we had to make the analogies between the given general patterns and the structures of the questions and their answers more apparent.

We also realized that we had been too optimistic about being able to measure people’s answers to the “softer” questions. It seemed, for example, in the case of a poem, that the patterns could even make it more difficult to solve a problem, as the subjects would have an understanding of the poem that would make our patterns contra-productive. We really would have liked to incorporate the “softer” questions into the questionnaire, as that would have made our results more general in nature.

After the second preliminary test, we also noticed that there were a couple of questions and answers that a large part of the subjects already knew. These questions were removed from the test.

In both these trial tests we noticed that many subjects preferred not to answer a question rather than running the risk of submitting an erroneous answer, many times actually guessing the correct answer when asked afterwards. This made us change the instructions given, for example, clarifying that it was not a test testing their intelligence. In our actual test, testing for our hypothesis, 144 students were given about 20 minutes to answer the questions, which were four in number (out of which one had to be dropped from our survey later on). To give the reader an idea of the type of questions we used and the type of answers we expected, the first question with a satisfactory answer follows:
Question 1: In physics, the nature of light has been tested in different ways. In some experiments it has been proven that light has a particle nature, that is, the light we perceive with our eyes comes as a stream of particles. In yet other experiments, it has been proven that light propagates like waves, not unlike waves on lakes and oceans. At the same time, particle and wave natures are opposing, mutually exclusive natures. One cannot, so to speak, be a circle and a square at the same time. Our question is: What could one infer from these results regarding the relationship between the wave and particle natures of light?

The four patterns presented to the students prior to question 1 were:

- Operating systems are used to maintain balance
- A pole and its anti-pole form an integrated whole
- If A is stronger than B and B is stronger than C, then C can overcome B by asking A to conquer B
- The vantage point from which a human being views the world creates the world she lives in

These patterns were presented together with analogous examples of the patterns. In the case of “A pole and its anti-pole form an integrated whole” the given examples were:

- Heat and cold constitute the reverse sides of a coin. Without the one, the other would not exist. Together they describe one aspect of our perception of the world
- In the arts, form and content is spoken of, whether it is in the context of music, literature, sculpture, or paintings. For example, in music, musical notes, harmony, counterpoint are different aspects of its form. In literature, it could be language, metrical form, etc. Content, on the other hand, is what is conveyed or the soul of the piece of art. These two, form and content, could not exist without each other. Literature would not exist without language, and as soon there is language there is also content. Vapidity and emptiness could also be the content of a work of art; in the same way silence is a part of music.

Among the four patterns “A pole and its anti-pole form an integrated whole” was the correct one. As we asked the students to reformulate the general patterns or concepts, using the terminology of the specific questions, a good answer to the question above might have been: Together, the wave and particle natures of light form the one single, integral and indivisible phenomenon of light.

The other three questions of the test, including the one that too many knew the answer to, were:

Question 2: In physics it has been discovered that time moves slower with a person that is in motion relative the time of a stationary observer. We do not expect you to understand this, but from a general perspective we would like to ask the following: If we would generalize this result to other areas, what would it say about the reality each one of us live in and the point of observation each one of us have?

Question 3: If a stick is illuminated from two opposing directions, two shadows form; one green shadow and one red shadow. The red shadow results from the red light illuminating the shaded area of the white light. All areas that are illumined by both red and white light throw back a rose coloured nuance. None of this is surprising. But, in the shadow of the red light the surface reflects the colour green, an area that actually is illumined by the white light. Also, the wavelength of the green light is not actually that of green light. The question is: Which general conclusion might be drawn from the above regarding the ability of human beings to see colour in the real world?

Question 4 (the excluded one): There are psychological tests where patients are shown a picture with a neutral content. In spite of this, the pictures make the patients disclose their unconscious feelings and fantasies. The question is: Could you describe, using simple words, a psychological process that could explain the above.

2.1.1 The Sample

The theoretical population of our survey are all university students. For practical reasons we had to select our sample of students manually. We opted for a class of second year undergraduates, comprising 144 students, studying system sciences. These students should well reflect the theoretical population, as system sciences are interdisciplinary subjects. We wanted them to be acquainted with both the “harder” disciplines, such as mathematics, logic, computer programming, etc., and the “softer” disciplines, for example, social anthropology, design and psychology.
2.2 Results

To be consistent in our judgement of the answers to the questions, we made a template of correct answers, like the suggested answer above. Each answer could be rewarded 0, 0.5, or 1 point. 1 point was awarded fully correct answers, 0 incorrect ones, and 0.5 for partially correct answers.

Occasionally, students would come up with several answers to a single question. In these instances we would give them a full mark if one of the answers was correct, and it answered the question independently of the other answers. We did this as we were mainly looking for the ability to come up with one good idea that could solve a problem. The students’ ability to analyse different ideas, and then choosing one of them to solve a problem did not belong to the domain of our investigation.

Sometimes the answers were not entirely correct, but showed understanding of the spirit, or essence, of the problems. In such cases we awarded the answers 0.5 points, for example: “Light may manifest as either a wave or a particle as we do not know how to observe light”. Similarly, we had to give ourselves the freedom to judge answers intuitively in some cases, as answers containing wordings that should have given them the same mark and meaning according to our template could have slightly different meanings, our main focus being the general understanding of the problems.

As some students paraphrased the patterns, using the terminology of the specific questions, and others did not, we decided to keep a separate count of those who did (shown later in a table), as they in a clearer way had shown an understanding of how analogies work. For example, answering the question above with “The wave and particle natures of light are two expressions of the integral event of light traversing space”, instead of just restating the given pattern “A pole and its anti-pole form an integrated whole”. Those who did not paraphrase the general patterns had of course also shown that they had understood the gist of it, but had not proven it to the same degree. Still, since both types produced correct solutions we decided to give both types of answers a full mark (count of results in Table 1 and 2).

In Table 1 below the main results of our survey are shown. One student in the test group did not fill in any answers. Therefore her test was taken out of the count. Furthermore, some of the students already knew the answers to some of the questions. The answers to these questions were also taken out of the survey. One of the questions had to be dropped altogether, as too many students stated in their test forms that they already knew the answer to that question. (At the end of the test form we asked the students whether they thought the questions were difficult or not, and whether they had previous exposure to the topics of the questions. For the test group, we also asked if they found the given general patterns helpful.)

Table 1. Results of the test. In each category and for each question, the fraction of the answers that were correct is presented. The heading CONTROL refers to test results of the control group and the heading ANALOGIES refers to test results of the group that was given analogous patterns. M = Male and F = Female. The discrepancy between the total number of individuals tested and the sum of the number of individuals tested in each gender category is due to that 3 individuals did not submit their gender

<table>
<thead>
<tr>
<th></th>
<th>CONTROL</th>
<th>ANALOGIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individuals tested</td>
<td>77</td>
<td>67</td>
</tr>
<tr>
<td>Gender</td>
<td>M 42</td>
<td>M 32</td>
</tr>
<tr>
<td></td>
<td>F 33</td>
<td>F 34</td>
</tr>
<tr>
<td>Number of individuals</td>
<td>42%</td>
<td>69%</td>
</tr>
<tr>
<td>Question 1</td>
<td>40%</td>
<td>69%</td>
</tr>
<tr>
<td>Question 1, Both genders</td>
<td>35%</td>
<td>56%</td>
</tr>
<tr>
<td>Question 2</td>
<td>27%</td>
<td>61%</td>
</tr>
<tr>
<td>Question 2, Both genders</td>
<td>28%</td>
<td>45%</td>
</tr>
<tr>
<td>Question 3</td>
<td>19%</td>
<td>47%</td>
</tr>
<tr>
<td>Question 3, Both genders</td>
<td>16%</td>
<td>38%</td>
</tr>
<tr>
<td>Average of question 1-3</td>
<td>28%</td>
<td>59%</td>
</tr>
<tr>
<td>Average of the two tests</td>
<td>26%</td>
<td>35%</td>
</tr>
</tbody>
</table>
In the last row of Table 1 the overall results are shown. As can be seen, the number of correct answers of students in the test group is almost twice that of those in the control group. In Table 2, in the third column, the overall improvement is given in relative numbers.

As can be seen we divided both the test group and the control group into gender categories. The overall result of that division can be seen in the last but second row of Table 1. In Table 2, the relative improvement for each gender can be seen. The gender differences should not be taken too seriously, as the survey was not designed to measure them. We could think of a few plausible reasons for this gender difference. First, as the "softer" questions, questions that culturally, and maybe otherwise, suit women better, had to be excluded from the test, due to that they did not lend themselves to measurement the same way the "harder" questions did, the remaining questions had a gender bias in favour of the men. Second, we cannot disregard the fact that two men drew up and evaluated the whole test.

<table>
<thead>
<tr>
<th>Male</th>
<th>Female</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>111%</td>
<td>40%</td>
<td>81%</td>
</tr>
</tbody>
</table>

In Table 3 below, the statistics of the aforementioned clearly imaginative use of analogous patterns is shown. As can be seen in the last row of this table, about 50 per cent of the correct answers indicated this understanding clearly. Here I must emphasize that the other correct answers did so too, but not as evidently.

Table 3. Percentages of the correct answers that clearly showed an ability to adapt the given patterns to the given problems, showing a clear understanding of what an analogy is and how it can be used as a problem-solving tool

<table>
<thead>
<tr>
<th>Percentage of correct answers that showed creative use of patterns</th>
<th>Number of correct answers showing creative use of patterns</th>
<th>Total number of correct answers</th>
<th>Total number of answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question1</td>
<td>44%</td>
<td>16</td>
<td>36</td>
</tr>
<tr>
<td>Question2</td>
<td>51%</td>
<td>15</td>
<td>29.5</td>
</tr>
<tr>
<td>Question3</td>
<td>56%</td>
<td>14.5</td>
<td>26</td>
</tr>
<tr>
<td>Overall</td>
<td>50%</td>
<td>45.5</td>
<td>91.5</td>
</tr>
</tbody>
</table>

The results of table 3 show that the users can adapt the given patterns to the given problems; in other words, they indicate that general patterns can be used as problem-solving tools.

3. DISCUSSION

The results of our test show that analogies are useful cognitive tools when trying to understand or when assimilating new knowledge. As we looked for general cognitive patterns in our preliminary work, aiming at creating, or finding, a single hierarchy containing all these patterns, we found that two subjects (physics and religion) already in themselves contain quite general hierarchies applicable to other subjects, the patterns of religion being of a more general nature, for example, with the monotheistic idea of God being an all inclusive pattern, and the patterns of physics more going into intricate details. Combining these two domains of knowledge and extracting the essence of their structures or contents would go very far in creating a general hierarchy.
3.1 Comments on the Questionnaire

The way students managed the test varied widely. Some students could easily find the appropriate pattern while others opted for the ones that, as far as we could see, had nothing to do with the questions. As in the case of mathematics and music, some have a knack for it and others not.

Looking at the test results, it also seems the use of analogies is gender related. In the control group the performances of males and females were about the same, but with the aid of general patterns, the males improved their performance with 111 per cent, while the females improved their performance with 40 per cent only. As our test was not specifically designed to measure gender differences, we do not want to draw any conclusions regarding gender. Still, it is noteworthy, and may be fertile ground for future work.

4. CONCLUSIONS

With the average performance of the test group being 81 per cent higher than that of the control group, the results of the test are markedly interesting. The results have affirmed that general patterns are powerful tools in problem solving, thus proving part of our hypothesis highly plausible. We have not proven the existence of a universal hierarchy of patterns and notions, as our search was tentative. Still, we incorporated this idea in our hypothesis, as it constitutes an indispensable part of the efficient use of analogies in learning.

Hopefully, continued research will throw some further light on general patterns as cognitive aids.

ACKNOWLEDGEMENT

We would like to extend our gratitude to the funding party and to all that participated in our study.

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CONSIDERATION FOR COGNITIVE PREFERENCES TO ENHANCE EFFECTIVE HCI IN ONLINE MUSEUM EXHIBITS

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ABSTRACT

Clearly, giving consideration to online museum visitors’ cognitive differences challenges curators when planning their exhibits. There are interactive effects between the visitor’s cognitive preferences and the exhibit’s display format on the quality of the resulting human-computer interactions (HCI). The rapid growth of web-mediated technology extends the opportunity to fulfil exhibit facilitation. Although there is research that investigates individual cognitive differences for more traditional learning environments, the concept of online museum exhibits broadens the scope for further research. This paper discusses the interactive effects of cognitive preferences and exhibit display strategies, to highlight the need for consideration of these issues when planning the HCI involved in online exhibit design.

KEYWORDS

Human-computer interaction, cognitive differences, cognitive style preferences, web-mediated learning, online museum exhibits.

1. INTRODUCTION

Examining cognitive differences in individuals has been a topic of interest for researchers when explaining the complexities of effective human-computer interaction (HCI). They suggest that understanding cognitive preferences is critical for the success of any web-mediated information systems (IS) development (Elsom-Cook, 2001; Sharp, Rogers, & Preece, 2007). The literature indicates that understanding computer users involves multiple perspectives (McCracken & Wolfe, 2004). Moreover, the rapid growth of web-mediated environments appears to offer opportunities to enhance students’ learning outcomes. We suggest that these mitigating factors may also apply to user-centred-design (UCD) practitioners, when customizing their instructional strategies to better fit their instructional outcomes (Alwi & McKay, 2010).

The online museum’s visitor profiles are expected to involve diverse characteristics such as: gender, background, and prior knowledge. Accordingly, this paper suggests that allowing for an individual’s cognitive preferences may provide an appropriate solution to improve the design of online exhibits. The current literature reveals that virtual museum visitors are likely to emanate from the formal educational sector (Peacock, Tait, & Timpson, 2009). We believe these visitor profile differences enforce museum curators to be mindful of how to present their online exhibits to ensure they afford more effective learning experiences. The rising interest in creating online museum environments presents fresh dilemmas for museum curators and their exhibit designers (Brown, 2006; Marty, 2004; Soren, 2005) to understand their visitors’ numerous differences (Peacock & Brownbill, 2007). There is evidence that individual differences in cognitive preferences may have an impact on how environmental variables affect learning as demonstrated by Mendelson & Thorson (2004) and Riding & Staley (1998). The literature does reveal there are various investigations that have been conducted to determine the changing needs and demands of the online museum visitor per se. Nevertheless, the emerging interest in the adoption of web-mediated tools should serve to re-emphasize the need for the exhibit designers to clearly understand how their online visitors process their website information. Even so, there has been little or no consideration given to the interactive effect of the differences in cognitive preferences (McKay, 2003) and the exhibit’s design, during the online exhibit...
designing process (Berry, 2000). Although there has been ongoing debate in the literature on the relevancy and the extent to which cognitive aspects can or cannot contribute towards the effectiveness of the HCI (Green, Davies, & Gilmore, 1996), we believe that individual psychological factors such as cognitive preferences emerge as important attributes in UCD.

Cognitive style has been described as “an individual’s preferred and habitual approach to organizing and representing information” (Riding & Rayner, 1998, p. 25) or put in other words, the way an individual processes the information they receive. More recently, there is a growing interest in pursuing research on cognitive preference as demonstrated by the number of new studies that involve web-mediated instructional environments. As most of these studies have been conducted in formal educational settings (Chen, Ghinea, & Macredie, 2006; Chen & Lui, 2008; Graff, 2003; Hannafin, Hannafin, & Gabbitas, 2009), our research hopes to add to the literature by examining an informal web-based educational environment. To address the importance of accommodating individual differences in cognitive preference in the web-mediated museum environment, this paper commences with a discussion on online museums that are emerging as innovative web-mediated educational institutions. We then discuss the two dimensions of cognitive preference (Wholistic-Analytic, Verbal-Visual) as described by Riding and Cheema (1991). We continue with an outline of our research design, ending with a short discussion.

2. MUSEUMS AS INSTRUCTIONAL SETTINGS

Museums have been well accepted as informal settings for learning (Falk & Dierking, 1992; Black, 2005). Although the role of museums in supporting the formal education of the general population is usually associated with visits to a physical museum, online museums are emerging to provide more information to many people, as well as further enrich their life-long learning experiences. As shown in the Melbourne Museum 2007 annual report, the online environment has been recognized as a ‘cognitive space’ in which a museum operates to deliver pertinent information and exhibit their artefacts. Another example is the millions of visits each year that are recorded by the Virtual Museum of Canada (VMC) on their website. With such outstanding figures, the potential to promote this type of novel learning environment has become an important agenda for many museums around the world (Copeland, 2006). Due to the complexities of web-mediated instruction, questions are now being raised about how museums will embrace this dilemma through information and communications technology (ICT) tools to improve their visitors’ experiences. In general, it would appear that museum curators do try to design their interactive exhibits for a broad range of visitors.

2.1 Web-mediated Instruction

Often, the notion of museum instruction has been interchangeably used as a human-being’s process of ‘meaning making’ for their visitors (Falk & Dierking, 1992, 2000). As an informal learning environment, an online museum thus affords a free-choice setting where the visiting experience is determined by the visitors’ locus of control (Falk & Dierking, 2002). Accordingly, individual preferences are acknowledged within the general museum community. Consequently, Kolb’s experiential learning theory involves: divergers, assimilators, convergers and accommodators. These profiling characteristics are well recognized by the curators, as they design the instructional strategies for their museum exhibits; Kolb’s model is reflected through the various exhibit designs. Instead, we believe it is important to note that it is very difficult to design one instructional strategy that suits everyone (Schaller & Allison-Bunnell, 2003; Schaller, Borun, Allison-Bunnell, & Chambers, 2007). Recently, during an informal discussion for our research with a museum expert, it was revealed that, “although we (the museum) need to follow certain instructional design rules, we (the museum) don’t really want our visitors to be restrained by that. Instead, we want them to freely explore and make the most out of that space”. In addition, as compared to the formal educational settings, museum learning highly depends on object-oriented exhibits that are delivered in a physical orientation. Nevertheless, as the ‘physical’ information is transformed into a virtual-oriented representation in a web-mediated environment, it is anticipated that the learning experiences rely heavily on the abstract nature of the virtual representation.

Museum learning experiences have been conceptualized as the interaction of personal, social and physical contexts (Falk & Dierking, 1992, 2000). Consequently, these three categories are organized within a
contextual model of learning that are accepted as an active (learning) process as well as a (learning) outcome (Black, 2005), relying upon one’s mental capacity according to Falk and Dierking (1992). Even so, whatever (event/data) that has been stored within an individual’s mental structure, it may be interpreted in parallel, as it potentially matches with an individual’s existing prior knowledge, or resides as (unprocessed) information until it meets a situation that turns it into knowledge. Therefore, when considering an online museum as the instructional platform, the need for “an individual to fully understand the overall structure becomes increasingly important” (Graff, 2003, p. 409). As suggested by Ifenthaler, Masduki and Seel (2009), this whole concept of information assimilation (which they referred as cognitive structure), has major implications in the instruction/learning process. In attempting to address such anticipation, museums have emphasized the use of multiple representations when exhibiting their artefacts, particularly in their online environment.

2.2 Information Representations

In web-mediated instruction, multiple modes of the virtual-oriented representations allow the instructions to be presented for more than one modality. With this implied recognition for cognitive difference, goes the assumption that a learner may learn more meaningfully. This strategy may explain the different approaches that are implemented in the design of online museum exhibits. In the case of the Melbourne Museum for example, they use multiple exhibit formats to exhibit their online artefacts as depicted in Figure 1. As researchers appear to have been primarily concentrating on combinations of text and pictures (Schnotz & Bannert, 2003), we suggest that it can be seen that the museums do apply such practice by using both verbal (text) and visual (images) in their exhibit display techniques.

Figure 1. Example of Melbourne Museum’s webpage using multiple representation formats in delineating the information of the Dinosaur Walk exhibition

It is important to note that the way information is represented may influence how individuals attend to appropriate pieces of information (Kollof, Eysink, Jong, & Wilhelm, 2009; Mendelson & Thorson, 2004). This recognition is further confirmed by Mayer and Moreno’s cognitive theory of multimedia learning as illustrated next in Figure 2.
The above model shows the cognitive activities where the students need to select relevant words or images, then organize them into a mental representation to integrate the corresponding representations (Mayer & Moreno, 2002). We believe that this model may indeed tap into both sides of a student’s thinking mode to exercise their thinking preferences as: the narration uses textual information, while the animation may force them to watch the images. We suggest that with this duplicity of cognitive activity, the student may be forced to think about the information while reading the words. The next section on cognitive styles will have further discussion on the information processing.

3. CONSIDERING COGNITIVE PREFERENCES

Cognitive preference (which some researchers identify as cognitive style according to Riding & Rayner (1998) ) is a human psychological dimension that is “integrally linked to a person’s cognitive system” (Peterson, Rayner, & Armstrong, 2009, p. 520) which assumes that an individual will “...... learn differently and that these differences are identifiable and quantifiable” (McEwan & Reynolds, 2007, p. 2). As such, cognitive preferences are understood to be an individual’s preferred and habitual approach to organising and representing the information they receive, it potentially provides “......... an extensive and more functional characterization of students than could be derived from intellective abilities” (Messick, 1984, p. 68). As such, researchers have attempted to substantiate the promises of cognitive preferences to enhance the expected educational outcomes. In doing so, Messick (1984) listed six educational impacts that cognitive styles should have, to include: (1) improving the instructional methods by providing a foundation to guide the appropriate presentation (delivery) mode, (2) providing the opportunity to better understand students’ way of thinking (information processing) which may help to broaden the educational goals and outcomes, (3) enhancing students learning and thinking strategies, (4) enriching teacher behaviour and conceptions, (5) expanding guidance and vocational decision making and finally, (6) tuning the stylistic demands of learning environments.

3.1 Wholist-Analytic Dimension

Over the years, there have been numbers of models and human-dimensions that have described cognitive style. Various terms have been used by well known researchers to describe cognitive styles; Riding and Cheema (1991) argue that, despite these various names, they appear to be measuring the same thing. Consequently, they condense earlier researchers’ style constructs into two families (or dimensions) of cognitive preference (Table 1) which is still one of the most useful models for explaining cognitive differences in recent years.

According to Riding and Rayner (1998), the Wholist-Analytic dimension is inherent and thus, each individual’s cognitive preference is unique and is therefore likely to be a fixed aspect of the individual’s (cognitive) functioning (Riding & Rayner, 1998; Sadler-Smith & Riding, 1999). This cognitive-dimension operates within the actual organisation and structure of the information received by the individual, which is either organised as wholes or as parts, and thereby affects the preference for instructional delivery method, media and learning performance (Sadler-Smith & Riding, 1999). Wholists typically view ideas as wholes and
are unlikely to be able to separate the information they receive into smaller parts. In contrast, analytics prefer to process information in parts and find it difficult to incorporate smaller pieces of information into a whole entity. Within the wholist-analytic dimension, individuals may perform at their best given the appropriate structure of information respectively.

<table>
<thead>
<tr>
<th>Terms describing cognitive differences</th>
<th>Researchers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levellers-Sharpeners</td>
<td>Holzman &amp; Klein (1954)</td>
</tr>
<tr>
<td>Field dependence-Field independence</td>
<td>Witkin, Dyke, Patterson, Goodman &amp; Kemp (1962)</td>
</tr>
<tr>
<td>Impulsive-Reflective</td>
<td>Kagan (1965)</td>
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<tr>
<td>Divergers-Convergers</td>
<td>Guilford (1967)</td>
</tr>
<tr>
<td>Holists-Serialists</td>
<td>Pask &amp; Scott (1972)</td>
</tr>
<tr>
<td>Wholist-Analytic</td>
<td>Riding &amp; Cheema (1991)</td>
</tr>
</tbody>
</table>

### 3.2 Verbaliser-visualiser Dimension

The other cognitive preference dimension, which continues to stimulate research in education, is the Verbaliser–Visualiser dimension. The first verbal - visual model was introduced by Allan Paivio in 1971. In that model, he proposed a verbal and a visual cognitive system as the two components of the Verbal-Imagery dimension of cognitive styles (Paivio, 1971). The Verbal-Imagery dimension denotes an individual’s thinking mode (Riding & Sadler-Smith, 1997). Since the Verbal-Imagery dimension interacts with the way information is presented, for example in text, images and diagrams; it is anticipated that an individual with a verbal preference for that task will perform better given a textual information piece, rather than an image (Sadler-Smith & Riding, 1999). Moreover, verbalisers may work better with verbal information, whereas imagers may work better with spatial information (Graff, 2003; Riding & Rayner, 1998). However, the idea that an individual possesses strength only for a certain dimension (verbal or visual) has been challenged by Antonietti & Giorgetti (1998).

They demonstrate that the verbal and visual dimension is independent; thus, there is a possibility “...for an individual to be strong or weak in both dimensions” (McEwan & Reynolds, 2007, p. 4). A recent finding in neuroscience study also confirms that the Visual-Verbal dimension is anatomically and functionally independent (Kraemer, Rosenberg, & Thompson-Schill, 2009). Moreover, a development in the Verbal-Visual cognitive styles literature suggests that a visual system could be categorised into an object and spatial dimension (Blajenkova, Kozhevnikov, & Motes, 2006; Kozhevnikov, Hegarty, & Mayer, 2002; Kozhevnikov, Koslyn, & Shepard, 2005). Thus further suggesting, that instead of being bipolar, the Verbal-Visual dimension of cognitive styles is three-dimensional (Blazhenkova & Kozhevnivkov, 2009; Kozhevnikov, 2007).

Nevertheless, from the educational research literature it can be identified that all Verbal-Visual cognitive preference studies focus on two bodies of knowledge (McEwan & Reynolds, 2007). The first investigates the affects of students’ cognitive preferences on their ability to learn from different types of material (for example: Grimley, 2007; Mendelson & Thorson, 2004; Riding & Mathias, 1991) and the second tends to focus on the effect on success when students choose/are given learning material that matches their cognitive preference (for example: Atkinson, 2004; Riding & Read, 1996; Riding & Staley, 1998). From this assumption, it may be concluded that students’ cognitive preferences do have an impact on learning in specific environment. However, “it is important to continue to delve into the black box of information processing” (Mendelson & Thorson, 2004, p. 487). Our research study is designed to continue the exploration of how students’ cognitive preferences affect information processing in a web-based environment that replicates a physical museum setting.
4. RESEARCH METHOD

Our research participants will involve primary school students aged 10 - 12 years from schools visiting the Dinosaur Walk exhibition at the Melbourne Museum. Schools will be identified from the museum booking database through convenience sampling and will be approached by the researcher to participate in this experiment. In the research design, it is important to note, that the whole cohort for a particular school group will have the opportunity to participate in this research. As the students’ prior knowledge will be considered in our research experiment, students in a particular group are anticipated to share similar backgrounds and to have received the same level of educational experience as others of the same group. By employing a quasi experimental design, we will consider each individual group tested as a whole ‘population’ to avoid underestimates and statistical errors during the data interpretation.

The fieldwork experimental design has three phases (in the primary schools and the museum). The first phase involves a screening test to measure the participants’ cognitive preferences, using the Object-Spatial Imagery and Verbal questionnaire (Blazhenkova & Kozhevnivkov, 2009) which will be administered. The QSIVQ and a pre-test to determine the participant’s prior domain knowledge related to the museum exhibits will be conducted prior to the museum visit. Based on the cognitive preferences identified from the OSIVQ, participants will be equally allocated their online museum treatment (online or physical visit).

The second research phase will be the actual museum activities (or visiting period), in which the treatment groups will be given access to either the online museum or the physical museum respectively. For the online session, participants will be given 30 minutes to browse the existing web pages of the Dinosaur Walk exhibition in the Melbourne Museum website. To support the quantitative data, there will be a (digital) observation of the screen activities of each participant of the online treatment that will be captured in real time using screen-activities capturing software. This qualitative data will provide the overview of the actual data attended by each of the students during the online museum visits. For the physical visit treatment group, the participants will have 30 minutes to explore the Dinosaur Walk exhibition in the Melbourne Museum. The final research phase will be a post-test to measure any improvement in the cognitive performance (or learning outcomes) derived from the museum’s learning exhibits.

The first round of reliability testing (we call the calibration of our test instruments) for both pre-test and post-test will be conducted in a preliminary pilot study. This preliminary experiment is important as it tests the research design and checks the reliability of the assessment instrumentation. In addition, this pilot study should also provide the evidence that the test items can distinguish effectively between those participants who lack knowledge pertaining to the museum’s exhibit and the knowledgeable participants.

5. CONCLUSION

The roles of technology in supporting web-mediated museums not only have to consider individual differences in their visitors’ cognitive preferences; we propose that they more importantly serve as a new type of learning environment in their own right. Consequently online museums should be reconceptualised as effective HCI environments, whereby learners may construct their own meanings (Jonassen, Peck, & Wilson, 1999). ICT tools are often used to support the acquisition of knowledge (Inglis, Ling, & Joosten, 1999); the information that a learner receives from an external source can then be stored in their memory to retrieve later on. As a consequence, we are suggesting that researchers need to understand how specific ICT tools can better present online museum exhibits, as well as understand how learners’ mental models may work to enhance their information processing through the web-mediated instruction they receive.

The cognitive preferences of museums’ visitors must be considered for developing the virtual-oriented information representations for their future online museum exhibits. Today, despite the emerging emphasis on multimedia with an increased expectation for virtual-oriented exhibits, these new web-mediated environments integrate both visual and verbal instructional formats. As people have their own cognitive preferences, more research is needed to predict measurable results for a broader range of human cognitive abilities (McKay, 2003). The findings from this doctoral study may serve to inform museum staff involved in online exhibit design and development that may also be transferable to other web-mediated learning environments.
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Short Papers
EFFECTIVE USE OF IT & ICT FOR INDIAN AGRICULTURAL DEVELOPMENTS: A SURVEY OF ANALOGOUS EFFORTS

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ABSTRACT
We aim to focus on key factors discovered for effective utilization of Information Communication Technology for agricultural boost up, at least on the surface, with supportive of evidence herein. Some issues discussed concern with how information technologies contribute to the wide sphere of agricultural and rural developments, as they are two sides of a coin. We have briefly surveyed several initiatives taken to provide IT-ICT based services in Asian region. Finally, we have suggested that there is a broad range of services that can be provided to a cross-section of rural households, particularly farmers even at relatively low levels of income to foster the developments in Asian zone.

KEYWORDS
ICT, Agricultural Developments

1. INTRODUCTION
We have analyzed that [1, 2] the Information Technology and Information Communication Technology (ICT) can doubtlessly contribute much to agriculture development. Usually, people in agricultural business mainly from rural area, work as primary producers and have their own information needs. They need to know about marketing activities at districts levels, availability of natural resources around them, seasons and monsoons, market rates of different commodities, time to time government regulations, etc. Some advantages of it can include,

I. It can initiate new agricultural and rural business such as e-commerce, real estate business for satellite offices, rural tourism, and virtual corporation of small-scale farms.

II. It can support policy-making and evaluation on optimal farm production, disaster management, agro-environmental resource management etc., using tools such as geographic information systems (GIS).

III. It can improve farm management and farming technologies by efficient farm management, risk management, effective information or knowledge transfer etc., realizing competitive and sustainable farming with safe products. For example, farmer has to make critical decisions such as what to plant? When to plant?, how to manage pests?, while considering off-farm factors such as environmental impacts, market access, and industry standards. IT-based decision support system (DSS) can surely help their decisions.

IV. It can provide systems and tools to secure food traceability and reliability that has been an emerging issue concerning farm products since serious contamination such as chicken flu was detected.

V. It can facilitate rural activities and provide more comfortable and safe rural life with equivalent services to those in the urban areas, such as provision of distance education, telemedicine, remote public services, remote entertainment etc.
2. ICT APPLICATIONS IN AGRICULTURAL DEVELOPMENTS: WORLD’S PERSPECTIVE

In the context of agriculture, the potential of information communication technology (ICT) can be assessed broadly under two heads: (a) as a tool for direct contribution to agricultural productivity and (b) as an indirect tool for empowering farmers to take informed and quality decisions which will have positive impact on the way agriculture and allied activities are conducted [2]. Precision farming, popular in developed countries, extensively uses IT to make direct contribution to agricultural productivity. The techniques like Remote Sensing using Satellite Technologies, Geographical Information Systems, Agronomy and Soil Sciences are used to increase the agricultural output. These approaches are capital intensive and useful where large tracts of land are involved. Consequently it is more suitable for farming taken up on corporate lines. Many Far East Asian countries like Japan, Korea, and China have practically implemented IT- ICT based development campaign for agriculture and rural development. To develop agriculture information systems, digital data contents are most important. Due to internet, fundamental and widely used data such as market information, weather information, and agricultural material information is becoming available. Taking in to mind the relevance between above lines, some efforts are made for such developments. We mainly appreciate Japan’s imitative for such boosting. In past years, many Agricultural scientists have studied impact of Information Communication Technology on Agricultural [8,9,10,11] and one extremely lucid study done by Seishi Ninomiya, National Agricultural Research center, Tsukuba, Japan, is a must read [4]. This work mainly highlights the key factors therein [4] for analogous Indian developments.

The indirect benefits of IT in empowering Indian farmer are significant and remain to be exploited. The Indian farmer urgently requires timely and reliable sources of information inputs for taking decisions. At present, the farmer depends on trickling down of decision inputs from conventional sources which are slow and unreliable. The changing environment faced by Indian farmers makes information not merely useful, but necessary to remain competitive. In addition to human economic activities, Agriculture stands on the very complex interaction between biological, climatic and geographical factors. The information flow under such complicated system is unpredictable, unstable, subjective, site-specific and reliant on empirical decisions given the inherent variability of biological phenomena. Agricultural information with these features is typically beyond the scope of the information science used in industrial information systems, and this has surely led to the failure, up to some extent. We have discovered basic problems Indian farmers are facing and attempted to solve them using ICT related approaches.

2.1 Problem 1: Conveying Field Information like Crop Yield and Quality

India is basically a large country and major population live in villages, geographically scattered. Although agriculturally sound, Indian farmers are not using trends in Telecommunication industry as modern ways to communicate field information. This often results for farmers to take many efforts to convince Merchants about their crop yield, crop quality so as to get best bid price. We suggest that, instead of remaining stuck to traditional sources acquiring crop information, the advances in computer technology (ICT) can help miraculously. A modern and state of the art system is found functional in Far East countries which use a web camera mounted on a metrological robot to record farm-working activities [8]. The web camera automatically collects crop images used to remotely analyze plant growth and condition. A recent mobile-phone version of it collects field data today [4]. Many people [6] tried to effectively use web based framework for the same. For example, Personal Digital Assistant-PDA-based field data collection systems combined with GPS (Global Positioning System) which record farming data on PDAs combined with location information of the plot. We have also found that some steps have been taken to synchronize such data with PCs. A proposal [4] meritoriously used voice-recognition technologies to record farming data directly from the fields. Another proposal [6] developed a field monitoring system called Field Server. A Field Sever originally has ordinal sensors such as temperature, solar radiation, moisture and soil temperature. It has very flexible interface and can optionally have several types of sensor such as a web camera, an infrared sensor, wind speed, wind direction and leaf wetness. In addition to its sensing functions, Field Server can serve as a wireless LAN access point so that each Field Sever can establish a wireless network with other Field Servers. This indicates that a whole region can be covered by the Internet accessible wireless Hot spot, having several Field Servers deployed and just one link point to the Internet in the region. Latest version of
the Field Server is completely autonomous without any requirement for electric supply. A new approach called case-based modeling has also been suggested recently. To model some phenomena such as crop growth, we usually take either mechanistic modeling or statistical modeling. Case-base modeling is partially close to statistical modeling but it is not always based on probability as statistical modeling does. A case-base is a kind of database that stores empirical cases and has a function to recommend relevant cases according to users' decision making queries. A prototype case base system developed using a concept search engine that is based on latent semantic indexing. User can enter normal sentences as queries to the system and the system searches for recommended cases corresponding to the queries. This is a typical non-reductive approach and seems to be a very powerful way to transfer knowledge for farm decision support.

2.2 Problem 2: Effectively Displaying Field Information

Since major Indian agricultural population resides in rural places, it is observed that the designing of easy-to-use interface is a big challenge. Such interfaces are extremely needed to display the farm information collected in problem 1. Several technologies have found available to provide easy-to-use systems for end users. For example, mobile phone-based interface is surely promising. Its simple screen is usually acceptable. The second and third generation mobile phones provide seamless connectivity to the Internet and can substitute for regular PCs. Actually, mobile phones are used not only for data collection but also for in situ decision support in the fields. For example, [4, 9] developed mobile-phone based applications to access weather database so that farmers can always check weather conditions in their fields. Geographical Information System (GIS) technology [10] is also promising in agriculture especially as a user interface to integrate several types of data sets. As agricultural information typically extends spatially and it is often necessary and convenient to handle it at a regional scale, an application of GIS to agricultural decision support is developed [4]. The system predicts the benefit to a farmer and the environmental stress based on the various scenarios about crop conversion planned by the user, integrating many layers of geographical data such as soil conditions and the watershed. Fulcher's group [4] in Japan also provides several Web-based GIS systems to the public, indicating the importance of sharing Internet-based resources such as huge data sets and expensive GIS systems. Once datasets and some analytical methods become available, GIS can be a powerful tool/interface for agricultural and rural DSS.

2.3 Problem 3: Knowledge Discovery from the Collected Information

In recent years computer scientist devoted their research studies to data mining and pattern matching areas. These both are related to each other and mainly stand for discovering hidden rules / knowledge from the collected information. Using ICT services, we can collect the agricultural data across the world and that too of past several years. This will potential construct a large data warehouse which could give us new knowledge in agricultural production. By discovering hidden patterns, we could even forecast climatic changes, demand, production estimate, increase in demand, etc valuable factors [7]. Data mining is familiar with statistical reasoning and also aids to display data in graphical format. However the crucial information on agriculture is still in the custody of Governmental agencies and we need to professionally organize them. Similarly there is an extreme need to digitize those data for an agricultural information system.

2.4 Problem 4: Changing Market Places

Since technology has been assimilated into developments, there is an extreme need to change appearance of traditional market places. Internet used in developed countries suggests that information exchange related to the completion of market transactions is especially valuable. In the rural Indian context, farmers selling their crops and buying inputs, parents seeking matrimonial alliances for their children, and job seekers are all potential users of Internet-based services. This facilitated IT based businesses in agriculture. Web-based marketing was originally initiated as a direct marketing system between farmers and consumers. This style of business called B2C. It has been steadily growing with the growth of Internet technology. Internet malls that virtually combine several farmers growing various commodities seem to be particularly promising, though have not yet achieved critical mass. Recently, a new style of business called B2B has been growing rapidly. This bridges farmers and wholesalers, substituting for fresh markets by providing virtual market places over
the Internet. In Japan, farmers found started a very interesting trial. They are equipping their greenhouse with a web camera system [4, 6] in order to analyze the growth of the crops. They utilized this system for their sales promotion. They sold plantlets of melons to consumers and undertook the management of those until harvest. While the plants were growing, they let the consumers to access web camera to observe the growth of plants. This idea was popular with urban people, giving them a virtual experience of farming.

2.5 Problem 5: Extending Cooperation: Virtual Farming

Due to exponential growth in Indian population, the land available for farming is reducing in size as it is continuously getting divided generation by generation. This is called as Small-scale farming and is typical in the Asian region. It is also a cause of the inefficient agricultural productivity and lack of global competitiveness. A simple solution is to merge small-scale lands to a big scale one. The land ownership, however, makes it difficult as the number of landowning farmers increased in recent time, may be due to the modernization in living style. One solution we can expect is to virtually integrate those small-scale farmers while keeping their financial independency. For example, a group of farmers can purchase chemicals with cheaper price than they can individually. Similarly they can share machineries and the total cost on them can be reduced. We can expect similar cost reduction in marketing, logistics, risk management etc. as merits of scale. To realize such cooperation, the help of IT is inevitable in many ways.

3. ICT APPLICATIONS IN AGRICULTURAL DEVELOPMENTS: INDIAN STORY

Today we witnessed two types of potential economic gains of ICT in India, the Static and the Dynamic. Former is one-time, and come from more efficient use of scarce resources, allowing higher consumption in the present. The later pertains to increases in operating efficiency, and aims for reduced transaction costs. For example Information technology based machines at milk collection centers are being used in cooperatives to measure butterfat content of milk, test the quality of milk, and make prompt payments to farmers. “This has resulted in the removal of incentives to cut the milk by adding water, reduced time for payments from 10 days to less than five minutes, and has thus instilled confidence in farmers in the cooperative set up.”

How beautifully the Information and Communications Technology (ICT) can be used as an effective tool for rural development can be seen “Warana, Wired Village” project, in the state of Maharashtra, India [1,2]. Here, the local cooperatives are using ICT to streamline the operations connected with sugar cane growing and harvesting. This is benefiting small farmers, in terms of transparency, time saved in administrative transactions, and in terms of monetary gains. This project was initiated in 1998. The stated goal of the project is not only to increase the efficiency and productivity of the sugar cane co-operative, but also to provide a wide range of information and services to 70 villages around Warana river belt. The project has already increased the efficiency of the sugar cane growing and harvesting process. Due Internet facility, the farmers are now accessing information on agricultural techniques, innovations, as well as on crop prices. Similar gain is also seen in E-Choupal scheme where it provides farmer an access to local market (“Mandi ”) prices and global market price for Soybean crops and derivative products so that the farmers can compare prices. The Warana example suggests four key lessons on the use of ICT for agricultural development in India: (1) Before launching any ICT initiative, the information needs of a community should be thoroughly assessed. (2)Content and software applications should be developed with continuous involvement and feedback from the community. (3)Special emphasis should be placed on women and poor people’s access and (4) Operators from the grassroots are probably the best agents to bring ICT to rural communities.

4. CONCLUSION

This paper has examined efforts taken by major developed countries in order to sketch the wide canvas of ICT for agricultural developments. This is then thought in the lines for the potential benefit of Indian agricultural developments in particular and rural developments in general. We have observed that several
initiatives have already been taken by Far East Asian countries and they need to be just tuned with Indian scenario. The study of literature related to ICT based agriculture development has indicated various issues impeding success of such initiatives. The main issues in India are lack of localization of content for rural communities and inadequate participation of rural communities in design of rural ICT initiatives.

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ICT FOR RURAL DEVELOPMENTS:
A REVIEW OF LESSONS

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ABSTRACT
Modern Information and Communications Technologies (ICT) hold great promise for the socio-economic development of rural hinterlands in any country. We have observed that if they are to serve the unserved and spawn innovation at grass root level, their implementation must be carefully localized. This paper explores several spheres of ICT deployments and usefulness which have been tried in various parts of the India, in the context of rural development, administration and agricultural initiatives and narrates them in terms of lessons learnt.

KEYWORDS
ICT, Rural Development.

1. INTRODUCTION

Information Technology (IT) in general and Information Communication Technology (ICT) in particular involve spreading the electronic processing, storage and communication of information. Nowadays, ICT is an integral part of development strategies of both developing and developed countries. It has great potential to bring in the desired social transformations by enhancing access to people, services, information and other technologies [1, 2, 3, 4, 5]. The ICT applications can enhance poor people's opportunities by improving their access to markets, health, and education. Literature review [4] highlights some major aspects of them. It is witnessed that ICT can facilitate rural activities and provide more comfortable and safe rural life with equivalent services to those in the urban areas, such as provision of distance education, telemedicine, remote public services, remote entertainment etc. In the rural context, development means use of physical, financial and human resources for economic growth or precisely it can be social development of the rural economics [2]. Usually, people from rural area work as primary producers and have their own information needs. They need to know about their activities at districts levels, natural resources around them, seasons and monsoons, market rates of different commodities, etc. Thus a nationwide canvas of IT and ICT needs to be set in terms of a nationwide network of computers, that too with Internet facility. Government and Administration authorities must take PC to every village. It will play role in rural education, health and agriculture. In the Indian situation, we suggest that the PC need not to be a Personal Computer. It can be a community computer. In the day time, it can be used to educate primary and middle level children in the village. In the evening time, the community computer can turn into a "Cyber Dhaba" (Road side Hotel) for villagers – where they can access web sites of their choice and get desired information. The community computer can also be viewed as an Internet kiosk, and may be placed at village community hall or the bus stand so as to make it easy for people to get access. The access must be for a small price or free of cost. This total discussion formulate concept of Community Information Centers, Community Library Centers and (Local Government Centers) across the country. These community centers would then become hubs of seasonal awareness. Since, Information goods typically have the characteristic that one person’s use does not reduce their availability for another person, a message like weather news, tropical diseases can be viewed by many people, simultaneously or sequentially. For example in June-July months, Community Centers can be used for educational activities like e-enquiring for colleges, courses and e-registration. Similarly, Information on Manson and climatic changes could be sent to people on mass scale. Here, we witness convergence of ICT in
broadcasting. This convergence brings capability of interactions. Experience has shown that any exercise for educating people necessarily requires interactivity. This can be achieved in India or anywhere analogously. Unfortunately, to our observation, the evolution of Information and Communication Technologies (ICT) in India has created a technological divide between the ‘haves’ and the ‘have-nots.’ These technologies are still not accessible or affordable for the majority of the population. The basic reason is weaknesses in technological infrastructure. Accessibility is also hindered by language barriers, and a lack of suitable content and applications in local languages. In order to access the impact and sustainability of programs enabling use of ICT in rural India, it is strongly recommended to be specific to some objectives like: (a) Develop a set of parameters to make choice of access technology and technology for powering the access devices; (b) Organize workshops and other interactions such as on-site consultations with policy makers to promote human development in rural areas; (c) Develop ICT-based applications for rural areas, especially community banking, online and distance education; (d) Conduct research on multisectoral partnerships (Private, Public, NGO, and Government) with rural communities and evolve a sustainable model of ICT.

2. LESSONS LEARNT

2.1 Lesson 1: ICT is responsible for shift happening

ICT has demonstrated opportunities to rural people to utilize it in their socioeconomic and cultural developments. Many Governmental agencies find its importance in delivering services at the locations convenient to the citizens, which are deprived of basic human facilities such as safe drinking water, diary, education, immunization, reproductive health, employment generation, human rights, etc. Similarly, the government and administration try to exploit the technological explosion by utilizing the ICT in offering improved and affordable solutions to these basic necessities of the people at their village doorsteps [6]. After careful review of literature [4], we have witnessed two types of potential economic gains of ICT in India, the Static and the Dynamic. Former is one-time, and come from more efficient use of scarce resources, allowing higher consumption in the present. The later pertains to increases in operating efficiency, and aims for reduced transaction costs. Rural India is in urgent need of knowledge empowerment and the challenge before us now is to enlist technology as an ally in the movement for economic, social and gender equity. A project like M.S. SWAMINATHAN Foundation [1] has created a knowledge revolution. This project gave proper attention to connectivity and contents. It established Knowledge centers everywhere and urged for the community participation.

2.2 Lesson 2: There is always Assimilation of ICT in Rural Developments

In India, there is almost assimilation of ICT in rural developments [4, 10, and 11]. Some witness includes,

2.2.1 Agriculture

Information technology based machines at milk collection centers are being used in cooperatives to measure butterfat content of milk, test the quality of milk, and make prompt payments to farmers. This has resulted in the removal of incentives to cut the milk by adding water, reduced time for payments from 10 days to less than five minutes, and has thus instilled confidence in farmers in the cooperative set up [11]. A very lucid description of effective use of technology for agriculture boost ups is presented by Seshi Ninomiya, National Agriculture Research center, Japan [12].

2.2.2 Good Governance

One case explores [11] Computer-aided Administration of Registration Department (CARD), which the Government of Andhra Pradesh (AP) implemented in an effort to improve the efficiency of its administrative offices and to become more responsive to its citizenry. CARD is described here as "a transparent system of property valuation which is easily accessible to citizens ". A rigorous study [12, 14] has demonstrated the power of ICT in rural context and is seen as reference models for future good government project Implementations.
2.2.3 Access to Knowledge

The Honey-Bee knowledge network [1, 4, and 11] is being used to augment grassroots inventors and overcome language, literacy, and localism barriers. We have discovered a beautiful implementation of ICT in Maharashtra State’s Warana Project. Besides providing services to Sugarcane growing farmers, the Warana Wired Village Project was designed to provide agricultural, medical, and education information to villagers by establishing networked “facilitation booths” in the villages.

2.2.4 Women

Women, in Panchayati Raj (Local Government), elected officials, primary school teachers, and child development workers spread over large distances have been trained in use of way video conferencing, one-way video, two-way audio teleconferencing interactive networks. An end-user perspective of this kind of training for rural women managers at SEWA, the Self Employed Women's Association, is found gaining popularity [7].

2.2.5 Disability

The scope for adapting and using ICT to enhance functional capacity and improve employment potential of disabled people - e.g., through speech synthesizers, Braille Embossers, and talking computers can also be seen [7].

2.2.6 Economic Development

Entrepreneurship in electronics and information technology maintenance, repair, and user training is illustrated by the case of All India Society for Electronics and Computer Technology (AISECT) centers, which provide direct employment to technicians and trainers [11].

2.2.7 Digital Divide

A DoT-Inmarsat Pilot project that involved installation of village public telephones in rural areas is observed, including call pattern analysis, costs and benefits of the project, and an operational framework [6].

2.3 Lesson 3: ICT brings New Tools for Development

It is observed [5, 6] that people are always optimistic to effectively utilize the capabilities of ICT for villages. This may include development of an ICT-enabled integrated health system, computer-assisted learning centers for rural children, a multimedia indigenous knowledge discovery program directly from rural area, a web-based information on food security, training course in knowledge management for local women, etc. However, success of it depends upon the new tools we invent and deploy. Due to ICT, many new tools found discovered and dominating traditional broadcasting tools like Television, Radio, etc. Our study has found out some important tools being invented for effective ICT implementations. These include:

2.3.1 Kiosks

It is an ideal information tool being used to deliver e-governance initiatives [10]. It is now looked as a possible solution to bridge the Digital Divide. Kiosk is totally independent of a person’s knowledge of computers. Ease-of-use is seen as the only reason behind the popularity of kiosks. Kiosks can be deployed in any regional language. A major problem in application of IT for rural areas is that the information content is generally not directly relevant to people for whom it is developed. Such systems, therefore, have limited utility and are commercially unviable. This problem can disappear by developing relevant content in local languages. Looking at the case of India, in cities and larger towns, cyber kiosks have already begun to proliferate. Urban population densities, income levels, cultural attitudes and telecom infrastructure all seem to be sufficient for the commercial success of these enterprises. The falling cost of hardware and the availability of a variety of English language software have also supported this trend. In rural areas and smaller towns, however, the various demographic and socioeconomic factors such as income levels, cultural attitudes, geographic and social fragmentation may not be present in configurations that would easily enable the diffusion of commercial access to various IT-enabled services. Electric power is more of a problem, and this is true throughout India. Battery backups are very partial solution to the lack of reliable power supplies,
and solar technologies may be more promising in the near future: they are already in use in existing infrastructure. The government can ensure that anyone, who wants to set up information kiosk at any place in the country, is not only freed from all regulations and licenses but also encouraged through simple and attractive financing schemes.

2.3.2 Computer Mobile Van

It is not possible for every student residing in remote place or in rural area to travel long distance for educational needs. Poor economic condition is the main barrier. Taking this into mind, a new concept, “Computer Mobile Van” can be adopted. This can cater the demands of above students and can impart computer education at their doorstep. Computer Mobile Van concept is practically implemented at VIIT, Baramati, Maharashtra, India. This can also be used for farmers to access required information. In many Indian villages, women are not allowed to work outside their houses. In such scenario, one can teach women by arranging Mobile Computer Van. This will make women to be aware of Information Technology and its effective application to their lives.

2.3.3 IVR Based Systems

Efficiency benefits of ICT are not restricted to the communication itself [6]. It can improve the efficiency of existing platforms for example, the telephone network where it is now possible to track and analyze communications. Similarly, using Interactive Voice Response (IVR), a voice-based service information contained in a computer to be accessed by other users. The multilingual IVR System, found successfully implemented, provide complete, reliable and high performance software solution for rural India. It fulfills the need of providing filtered information and an illiterate user can use it in its own language through normal telephone. This can work beyond any terrestrial boundaries. It can also be used in most adverse conditions. In the view of services like Tele Banking which help account holder to enquir account balance telephonically, new services can be implemented as “Market Price” where we can counsel the rate of various commodities on the telephone in Local (regional) language to farmers. While conventional telephone connectivity has often proved inadequate for Internet access in rural areas, because the quality of existing voice lines is too poor to sustain data transmission, several innovations provide alternatives that are likely to be cost effective [3]. Some facilities like wireless in local loop (WLL), fiber optic cables, and high powered versions of Wi-Fi (802.11 wireless standards) are recommended. However, the major challenges in India for above connectivity are likely to be regulatory, having to do with interconnection to the main network, and with maintenance, rather than with the fundamental technological choices and implementation. Now days we can use new tools like Wireless Fidelity (WiFi), Mobile technology, GPS, VoIP, RailTel, etc

2.4 Lesson-4: There always exists a Scope for Calibration between Development Policy and ICT Deployment

To our observation, bridging the "digital divide" might not be as easy as it sounds when computers are still mystery to major Asian and particularly Indian people. Does PC technology made enough impact in a less connected, poor, rural area to justify spending resources on them? And in such a scenario, what can be the role of ICT in villages or in rural development? Are the main concerns to be looked upon? Scientists, IT industry experts, Government authorities, are taking steps to work out viable and scalable models to make it a reality. This is really a challenge for all and particularly Indian Government as major rural population today does not know how to read and write? And even if they can read and write, they are English illiterate, where English is the predominant language in the IT- ICT arena. Moreover, how many people in Asian countries can afford to have a personal computer or PC? In a remote agricultural village of India where the average worker earns about Rs.2000 ($ 40) per month and electricity might only be available for two hours a day, what possible difference could a computer make? Even when, Indian information technology sector is one of the sunshine sectors of the Asian and Indian economy which shows rapid growth and promise, the implementation of good IT arena for rural background is still a hurdle. This will require calibration by paying attention to three key questions of success: For whom? What bundle of services? How well they are managed? Our suggestive findings for calibration of Indian rural development and Good IT, ICT policies give emphasis on stimulating integration between the service providers and users locally, and even support cooperation among the users of new technology in the region. We strongly urge to include local public
institutions (e.g. Municipalities) as part of local market for IT services. There is also a need to develop horizontal networks between the industry, educational and R&D-institutions from all parts of the region that can contribute to knowledge buildup and innovations.

To conclude, in India, there is an urgent need to recognize opportunities and role of local knowledge in sustainable development. A serious study proposed in [10] argues that interactions between communities based local bodies and development population need to be enhanced to ensure success of the development process. Since communities are the closest to grassroots’ problems, they are the best judge to evaluate technology alternatives and provide innovative solutions for the problems of their respective areas.

3. CONCLUSION

This paper has briefly surveyed several initiatives taken to provide ICT based services primarily in rural India. We have explained the ways through which ICT impacts can be realized, in terms of a comprehensive review of lessons. Our work has also highlighted the relative strengths and weaknesses of different ICT approaches for rural development. We have clearly pointed out that for any country, increasing the effectiveness of rural development programs is a complex task. The administration has to be energized to face up to the challenge and implement development programs with honesty and vigor.

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A METHODOLOGICAL APPROACH FOR DEVELOPING USER CENTRIC INNOVATIVE ICT SERVICES

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ABSTRACT
The users’ experiences and feedbacks on new applications have become important components in the development of new ICT products and services. Many innovative information communication technology (ICT) products and services fail not because of a lack of advanced technology but because of a failure to understand real users’ needs. Therefore, an empirical approach to identify users’ needs and underpin the product requirements can support the development of new ICT services significantly. Context research, user requirements specification, user involvement, and iterative evaluation and modification the business model are the key elements in the new service development. A methodological approach – “Service Experience Engineering (SEE)” has been established to enhance effective open innovation, the three major phases of SEE methodology are: (I) FIND; (II) InnoNet; (III) Design Lab. Two projects- “Grandparents Easy Go”, and “Wise Household Case & Communication”, have been deployed with SEE approach in Minsheng Community to validate the methodology. The processes and outcomes of the projects are introduced and discussed in the paper.

KEYWORDS
Information Communication Technology (ICT), User Centric, Service Experience Engineering (SEE), Methodology

1. INTRODUCTION
In the past days, the development of information technology was mostly driven by the experts and scientists. In the twenty first century, everyone can be the driver of technology innovation. The users’ experiences and feedbacks on new applications have become important components in the development of new products and services. A new concept called Living Labs that supports the processes of user driven ICT innovations has started to emerge in Europe (Følstad 2008, ENoLL 2010), then sprout globally. In contrast to technology-centric research and development, the aim of Living Labs is to facilitate user involvement in innovation processes (Eriksson, et al. 2006). Therefore, a user-centric multidisciplinary research approach based on real life experiments- “Taiwan Living Lab” has been set up. The purpose of Taiwan Living Lab is to work with companies, public sectors, research institutes, local habitants and communities to test the new service applications and promote open innovation activities.

The domain of living lab research is lack of empirical research, a methodological approach to living lab development and operation – “Service Experience Engineering (SEE)” has been established to enhance effective open innovation (Gong 2008). “Service Experience Engineering (SEE)” is a methodological framework developed to realize the living lab experiments by means of systematic processes, the three major phases of SEE methodology are: (I) FIND; (II) InnoNet; (III) Design Lab.

As many countries are confronting with the aging society problems, market demands of services designed for the seniors are growing. Therefore, two projects (1) “Grandparents Easy Go”, and (2) “Wise Household Care & Communication”, targeting at innovative services designed for senior citizens, have been deployed with SEE protocols to evaluate the effectiveness of the methodology. The paper presents the work undertaken to start up the user driven innovation projects, and establish the collaborative network with local community to create a sustainable business model.
2. USER DRIVEN INNOVATION TO CREATE NEW ICT SERVICES

2.1 Taiwan Living Lab Approach

Many investments in research and development of new ICT-based products and services fail to produce market valid value. One of the main reasons is that traditional R&D projects are executed in a closed and artificial laboratory environment with limited and late interaction with the potential market and its users. In the Living Lab concept, the lab environment is brought to the users and the experiments are validated in real life contexts (Mirjami, et al. 2006). A Living Lab environment should have a good relation with users willing to be involved in new service development process. In order to increase the understanding of users’ demands, there is a common need to involve users in the early phase of new innovations. Therefore, “Taiwan Living Lab” has been set up in Minsheng Community in Taipei City, Taiwan with a user-centric multidisciplinary research approach to support ICT-based R&D activities and promote open innovations (http://www.livinglabs.com.tw/En/index.html).

The components of Taiwan Living Lab are as follows: (1) research organization/institution to lead and coordinate the new innovations between different stakeholders; (2) user community, who play the role as the co-creators and evaluators of new innovations/products; (3) “Service Experience Engineering (SEE)” methodology to emerge best practices within the Living Lab environment; (4) ICT technology and infrastructure to support the development of new ideas and the delivery of service models; (5) professionals who bring their own specific domains of expertise and knowledge in both technical and humanity aspects to contribute to the Living Lab.

2.2 Service Experience Engineering (SEE) Methodology

A methodological approach to living lab development and operation – “Service Experience Engineering (SEE)” has been established in Taiwan Living Lab to enhance effective open innovation. “SEE” is a methodological framework developed to realize the living lab experiments by means of systematic processes, the three major components of the methodology are: (I) FIND; (II) InnoNet; (III) Design Lab. (Figure 1) The methodology involves multidisciplinary expertise and collaboration. The goal of SEE is to help software designers to understand user requirements, in order to fulfill the goal of a product or service engineered for their users.

2.2.1 Find

Phase I “FIND” focuses on context research, observation and collection of users’ behavioral data, and trend research of new ICT service and relevant technologies. An important contribution to an innovation process in the early stage is to study the context of use, including the users’ behaviors and their environments. The purposes of “FIND” are to discover insight into unexpected ICT uses and new service opportunities by means of customer demands and market trend analyses.

2.2.2 InnoNet

Phase II “InnoNet” concentrates on business ecosystem analyses and service modeling. Business ecosystem analyses include industry information survey, and value chain analysis of target business. Key components of service modeling are exploration of service requirements specifications, gap analysis of the service chain on both demand and supply sites, and design of new service models. The purpose of “InnoNet” is to promote a user-centric co-creation and innovation process by bringing different stakeholders with a common interest together, in which public sectors, researchers, industry partners, and consumers are all involved to co-create a new business.

2.2.3 Design Lab

Phase III “Design Lab” enables the industries to test new services or products within real life environments in the order of “Proof of Concept” (PoC), “Proof of Service” (PoS) and “Proof of Business” (PoB). Technical usability testing is the focus of the PoC stage. Technical architecture design, technical performance analysis,
prototype implementation, and technology acceptance study are conducted to explore the possibility of new technology. In the PoS stage, service model design, service quality and performance analysis, and service acceptance analysis are achieved to evaluate the feasibility of a new service model. Furthermore, business model design, demo kit development, strategic partners’ alliance and marketing strategy are validated in the PoB stage. The emphases of “Design Lab” are to identify pre-commercial problems, reduce market risks of uncertainty, and find the right combination of partners to develop a successful business model. Many new products and service development that fail are not for lack of advanced technology but because of a failure to understand real users’ need.

Figure 1. Service experience engineering (SEE) methodology.

2.3 Empirical Studies to Validation SEE Methodology

As more than fifteen percents of the population in Mingsheng Community are senior citizens (Department of Budget, Accounting, and Statistics 2008). Two projects targeting at senior citizens, “Grandparents Easy Go” and ”Wise Household Care & Communication”, have been deployed with SEE methodology to validate and refine the new services in real life environment.

2.3.1 “Grandparents easy go” Project

The purpose of “Grandparents Easy Go” project is to develop a city bus information service kiosk specifically for the senior people. In Taipei, senior citizens over 65 years old can ride public buses for free. However, after the interviews with the senior residents, we found that the utilization of free bus service is restricted due to the complexity of the public transportation network. The kiosk has been optimized for use with a 20 inches touch screen, with big icons and readouts, and other touch friendly elements. In addition, the hierarchical layouts and colorful design allows the senior citizens to find a bus route easily.

Based on results of the online questionnaires collected voluntarily from the users, 33% of the users suggested making the font size larger on the screen, and 61% of the users suggested simplifying the hierarchy of the pages for bus route inquiry. In addition, 37% of the users prefer to have speech input interface for the kiosk, 39% of the users would like to get print outs of the suggested bus routes, and 10% of the users prefer to receive the bus information by SMS messages.

2.3.2 “Wise Household Care & Communication” Project

According to the results of a previous field study, we found that many senior people live alone and maintain very little social interaction or contacts with the outside world. Based on many scientific findings, loneliness and isolation are two risk factors that contribute to depression among the elderly. The goal of ”Wise Household Care & Communication” project is to provide a service with key features of caring senior citizens’ physical and psychological health at the same time. An easy-to-use-in-home wireless device with a
7 inches touch panel has been uniquely developed to enable senior citizens to monitor the personal health conditions while communicate with their families/friends easily with the same device. The featured functions of the device include (1) personal health management: health monitoring, food diary, and exercise journal; (2) wise family communication: online photo sharing, video communication, and reminder message setup. The feedback from the senior users will be collected by face to face questionnaire interviews in the pilot study, in order to improve the functions and interfaces in the next stage.

3. CONCLUSION

Context research, user requirements specification, user involvement, and iterative evaluation and modification the business model are the key elements in the new service development. Living Lab is an innovative research tool to improve the research and development process of the products and services through the real life experiments, and thereby to increase the market applicability and contribute to marketing and promotion of the new products. “SEE” methodology including “FIND”, “InnoNet”, and “Design Lab” has been developed to provide a structural framework for conducting living lab experiments. In the paper, two projects aimed at the senior citizens that are deployed with “SEE” methodology are presented, particular focuses are on initial ideas generation, user demands observation, service model design, and experimentation processes. The effectiveness and performance of the projects, stability of the hardware devices, and the market acceptance of the potential business model are evaluated in the present studies. According to the users’ feedbacks, we will add the necessary software and hardware enhancements to make the service as simple to use as possible in the next stage, in order to make sure the system is optimized for the users.

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BPM AS A SUPPORT FOR CONTINUOUS IMPROVEMENT IN CARE MANAGEMENT

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ABSTRACT
The present work analyzes the results of an Italian care management project, called Leonardo Project, promoted by Apulia Region, in the south of Italy, in partnership with Pfizer. The work starts from the consideration that care management represents an innovation in the management of the chronic diseases because it introduces a new model in the organization of healthcare services. Such a model needs gradual refinements in a continuous improvement cycle, in order to be totally effective. The research activity has regarded the test of Business Process Modelling Notation (BPMN) as the tool able to support the modelling of care management process as developed in Leonardo project and the analysis of results in order to retrieve guidelines to improve the following cycle. In this paper we discuss the results of Leonardo project and we highlight how the software support represents a critical element for the success of a care management initiative. BPMN helps to highlight indications about system requirements. The paper aims to illustrate how analyzing a care management project with tools borrowed from other domains can help to show weaknesses to be overcome in the design of the second generation’s tools.

KEYWORDS
Care management, enterprise modeling, BPM, e-health.

1. INTRODUCTION
This paper is related to the e-health domain and in particular to ICT applications to support care management in healthcare sector. Care management can be defined as a cyclic process of planning, coordination, management and review of person’s assistance in healthcare field selecting options and services that answer to his/her needs. The aim is to optimize self-care reducing the fragmentation of treatments and the hospital stay, improving the care quality thanks to the continuous presence of a professional and promoting the effective use of the resources so as to improve the patient’s quality of life. The professional that makes such an objective possible is the Care Manager (CM) who represents the new professional figure for educating and coaching the patient and his family and relatives.

Care manager’s role is to facilitate and coordinate the care process determining objectives and duration of hospital stay and managing and guiding the assistance out of the hospital. The core concept at the basis of care management is to provide personalized treatments based on a care plan that takes into account patient’s choices and preferences about service provision. Actually, such a plan is developed in collaboration with the patient; in fact, one of the most important elements in the process of patient management is the relationship with CM, which must be based on confidence, trust and communication. This process is cyclic and each cycle must consider the results of the previous phase. In such a context, Information Technology assumes a crucial role for care managers, because it provides tools to support their decisions or to improve their interaction and communication with the patient. Some software applications already exist to support care management process. In this paper we analyze the results and the software used in a care management project realized in the Italian Apulia Region. This project, called Leonardo Project, represents the first phase in the cyclic process of care management, applied to a local group of patients affected by chronic diseases (metabolic syndrome, cardiovascular disease).

The second phase of this project (which will be called Galileo Project) is planned to start in 2010, so our research effort has been addressed towards the identification of tools allowing a critical analysis of the results.
of the previous phase in order to improve the next phase, in the continuous improvement approach. According to this idea we have tested Business Process Management Notation (BPMN) as the tool to be used for the critical analysis of the results of the first run in the cyclic care management process, developed by the Regional Healthcare Agency.

The paper starts with the description of the state of art about current tools for process modeling in Healthcare and the industrial software solutions to support care management, then it continues with the discussion the Leonardo project. Such a project is illustrated with particular reference to the technological aspects and to the adoption of Informacare application. The results are shown in section 4. At the end conclusions and references are presented.

2. STATE OF THE ART

Research literature presents a large collection of diagrammatic representation of medical processes and computer interpretable guidelines. Bin Chen deals with the applicability of software engineering techniques to medical process definition and analysis using the Little-JIL process definition language. According to Rahmanzadeh, PROforma represents guidelines in a logic/constraint based formalism. Each node represents a task (an action, a decision, and so on), while constraints (logical, temporal, and so on) link different tasks. Shahar defines a language, Asbru, that explicitly represents the intentions underlying a set of schematic plans which is the representation of a guideline. Besides representing actions (i.e. prescribe diuretics), Asbru contains primitives to represent goals (i.e. maintain blood pressure below 140). Guidelines written in Asbru are a set of hierarchical plans which associate actions with goals. According to the author Ohno-Machado, GLIF is, instead, a more generic representation language that combines aspects of the Arden Syntax, to represent decisions, with a flow diagram to represent actions flows. The GLIF model was not computer-executable until a recent version, when an interpretation abstraction level to the representation language has been added. Wang and Chen compare the representation concept against guidelines systems, whereas Shiffman compares the systems according to other aspects. Prodigy 3 developed at the University of Newcastle, models guidelines using states, which are called patient scenarios, and transitions. Noumeir has also pursued similar goals, but using a notation like UML to define processes. Others view medical processes as workflows and use a workflow-like language to define processes and drive their execution. None of these process definition approaches, however, seems able to support process definitions that are both sufficiently clear and sufficiently broad and precise. The main problems with these approaches include inadequate specification of exception handling, weak facilities for controlling concurrency, lack of resource management, and inadequate specification of artifact flows. Regarding ICT solutions to support the care manager, the most important industrial one is Informacare. InformaCare is a software supporting integrated disease management and conceived in order to support CMs in the management of patients affected by chronic diseases. Integrated disease management involves a set of coordinated activities addressed to groups of people with pathological situations, where the engagement of patients in self assistance is fundamental. InformaCare is a Web based application, supporting care management process. It contains functionality to insert patient’s clinical data and documentation about symptoms in the electronic patient folder, to administer questionnaires to patients and to update and to print reports (clinical, ad hoc, ..). It considers three different user profiles:

- **Care manager**: it is accessible to the CMs who assist the Family Doctor in the coordination with the healthcare attendance;
- **The Family Doctor**: it is accessible to the doctor who is in charge of the patient and coordinates care managers activities;
- **Client administrator**: it is accessible to the user who carries out typical administration activities related to InformaCare system (es. account creation) but also to coordinate the activity of the CMs scattered in several medical studies (es. shipment of messages containing useful suggestions and indications, etc).

InformaCare has contributed to support an innovative organizational model in healthcare service, but some weakness points have to be removed in order to make the care management process more efficient and effective.
In this paper we test the use of BPMN notation, which is generally used in Enterprise modelling, proposing a novel approach to describe all the steps of care management process and to define guidelines for the design of the software solution able to cover each of these steps.

3. ENTERPRISE MODELING AS A TOOL FOR THE ANALYSIS OF INFORMACARE PLATFORM IN LEONARDO PROJECT

The 24 months’ Leonardo project started in 2006, promoted by the local healthcare agency in Lecce (Italy) in collaboration with Apulia Regional Healthcare Agency and Pfizer Italy and involved about a hundred patients. It was the winner of the “Educating to the Health” category reward at “Forum P.A. 2007” in . The project aims to introduce a new professional, the Care Manager (CM), in the context of local healthcare for chronic diseases according to a model imported from United States. Thanks to this pilot project several activities have been developed to improve the results. In the care process of chronic diseases CM is a professional useful to facilitate the communication between patients and Family Doctors.

The Chronic-degenerative diseases managed by CMs involved in Leonardo project are three: Cardiovascular diseases, metabolic disease, diabetes. The role of CM consists of relieving the Family Doctor from the routinely activities and of supporting the patient and his relatives in self care management: In particular they take care of patients’ education, prevention, counselling, monitoring and assessment. In Leonardo project the care manager uses Informacare software as supporting tool for operational activities. The research group working at Innovation Engineering Department of University of Salento has critically analyzed Informacare software with the aim of identifying its weaknesses for future reengineering. The approach is based on modelling care management process for identifying requirements not covered by Informacare, so that the next cycle of the care cycle will be based on a novel open-source workflow platform to be customized for care management of chronic diseases which will be more fitting stakeholders.

![BPMN model of care management process in Leonardo project (AS IS)](image)

As highlighted in the state of art none of the currently used approaches to process modelling seems able to sufficiently support healthcare process definitions due to their lack of flexibility. So in this paper we
propose to borrow tools from Enterprise modelling, and in particular BPMN to model healthcare process. We propose BPMN in a novel way because the results of the model is used to define guidelines for a next phase of the process and for defining requirements in order to realize a new version of the support software.

At first we have analyzed the process related to care management, as executed in Leonardo project (AS IS) (Fig. 1) and we have represented such a process at high level through BPMN. Swimlanes with grey header mean that a software support is provided to the user through Informacare.

Then we have carried out targeted interviews and questionnaires to CMs, and modelled the requirements in a novel BPMN model (TO BE), where we highlight the presence of more stakeholders (blue headers) in the process and the necessity for all to have software support. These elements have been particularly useful to proceed with Informacare reengineering.

![BPMN representation of care management process (TO BE)](image)

After the BPMN modeling of care management process we have mapped the Informacare functionalities with the phases of the process according to a reverse engineering approach. This analysis has been lead through informal interviews to the CMs been involved in the Leonardo Project that have provided their feedbacks while they directly operated on the Informacare software.

From the analysis of Informacare functionalities according to the phases of the process represented with BPMN, some missing and innovative opportunities appear according to continuous improvement logic.

First of all, it appears clearly visible the necessity to foresee other users profiles in order to allow all process actors to use the proper functionalities. In particular, in developing a new information system supporting the care management, it would be useful to introduce and specialize other user profiles: Physician (Family Doctor, Specialist Doctor), Patient, Relatives, Healthcare Manager.

For each of these profiles, the functionalities to be introduced are the following:

**Patient**
- Web access to the system in order to visualize his own clinical situation and to share calendar and activities with CM;
- Access to a Web 2.0 community area to support patient-patients or patients-CMs communications.

**Doctor**
- Web access to the system in order to record data related to chronicle disease (medical report, clinical data, etc.);
- Retrieval of data from legacy systems (existing electronic health record software).
Relatives
- Web access to the system in order to visualize patient information and collaborate with CM to take care of their relative;
- Access to a Web 2.0 community area to support communications between patients relatives with similar disease and with CMs community.

Healthcare Manager
- Web access to an advanced reporting area in order to check the success of care process not only from a clinical point of view but also from a managerial perspective (ex. What if analysis in order to support planning and resources allocation for disease management).

These requirements have been shared with our Leonardo project interviewees (CM and patients) who have agreed about them and are offered for user tests of the next platform.

4. CONCLUSION

The objective of the present paper has been to assess the use of the Enterprise modeling tool and in particular BPMN to analyze critically the results of a first phase in a cyclic care management process in order to extract knowledge from the run of a previous project (AS IS) and to use this knowledge as input for the reengineering of the process (TO BE) and its adoption in a new care management project. Starting from the representation of the BPMN model, it is very simple to define also the impact of process reengineering on the software support in terms of new requirements and functionalities to be provided.

Thanks to its expressive strength, such a systematic approach can be extended and generally used to facilitate process definition in healthcare and to assess the coherence between process and software support.

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COMMUNITY CONVERSATION: 
DESIGNING TO SUPPORT EMPATHY 

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ABSTRACT
In isolated, rural areas, people are necessarily independent and it can be difficult for them to seek help. One of the ways to improve this is to find a remotely accessible solution. Information and communication technology (ICT) can be used to eliminate distance as a barrier to social interaction, and in turn can create new optimism for rural areas when it is a device to improve interaction. The important benefit of receiving emotional support and information from others is that it encourages and increases hope. This research suggests that when collaborating virtually, the farming community can receive effective advice from experts to facilitate their decision making and at the same time to support their psychosocial health. Our study propose characteristics of design that support emotional communication as well as factual information exchange to motivate the user, display empathy and develop understanding in a crisis. The user experience of the emotional expression in the discussion among community members will be highlighted. We posit that it is important that empathy and hope are included in interaction between participants, especially when ICT is used to deal with complex conversations (e.g. climate change, agricultural information). However, not much is known about the effectiveness of ICT in expressing empathy. Therefore, the hope interaction pattern is introduced to provide an experience of feeling supported to the users of a community conversation system.

KEYWORDS
Rural community, psychosocial health, empathy, interaction of hope

1. INTRODUCTION
Community is defined as groups with the same interest, shared goals, activities and individuals who cooperate to share resources and satisfy each other’s needs (Jewkes and Murcott, 1996). In this research, the community refers to the rural community. As rural communities are remote, they rely on farming to obtain food and at the same time generate their income and contribute to the economy (Hunter, 2007). Farming is a stressful occupation which is impacted by the environmental context of farming, such as decreased yield, as well as the prices of goods from competitors, cost of fuel and globalization. It has one of the highest rates of suicide and farmers are at high risk of developing mental health problems. In Australia, for instance, approximately one male farmer dies from suicide every four days (Judd, Jackson et al., 2006). As people in rural areas live in isolation, they are necessarily independent and it is difficult for them to seek help. One of the ways to improve this is to find a solution remotely. People in situations of isolation lack the contact that is important for their psychosocial wellbeing.

The fast growth of information and communication technology, mobile communication and the Internet has played an important role in people’s social lives. Relationships, social interactions and information sharing among people in a community can be strengthened with the increasing accessibility and speed of communications platforms. Communities can incorporate this emerging technology into their social interactions without losing social touch and engagement (Preece, 1999a).

While information and communication technologies can accelerate development in rural areas, it is important to explore how information, such as agricultural and climate change information can be disseminated in rural communities so that members will get the most benefit from the interaction. For instance, when farmers send data to experts, they hope that the experts can interpret it in such a way that will help them to increase their productivity. Therefore, when farmers send the data but do not receive any
response, or the data received does not show things getting better, they can discuss the problem with the experts via technology.

An important side-effect of this informational interaction is the reduction of stress levels. This is becoming more necessary as farmers need social contact. When contact is made, the negative feelings and problems experienced by farmers can be transformed to positive and balanced thoughts and emotions, which can in turn improve the productivity of their farm. This research suggests that when collaborating virtually, the community members can receive effective advice from experts to increase their knowledge and at the same time to support their psychosocial health. This research aims to increase the understanding of using the concept of empathy and interactions of hope in the system design particularly for user experience.

User experience is a term that has become popular in user-centered design in recent years. It is an approach that gives more understanding into the relationship between the user and the product and the experiences that result from their interaction (Battarbee, 2004). In the context of design, a broader view should look into the needs, emotions and experiences of users to facilitate the design of the system that would benefit them. This research is inspired by studies into exploring and understanding computer supported cooperative work (CSCW) systems that can support and allow people to communicate with each other when they are in different physical locations and thus not able to communicate in the usual face-to-face manner (Kabanda, 2008). The main focus here is how to design a platform that allows community members to communicate via a technology intervention that enhances social interactions in a normal community conversation context. The design should also look into better ways of supporting empathy as well as information exchange. This research will observe the usability of the future design, that is, to ensure it is easy to use and clear to the users. This research will be based on the hypothesis that the user experience of interacting through a collaboration technology can be more supportive when using empathic communication techniques.

2. COMMUNITY CONVERSATIONS

2.1 Rural Community and Psychosocial Wellbeing

People living in rural and remote communities have low health status due to many stressors. Farmers and supply industries in the farming community have to face unpredictable weather, government regulations and loss of farm or livelihood due to crop or production failure. According to Ramsey and Smit, rural community wellbeing can be classified into four inter-related categories, namely, economic, social, physical and psychological wellbeing. They defined rural community wellbeing as the condition of individuals and communities within rural areas, noting that individual wellbeing can be affected by a person’s perceptions of the rural community as a whole. ‘Psychosocial’ is a term which implies that social and psychological issues are closely inter-related (Ramsey and Smit, 2002). Social wellbeing is characterised by social support and activity, personal interaction and life satisfaction, while psychological wellbeing is measured by suicide rates, indicators of life satisfaction and psychological assessment. In this paper we propose activities that are intended to support positive psychosocial results by integrating with other interventions in the context of the wellbeing of the farmers. The affected population will be identified by their psychosocial needs, problems and issues, and how technology intervention can facilitate the enhancement of these. In addition, significant collaboration is needed among experts to tackle all areas of physical and psychosocial needs.

2.2 Social Support in Farming Community

Social support is a ubiquitous part of human interaction, such that people serve as both provider and recipient of social support in important times throughout their lives. One of the reasons that people utilise technology is to support their wellbeing. There are several components of a person’s need for social support in various life situations, including hope (the expectation that something good will happen) and the need to trust others when receiving support in the environment (Bruhn and Philips, 1987). The social interaction and support in
rural communities that is involved in a farming community can be divided into three parts: experts, farmers, and families and friends. The role of each entity in this relationship can be defined as follows:

- **Experts** - The agricultural experts give suitable advice remotely and interpret the data received from the farmers.
- **Farmers** - The farmers send data to the experts, follow the advice, take appropriate steps and provide the feedback.
- **Friends and family (community)** - Farmers and workers share their problems with their social support (friends and families) to discuss complex issues (e.g. climate change and agricultural information) and to reduce stress.

One way to reduce stress is by interacting through technology that can support rural workers to establish interaction more regularly with experts and can transfer data automatically. It is important to create interaction so that, even though the bandwidth of data is low or the information to be transferred is not significant, there is still interaction among them. Consequently, this will contribute to the psychosocial wellbeing effect where the farmer can share not only the agricultural information but also information on other topics. For instance, if there is only bad news to share (such as the data showing that productivity might not improve), interaction should still occur as bad news is better than no news at all and gives the expert the opportunity to know how the farmer is doing physically and mentally.

Computer-mediated communication (CMC) allows people to participate in supportive interactions with friends or strangers, synchronously and asynchronously. These interaction partners can be separated by geographic distance that would be difficult, if not impossible, to traverse using traditional face-to-face modes of support. To provide a foundation for research on computer-mediated social support, this research examines how social support unfolds within the world of computer-mediated empathic communication by delivering advice, news or opinion appropriately and assists the farmers to deal with negative emotions by introducing the concept of hope.

### 2.3 Empathy for Support

ICT design should not only consider how people communicate but also what they communicate (Zhang, 2007). It is necessary to incorporate human to human interaction mechanisms in the design of new technology as this can provide the sense of relatedness socially and psychologically when communicating (Baumeister and Leary, 1995). Much of the research in CSCW and computer-mediated communication focuses on performance in formal tasks, where empathy is usually not obvious. The increasing number of studies in empathic communication provides researchers with opportunities to take a new perspective on the role of empathy in informal communication.

As Levenson and Ruef point out, empathy is “knowing what another person is feeling, feeling what another person is feeling and responding compassionately to another person’s distress” (Levenson and Ruef, 1992). Empathy is the key ingredient in giving comfort or emotional support. Although there is no data yet about whether CMC may be more or less empathic than face-to-face conversation, some scholars have stated the importance of empathy to be applied as an emotional support. For example, empathic emotion has been embedded in a learning system to consider students’ needs in learning, help them deal with negative emotions, encourage students by listening to their social and affective needs, provide empathic feedback and give them appropriate advice to overcome academic problems (Cooper, 2004, Lee, Chang et al., 2007, Lyons, Kluender et al., 2005). The components of offline empathy, which are understanding, emotions, similarity and concern, are also applied in online communication (Pfeil and Zaphiris, 2007). Embedding empathy into the design of health technology interactive systems can potentially be very important for the acceptance and success of the technology intervention (Liu and Picard, 2005). Their study shows that empathetic systems can play a key role in contributing to a better user experience based on the work that they have done to build long-term social-emotional relationships in a mobile interactive health application system by using empathetic dialogue to facilitate a more satisfying and less stressful user experience. Preece designed an online support community that helps members to deal with emotional distress, empathise with common problems and exchange information about symptoms and treatments (Preece, 1999b).

This literature shows that CMC offers a great tool for support as participants are able to share the same or similar experience. Therefore, when the farmers express their emotions and share their feelings, the social sharing with others is effective in improving physical and psychological health (Pennebaker, Zech et al.,
Positive emotion may lead people to a better life, improve wellbeing, and can contribute toward emotional wellbeing which leads to happiness and success in work (Lyubomirsky, King et al., 2005). Hence, it is essential to incorporate the concept of empathy as an important part of social interaction. People seek out social interaction to cope with emotional distress. Computer-mediated emotional support allows support seekers who have limited mobility to participate in or attend the support offered in face-to-face formats. One important factor in empathic communication is hope. This concept supports the farmers’ needs in dealing with negative emotions by giving them hope and appropriate advice if there are any problems. Hope has been identified as an important therapeutic factor in effective coping, decision making, psychosocial adjustment, quality of life and has been used in the process of recovery in mental health.

3. INTERACTIONS OF HOPE DESIGN PATTERN

In earlier work (Baharin, Nor et al., 2008) applying the Locales Framework to the ICT for Development (ICT4D) literature, we identified that there is a clear gap in supporting mutuality or how presence is enabled in a locale and how awareness of that presence is supported.

Thus, interaction of hope is introduced. Groopman defined hope as “the elevating feeling we experience when we see in the mind’s eye a path to a better future”. Future is based on the reality that there would be obstacles existing along the path. He also differentiates between true hope and false hope (Groopman, 2004). In the present study, this distinction is important because the expert must know how to express hope as well as the risk that it may be proven wrong. When farmers interact with the expert, they anticipate that there is some hope when they have to deal with bad news regarding their crops. According to the studies done, hope is a path to a better future and the interaction of hope can improve the communication between farmers and experts. This can be expected to result in self-care and higher level of psychosocial adjustments. In contrast, when farmers have the feeling of hopelessness, it can lead to depression, suicidal ideation and decreased physical health (Curtis, Engelberg et al., 2008).

To create successful interactive systems, a definition of a design pattern is a proven solution to a recurring design problem. It gives special attention to the positive and negative consequences of the application and also the usability (Borchers, 2001).

The factors involved in the interaction pattern between farmer and expert through technology are outlined as follows:

**Problem**: Farmers in rural areas in a situation of isolation need advice and lack the contact which is important to their psychosocial wellbeing.

**Use when**: Experts provide farmers with appropriate advice and regular contact. The main objective of this study is to enhance the quality of interaction among farmers and agricultural experts via CMC.

**Principle**: The underlying principle is to add user experience design to technologies that can support empathy and build hope among farming communities in rural areas.

**Solution**: There is an open channel transmission that can be utilised for this intervention (e.g. online communication from experts to farmers). Ideas are taken from technology interventions in the literature.

**Why**: It is meaningful for the farmers if experts can support emotional communication/empathy and provide hope in the communication as well as factual information exchange.

**Examples**: Farmers interact with experts remotely via technology. With the proposed enhanced technology intervention, the contact between farmers and experts is replaced with technology that delivers advice with empathy and hope. With the availability of the network connectivity, experts can contact farmers, or vice versa, to share information and thus contribute to the psychosocial wellbeing of farmers. When data is sent to the experts, there is an open channel of communication that can be utilised to establish contact between the parties.

4. CONCLUSION AND FUTURE WORK

The aim of our work is to design a system that supports empathy during community conversation. In examining the possibilities of CSCW systems, we have investigated technology already in use to explore how locales can be enhanced to better support the various activities to tackle the unmet needs existing in the
process. We argued that the usage of ICT in farming creates an open channel, which can be tapped to enhance the psychosocial wellbeing of farmers in times of crisis by delivering empathy and hope. However, not much is known about the effectiveness of ICT in expressing empathy. Therefore, in this paper we have introduced a hope interaction pattern. The application of this pattern in the rural farming community is the focus of our future work.

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ABSTRACT

The article employs a phenomenological framework of understanding and presents an analysis of selected queries raised by teachers on the web-based guidance provision Teachers’ Forum. The analysis looks particularly at the extent to which teachers explicitly describe their own practice in relation to the problem that is presented. The analysis shows that a significant proportion of the teachers do not position themselves as actively involved in the problems they raise. The article discusses understandings of this and the consequences it can have for the guidance process. The article also discusses how systematic analysis of the enquirers’ questions can yield tools that may be of help to the guidance process.

KEYWORDS

Guidance, ICT, Practice, Teachers, Phenomenology

1. INTRODUCTION

The project Praksisrettet veiledning i grunnopplæringen (practice-based guidance in basic training) (the PVG project) has two main goals – to establish an internet-based guidance provision for teachers and to develop knowledge about essential aspects of using this kind of guidance provision. One of the questions addressed by the project is how an enquirer experiences, uses and assesses a web-based guidance provision such as the Teachers’ Forum. In previous work I have focussed on themes within questions submitted by enquirers and on how problems are taken up. Are they presented as requests for information, requests for advice or as more open, reflective queries? What I have found so far is that the questions are closely connected with practical application and that most queries are formulated as requests for advice.

2. AN ANALYSIS OF TEACHER’S QUESTIONS

In this article I will subject questions submitted to the Teachers’ Forum guidance provision to a phenomenological analysis and focus on the enquirer’s self-understanding as interpreted through their personal presentation. Phenomenology is concerned with how phenomena are understood by us from a first-person perspective, and a phenomenon, irrespective of the arena, is understood differently by each individual (Embree 2006). With this kind of understanding of the phenomena presented by those requesting advice/guidance from the Teachers’ Forum, there is one aspect in particular concerning which I am interested in gaining further knowledge. This is the extent to which enquirers view their own involvement as a relevant and significant part of the problem being described, such that this emerges as part of the explanation of the problem. Against this background I wish to discover the extent to which teachers who submit descriptions of problems to Teachers’ Forum explicitly describe and explore their own role in relation to the phenomenon about which they are seeking advice/guidance. There are two reasons in particular why this issue is of interest to me:
a) A central aspect of a phenomenological understanding of the interaction between a person and his surroundings is that the person is not seen as a neutral observer of the world around them. The person is a part of this world and interacts with and shapes his environment (Hiim & Hippe 1998).

b) An educational justification for raising this question is that regulations and central guidelines for the educational system are attempting to construct a clearer systematic perspective in respect of school activity (Imsen 2000). A systematic perspective involves, amongst other things, having a sense of collaborative action regarding the teaching offered to the pupils.

2.1 Problem Formulation

Against the background of the introductory discussion I wish to find an answer to the following question: How can one describe and express the individual practice of enquirers in respect of queries directed to the Teachers' Forum guidance provision?

2.2 Theoretical Reference

The philosophical and epistemological basis for phenomenology as an approach and means of understanding is attributed to Edmund Husserl. To put it somewhat simply, one of Husserl’s principal theses is that people experience the world through experiencing phenomena. The source of knowledge is thus the phenomenon as it appears. It is characteristic of phenomenology as a research approach that what is to be isolated and described is the experience of a phenomenon as it appears to the informants. Both the individual variation in experience and the common essence will be of research interest (Molander 1993). This theory forms the background for the work with the available textual material. It means that there is a clear intention that the analysis should bear in mind that at every text element is an expression of one person’s genuine experience of the phenomenon under discussion. The goal is to search for more understanding and insight.

2.3 Web-based Interaction

In a study of web-based communication we are obliged to reflect on the difference it makes not to be communicating face to face. One cannot see, and may not have full knowledge of, the person who is receiving the messages. In this form of communication only the written word is available; there is no opportunity to adjust comments on the basis of the interlocutor’s reaction or on the basis of reflection during the course of the conversation. No form of reaction other than written replies can be observed, and in any case the original message cannot be changed. On the other hand, Korsgaard Sorensen (2003) argues in his article ‘Virtuality promotes reflection’ that the distance in terms of time and space that we observe in web-based communication, together with the requirement for putting things in writing, forces a greater degree of self-reflection than in a physical meeting in which conversation flows quickly and freely.

2.4 Design and Method

The research material consists of 18 randomly chosen texts submitted to the web-based guidance service ‘Teachers’ Forum.’ As a basis for the process of developing analytical categories I used the text itself, subjecting it to repeated re-reading in order to categorise it at the level of overall meaning. I built on principles from grounded theory (Glaser & Strauss 1967/1970, Strauss & Corbin 1990), from abduction (Blaikie 2000), from hermeneutics (Gadamer 1997, Guneriussen 1996) and from general principles of qualitative textual analysis (Kvale 1997). On the basis of the above arguments I have focussed on how the enquirer communicates the issue to which he or she is looking for a solution, as well as, to some extent, the expectations that are held of the mentor/adviser or other teachers.

2.5 Results

In this section I present the ten different categories that I determined through the textual analysis, which was carried out in the three-stage approach described above. The categories are presented in ascending order of
frequency of occurrence in the textual material, along with some comments concerning the different
categories and interpretation of the enquirer’s understanding and choice. The section ends with a general
commentary on the findings.

2.5.1 Enquirer’s Judgements (7 Statements in 5 Messages)
In this category we find statements in which the enquirers express their own judgements, such as what they
felt had caused the problems that were described. ...has everything she needs, apart from parents who
perceive that she needs extra help at school. The material contained few statements with this type of clearly-
stated opinion. Both the incidences of such statements concerned the parents of pupils.

2.5.2 Invitation to Reflection (9 Statements in 6 Messages)
In this category we find relatively open questions that cannot be interpreted as a direct request for concrete
advice or information. Does anyone else have any thoughts about this? The term “reflection” is not explicitly
used in this material. The category contains questions that are intended more to elicit the opinions of others
than to obtain concrete advice relating to a current situation. That the number of such questions is not greater
can form an interesting starting point for further discussion. Can it be related to distance and the absence of
direct relationships?

2.5.3 Requests for Information (8 Statements in 4 Messages)
This category includes those who to a greater extent are looking for information about an issue. These
questions are often connected to administration and regulations and may be along the lines of: does the law
say anything about what to do in such a situation? There are also few expressions of this sort in the material.
There are perhaps sources other than a forum of this type when what is needed is answers to precise
questions.

2.5.4 Requests for advice (19 Statements in 14 Messages)
Some people ask specifically for advice, usually after presenting the nature of the problem. The question
posed is often of the type what should I do? or can anyone offer advice or tips? Some people asked for
several pieces of advice within the same message whilst other messages lack an explicit request for advice.
Some of these requested exact information or posed more open, reflective questions. For others the request
for advice was implicit in the presentation of the problem. The fact that concrete advice is more in demand
than reflective comment, and more in demand than factual information, is in line with equivalent analyses I
have carried out of other selections from the same material.

2.5.5 Questioning Own Role (8 Statements in 5 Messages)
Some people query their own role and their own actions in relation to the situation that is described. The
questions can, for instance, concern whether or not what one has done has been in the best interests of the
pupil. The nature of the enquiry in this respect can be: (a) To question whether actions/statements have been
the most useful in the given situation. (b) To highlight alternative courses of action that could have been
chosen: What have we missed/not seen with this girl? 5 of 18 questions explicitly enquire about whether
measures taken for the pupil have worked well enough or whether the provision has been good enough.

2.5.6 Description of Own Contribution (23 Statements in 11 Messages)
Some people explicitly describe what they, as individual teachers together with their colleagues, have done in
the form of measures in relation to the situation that created the impetus for the question. In this category we
find descriptive statements that describe in concrete terms what the teacher or the school has done in relation
to the case under discussion, without raising any question in relation to the quality of these measures. That
the measures are being described at all perhaps suggests that an assessment has been carried out concerning
the extent to which measures and their implementation in respect of the pupil have been useful. Descriptions
of this sort are thereby found in almost two thirds of the analysed messages.

2.5.7 Description of Own Perception of the Situation (13 Statements in 8 Messages)
Some people describe their purely emotional reactions to the situation that forms the backdrop for their
question. This may be a case of unease, uncertainty, anger or worry. “As things are at present, I feel I’m not
able to embrace the interests of all 15 pupils I have in the class. From a phenomenological perspective this is also important information. Is the situation regarded as unpleasant, worrying or in fact frightening? This is information that has something to say about the working situation of the teacher and about the degree of support at their place of work, but it can also say something about what is required or expected of the advisor.

2.5.8 Description of the Problem (67 Statements in 17 Messages)

Here we find the description of the problems that are being experienced in connection with a situation. It is this description that accounts for the reason that one has chosen to seek outside guidance/advice. No division has been made in the analysis in respect of who is experiencing the problem. It may be the pupil, teacher, parent or all of these. Without exception, all enquirers described one or more problems. I have not distinguished here between who is portrayed as the principal “owner” of the problem.

2.5.9 Presentation of Supplementary Information (90 Statements in 18 Messages)

Background information is given in order that the advisor/mentor has a basis. This could be a matter of the pupil’s previous history, of situations other than at school, areas that function without problems, the opinions of others, or other things. On the basis of a phenomenological thinking, what is being presented is the situation as it appears to the enquirer/person seeking advice, and not an objective picture of the situation.

2.5.10 Personal Presentation of the Enquirer (18 Statements in 11 Messages)

Most enquirers begin with a short presentation of themselves. This may include matters of gender, age, which class they work with and whether their function is that of form teacher or of educational specialist. In all 11 of the 18 messages contained one form or another of self-presentation. The rest went straight to the problem area without giving any information about the enquirer themselves.

2.6 Discussion

The synopsis shows that the same type of statement, for example the problem description and supplementary information, can occur several times within the same message. Some of these postings contained highly compound problems. It is immediately apparent from the synopsis that two aspects are heavily emphasised in the material. (1) Describing the problems and problem situations of the pupils. (2) Describing background information about the pupil. Such information most often concerns the actual pupil and their family. The school’s provision is not included here. (3) Statements concerning the school’s own provision (description and questioning own influence) occur to a far lesser extent, and only a half of these statements display a critical perspective of the questioner’s own practice. Such an analysis provides absolutely no basis on which to draw conclusions that the one perspective seems to be important, or the other unimportant, to the person seeking advice, but I believe that there are grounds for questioning whether this division perhaps can tell us something about how a difficult situation is experienced and interpreted. Is a problem within the learning situation perceived as a problem with the pupil, or is it perceived as a problem that has arisen in the school’s interaction with the pupil (Imsen 2000)? Another distinction that is drawn in the analysis is what expectations the problem statements express. Do they request case information, do they ask for advice or invite reflection? What we observe is that most request advice, such as …Is there anyone who can give me good advice on what I should do now…? Refer the case to the child-protection agency, or continue trying to persuade the mother? I find statements of this sort in 14 of 18 postings. Requests for pure case information or invitation to reflection occur less frequently. On the basis of the material that I have presented, it is also appropriate, and perhaps essential, to pose some critical questions. I chose to focus on whether the individual questions their own practice when the teacher is looking for advice regarding every-day problems at school. Finds in the selected material show at any rate that the emphasis on describing the pupil’s problems is much more evident than questioning the influence and practices of the teacher and the school. Two relevant questions are thus: Does this tell us anything about current thinking in every-day school life? And if so, is the emphasis on the individual that we can observe here something that we want in a school that is to be inclusive, appropriate and non-discriminatory? Can this also be seen in association with the tendency observed in the investigated material that teachers in the selection ask for advice on how to act rather than for reflective responses?
3. CONCLUSION

The actual process of categorising the material and finding patterns and connections has provided ideas that a systematic analysis can help provide the advisor with tools with which to work. The analysis so far has shown that searching for patterns and structures in the textual material contained in the 18 queries has yielded something meaningful. Having a category set as a basis can assist an advisor by providing help in finding good questions. An approach of this sort exists in some tension to and should be balanced against the phenomenological-based understanding that every experience encompasses different aspects. Here I return to Husserl’s term life world which involves an acknowledgement that phenomena cannot be described in an objective, universal manner but only as an individual’s experience of the phenomenon. But Husserl also points out through his term essence that there is a core of meaning and content that can be communicated between people in a meaningful sense. My method of systematising and categorising the text is also by no means to be understood as an objectively “correct” categorisation. However, may it be possible for such a systematisation in the collaboration between enquirers, advisers and researchers to be developed into a tool that can contribute to better guidance and thus contribute to better learning?

REFERENCES


USING THE INTERNET FOR ACADEMIC PURPOSES: CHALLENGES FOR PRIMARY SCHOOL CHILDREN IN MALAYSIA

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ABSTRACT
For some time now, in all types of schools, the curriculum has been integrated with online learning in order to meet the demands of an information and knowledge-based society. The Malaysian government has made a major investment in ICT programs for national schools in order to fulfill this demand. In Malaysian Smart Schools students participate in an ICT literacy program from Year 1 to Year 6. In Year 4 primary school children are introduced to the use of computers to access the Internet for school assignments and for personal use. It has been found that school children have difficulty in searching for information for academic purposes due to their limited knowledge of the Internet and web searching skills. This research paper, derived from doctoral research findings, attempts to identify the trends and challenges in the information seeking techniques of school children using the Internet for academic purposes.

KEYWORDS
Internet, information seeking, knowledge, skills, school children.

1. INTRODUCTION
Recently, there has been an increase in school children using electronic resources, mainly the Internet, to support their information needs for both school assignments and personal use (Hirsh, 1999; Large, Beheshti, and Rahman, 2002; Madden et al, 2007). However, many studies have identified a number of challenges and problems with children’s information seeking techniques due to their inadequate knowledge of how to use search engines, their limited level of research skills, and the poor structure of the web itself (Bilal, 2000, 2001, 2002). Children also experience difficulty in retrieving information from various other electronic information sources (Large, Beheshti, and Rahman, 2002). Research has found that children’s information seeking behaviours differ from those of adults (Kuhlthau, 1991; Walter, 1994; Hirsh, 1999; Xie, 2008) and since children use the web as a major resource for their school projects and entertainment (Rothman, 2003; Madden et al, 2007), there is a need to learn about children’s information seeking processes in order to improve their access to web-based information. Children need appropriate information retrieval tools, designed to meet their academic needs. Broch (2000) addresses the important issue of interface design which should be taken into consideration for children’s use. This includes elements such as Internet filtering, authorship and other aspects of using the Internet for information seeking purposes. In order to design more appropriate information retrieval systems, which children can use effectively, we need to understand how children seek information from electronic resources. The main objective of this study therefore is to investigate how Malaysia primary school children behave when seeking information for academic purposes using the Internet. This study was carried out within the Smart School program in Malaysia. According to Chan (2002) the Smart School program is designed to achieve one of the goals of Malaysia’s Vision 2020; that is, to transform the educational system from memory-based learning to an ICT enabled environment. Two 30 minute teaching periods per week are allocated for the ICT program, which aims to provide a systematic, integrated teaching and learning environment through the use of IT applications in Malaysian schools.
2. METHODOLOGY AND APPROACH

Two primary Smart Schools were involved in this study and feedback from Year 4 and Year 5 students was analyzed. One hundred written permission slips were distributed to parents and 67 were returned. After discussions with the class teachers involved, questionnaires were distributed and completed in ‘free time’. This paper describes and discusses the data collected in order to determine how school children seek information from the Internet for academic purposes. According to Neuman (2006), using descriptive research is to “paint a picture”, using words or numbers from graphs or tables, to determine a profile. There are two main findings presented in this paper, based on a profile of the school children involved: children’s knowledge and usage of, and challenges in using the Internet in a school environment and the identification of children’s information seeking processes for academic purposes.

There are various models that describe information seeking from different perspectives. A study by Kuhlthau in 1993 was conducted in a library and information services environment and her model represents the tasks considered most relevant to the information processes of children. Her model presents a relationship between information seeking and learning. The six stages of the Kuhlthau (1993) model can be described as follows: First is the initiation stage, where a person has feelings of uncertainty and a need of information; second is the selection stage, where a person tries to identify a general topic in order to search for the information; next is exploration, where a person tries to search for more information on the topic; fourth is formulation, where a person will focus on a specific area within the topic; next is collection, when a person gathers all relevant information needed and finally is presentation, when a person completes the information search. This paper will focus on the first two stages of Kuhlthau’s model relevant to children’s information seeking processes when using the Internet for academic purposes.

3. FINDINGS

3.1 Children’s Background

In the two sample schools thirty-nine children were female and twenty-eight were male. Their ages ranged from 10 to 11 years, with twenty-nine children aged 10 years and thirty-eight aged 11. A majority of the school children (89.55%) reported that they had a computer at home, and a total number of forty-four school children (65.67%) had Internet access at home demonstrating that Malaysian school children are often exposed to an Internet environment at school and also at home. The children reported that they used a variety web search engines. A majority of the children used Yahoo, followed by Google. Other online resources commonly used are Wikipedia and Answers.

Table 1. Children’s internet experience

<table>
<thead>
<tr>
<th>Variables</th>
<th>Measurement</th>
<th>Frequency</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet Ability</td>
<td>Beginning skills</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>Moderate skills</td>
<td>61</td>
<td>91.04</td>
</tr>
<tr>
<td></td>
<td>Expert skills</td>
<td>5</td>
<td>7.46</td>
</tr>
<tr>
<td>Frequency of Use</td>
<td>More than 5 times a week</td>
<td>1</td>
<td>1.49</td>
</tr>
<tr>
<td></td>
<td>3-5 times a week</td>
<td>12</td>
<td>17.91</td>
</tr>
<tr>
<td></td>
<td>Twice a week</td>
<td>35</td>
<td>52.25</td>
</tr>
<tr>
<td></td>
<td>Once a week</td>
<td>19</td>
<td>28.35</td>
</tr>
<tr>
<td>Purpose (multiple choices)</td>
<td>Assignment/Homework/Project</td>
<td>61</td>
<td>91.04</td>
</tr>
<tr>
<td></td>
<td>News</td>
<td>15</td>
<td>22.39</td>
</tr>
<tr>
<td></td>
<td>Email</td>
<td>39</td>
<td>58.21</td>
</tr>
<tr>
<td></td>
<td>Entertainment</td>
<td>47</td>
<td>70.15</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>10</td>
<td>14.93</td>
</tr>
<tr>
<td>Challenges (multiple choices)</td>
<td>Server down</td>
<td>33</td>
<td>49.25</td>
</tr>
<tr>
<td></td>
<td>Inadequate Facilities</td>
<td>11</td>
<td>16.42</td>
</tr>
<tr>
<td></td>
<td>Poor Internet Skills</td>
<td>27</td>
<td>40.3</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>6</td>
<td>8.99</td>
</tr>
</tbody>
</table>
3.2 Children’s Internet Experience

Table 1 represents the school children’s experiences based on their Internet usage at school. The children answered questions based on their best understanding of Internet usage in school. The most challenging aspect was using the Internet to seek information for academic purposes such as for an assignment set by their teachers.

3.2.1 Ability to use the Internet

Sixty-one children (91.04%) claimed that they were moderately skilled users with regards to their Internet ability. This is followed by five school children (7.46%) who believed they were experts and one child (1.5%) who considered him/herself to be at a beginner level.

3.2.2 Frequency of use

It was identified that thirty-five school children (52.25%) used the Internet twice a week at school, followed by nineteen school children (28.35%) who used it once a week. Twelve children (17.91%) used the Internet three to five times a week, and only one child used the Internet more than five times a week.

3.2.3 Purpose of use

As a whole, considering the children from both schools (a total of sixty-seven school children), sixty-one (91.04%) revealed that the purpose for seeking information was to fulfill the requirements of school assignments, class projects or homework; followed by forty-seven school children (70.15%) who accessed entertainment sites, thirty-nine (58.21%) who used email services, fifteen (22.39%) accessed news, and ten reported using the Internet for other purposes (14.93%).

3.2.4 Challenges

With reference to the challenges of using the Internet, thirty-three school children (49.25%) claimed that the biggest challenge faced was the server being down. This is a common occurrence in Malaysia. Twenty-seven children (40.3%) said that they lacked Internet skills, eleven (16.42%) believed that there were inadequate facilities such as a lack of sufficient computers requiring children to share computers during classes, and the six school children (8.99%) who chose “Other”, referred to being unable to find what they wanted or identified the text as being of too high a literacy standard for them to understand.

3.3 Information seeking Processes using the Internet

Table 2. Frequency analysis of the information seeking process for academic purpose of school children in Malaysia

<table>
<thead>
<tr>
<th>Variables</th>
<th>Always (%)</th>
<th>Sometimes (%)</th>
<th>Never (%)</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I use Internet to search for information for class assignments.</td>
<td>36(53.7)</td>
<td>27(40.3)</td>
<td>4(6.0)</td>
<td>1.52</td>
<td>0.612</td>
</tr>
<tr>
<td>I use more than one search engine to find information for my task.</td>
<td>23(34.3)</td>
<td>41(61.2)</td>
<td>3(4.5)</td>
<td>1.72</td>
<td>0.551</td>
</tr>
<tr>
<td>I search for the information by myself</td>
<td>20(29.9)</td>
<td>46(63.7)</td>
<td>1(1.5)</td>
<td>1.72</td>
<td>0.486</td>
</tr>
<tr>
<td>I get help from a teacher to find the information.</td>
<td>20(29.9)</td>
<td>43(64.2)</td>
<td>4(6)</td>
<td>1.76</td>
<td>0.553</td>
</tr>
<tr>
<td>I have difficulty finding information</td>
<td>14(20.9)</td>
<td>48(71.6)</td>
<td>5(7.5)</td>
<td>1.87</td>
<td>0.519</td>
</tr>
<tr>
<td>I read and take notes on information that I found</td>
<td>21(31.3)</td>
<td>37(55.2)</td>
<td>9(13.4)</td>
<td>1.82</td>
<td>0.650</td>
</tr>
<tr>
<td>I discuss the information with others before making a final decision on its usefulness</td>
<td>24(35.8)</td>
<td>41(61.2)</td>
<td>2(3)</td>
<td>1.67</td>
<td>0.533</td>
</tr>
</tbody>
</table>
The data given in Table 2 is based on Likert scale questions where 1 = always, 2 = sometimes and 3 = never. The mean averages indicate that the children generally responded *always* or *sometimes* to the options, with low standard variations.

In using the Internet to seek information, thirty-six of the children (53.7%) selected *always* and twenty-seven (40.3%) children said *sometimes*, representing 94% of the total observations from the survey. This gives a positive indication for Malaysian primary school children using the Internet to search for information for their class assignments.

Forty-one of the school children (61.2%) indicated that they *sometimes* used more than one search engine in order to complete their class assignments, which suggests that they had basic knowledge of various web search engines, as reported above. According to sixty-six (93.6%) of the children, they generally searched by themselves, but sometimes children needed assistance from teachers. About 64.2% of the children claimed that they *sometimes* got help from their teachers. The survey also revealed that out of sixty-seven children, sixty-two (92.5%) of them admitted that they *always* or *sometimes* had difficulty in searching information for academic purposes.

It was found that about 31.3% of the school children *always* took notes as they searched. However, they do not seem keen to share their ideas with their friends or teachers. About 61.2% claimed that they *sometimes* discussed the information found with others.

### 4. DISCUSSION AND CONCLUSION

In summary, the findings presented in this paper indicate that Malaysian school children use the Internet as their main electronic resource for class assignments. A majority of them are moderate users and choose Yahoo as their favorite search engine, followed by Google. According to the school children, they can search for information by themselves; however this is not necessarily the case. In reality, the results show that some of the children would benefit from assistance from teachers to overcome difficulties and challenges, such as a lack of Internet searching skills in acquiring accurate information. This is evident from the school children who claimed that they do not get expected results. The high literacy level of the text that the children encounter on the Internet also affects their ability to access the information sought. Another difficulty faced is the common occurrence of the server being down. This situation is beyond the control of the children and school management should attempt to ensure that online networking systems are running smoothly during class hours. The success of the Smart Schools’ program is highly dependent on the commitment of teachers and the availability of ICT facilities. In addition, while most Malaysian school children are aware of the importance of checking or discussing the information found with their teachers or friends, this is certainly not always the case. In particular, when facing the difficulties and challenges of successfully seeking information from the Internet, school children should be more amenable to discussing identified information with their teachers. This would assist with selecting relevant information from appropriate search engines, interpreting difficult words and phrases, using search options such as keyword search or Boolean search, and learning how to explore other options for locating information, such as following links for further exploration. Teachers are encouraged to supervise school children during computer classes and expected to conduct their own school based assessment of online searching skills and evaluating web pages. Primary school children must also learn the value of checking information found before submitting their assignments.

Large and Beheshti (2002) suggest that the web is too complex for children at primary school level, but given proper instruction, some initial training from teachers or teacher-librarians and well designed technological tools it can be a very useful online resource which could allow students to incorporate information retrieval skills in their academic growth. Findings reveal that primary school children in Malaysia have a basic understanding of how to use a search engine in order to locate information for academic purposes. However, the question is whether or not they can go beyond the basics and explore the information initially retrieved for more specific knowledge and understanding. The next phase of this study will be to analyze in detail how primary school children seek information from the Internet based on Kuhlthau’s model of observation beyond the first two stages of initiation of the information seeking process and selection of appropriate resources. Future analysis will focus on the exploration, formulation, collection and presentation stages of Kuhlthau’s model related to children’s information seeking on the Internet.
REFERENCES


ABSTRACT
The European Union has defined e-skills as an important requirement for inclusion in the Information Society (EU, 2007), a view that is further reflected in the recently published Digital Agenda for Europe (EU, 2010b). A project was initiated in 2009 by the CEN/ISSS Workshop on ICT skills to identify whether there was a need for a framework to describe the skills required by end users of computing resources. The aim was to obtain an understanding of end user e-skills, to identify the requirements for a reference framework and to outline tools that could benefit framework users. Initial research involved the examination of e-skills frameworks already in place in European countries. Following this, four potential target groups were identified. This paper describes the initial results of this work and an early outline of requirements for a framework.

KEYWORDS
e-skills, end user, ICT, framework

1. INTRODUCTION
It is recognised that some skills in using information and communications technology (ICT) is needed in today’s society (EU, 2010a). The EU defines such skills (e-skills) at three levels - ICT practitioner skills, ICT user skills and e-Business skills. A project was initiated in 2009 to understand what ICT user skills were required and to make proposals for developing a reference framework. Initial research was undertaken which involved the examination of frameworks already in place in European countries. This informed a survey which was carried out with the individuals and organisations representing four target groups.

What skills are needed and at what level? Bartholomew (2003) talked about skills which were a “nebulous set of skills” and that they are “sought after” and “seldom attained”. Tim Berners-Lee spoke in 1998 of a web which would be “a mirror” of the way we work and socialise, where “we could then use computers to help us analyse it, make sense of what we are doing, where we individually fit in, and how we can better work together” (Berners-Lee, 1998). What skills do we need to do this? Mason et al (2006) suggest that user skills must include awareness and competence. Talja (2005) finds that “IT competencies” are “dialogic, multi-layered and context dependent social constructs”. To ensure that the focus and scope of the project would be clear, a definition of “end user e-skills” was researched and agreed. The definitions were informed by previous definitions including the Synthesis Report of the 2004 European e-Skills Forum (EU, 2004), and the definition of Digital Competence which was included as one of the key competences for lifelong learning, as part of a recommendation of the European Parliament and Council (EU, 2006).

Based on the project requirements, a revised definition was created and agreed, as follows:

“End user ICT skills: the capabilities required for effective application of ICT systems and devices by the individual in either a work or personal environment. Individuals apply systems as tools in support of their own activities, which is, in most cases, not ICT. End user e-skills cover the utilisation of common generic software tools and the use of specialised tools supporting business functions. End user e-skills vary in complexity from introductory up to an advanced usage level.”

1 Includes recreational home usage
The project, funded by the European Commission, is part of the CEN/ISSS Workshop on ICT Skills, a European work group consisting of both national and international representatives from the ICT industry, vocational training organisations, social partners and other institutions. This paper describes the methodology and findings from the initial research.

2. METHODOLOGY

The first part of the project was to examine how end user e-skills were being defined and addressed in Europe. This gave a snapshot of the current activity and the existing solutions being used across Europe. Some of the e-skills frameworks referred to the skills of IT professionals. Others were those of the end user. This project is focused on the end user skills requirements. Having completed the initial framework review, a survey was circulated to individuals and organisations representing four potential target groups. Finally a series of interviews was carried out with key stakeholders to clarify issues where required, to further explore requirements and discuss potential benefits that could be derived from a framework.

It was noted that many of the respondents referred to the European Computer Driving Licence (ECDL) as the framework in use in their country. The ECDL certification programmes are widely adopted across Europe and beyond. Outside Europe ECDL is known as ICDL (International Computer Driving License). ECDL has become the de facto standard in many countries (ECDL, 2009).

Research also noted two important European level framework developments which may interact with any future end user e-skills framework – the European Qualifications Framework which links countries’ qualifications systems together (EU, 2008) and the e-Competence Framework which is a reference framework of 32 ICT competences (EU, 2009a).

Four target groups were identified as key target groups and form the main focus of the research activity.

1. Human resource and training which require a way of describing ICT skills and competences that relates logically to job roles and can be used to identify skills gaps
2. Training and/or certification organisations which could benefit from being able to create flexible training and certification that relate to a common framework
3. Individuals - Access to appropriate and recognisable descriptions of their skills sets would facilitate mobility for the individual. A commonly accepted “language” would allow people to reflect their specific skills on CVs.
4. Regulatory authorities - National qualification frameworks are engaged in formalising and structuring certification definitions to allow certifications to map to each other. This process would be assisted by a standard expression of the e-skills domain.

The project aimed to gather requirements from those experienced in particular sectors and use this data to gauge the potential for sector specific versions of a framework. The ICT-Skills Certification in Europe (EU, 2006) report and the Synthesis Report of the 2004 European e-Skills Forum (EU, 2004) both noted that end user e-skills includes the utilisation of common “generic” software tools in an office environment, and the use of specialised tools supporting major business functions with a large number of “user sectors”.

![Figure 1. Relationships between generic and sectoral software](image-url)
The level of overlap between these two skills categories will vary between sectors. The interview element of this research aims to explore this further to gauge the requirements of the sectors.

The survey was structured to gain the maximum amount of data from the respondent within a reasonable timeframe. Initial piloting of the survey took place to validate the survey content and to estimate the completion time required, which varied from 15 – 25 minutes. The general structure and questions were adapted slightly to suit each survey target group. The survey featured the following content:

- Survey Respondent Information
- Framework Structure, including level of detail, proficiency levels, links to national qualification frameworks, suitability of descriptors
- Importance of framework against other requirements
- Various uses and tools an end user e-skills framework could provide

The survey was circulated to a listing of 230 representatives of the four target groups. In addition, the survey was circulated to various related mailing lists (e.g. European e-Skills Association (formally the e-Skills Industry Leadership Board), CIGREF members, ECDL Foundation Licensees). 118 responses from 25 countries were received.

The results of the interviews will be used to gather qualitative perspectives on the requirements of stakeholders. The interview results are not included in this paper, as synthesis of the interview outputs is ongoing at the time of publishing.

3. FINDINGS

The survey aimed to get an indication of the priority of the need to have an end user e-skills framework. The responses suggested that, while the need for such a framework was not deemed to be “extremely important” by some (10%), there was a sufficient level of demand to suggest that the development of such a framework would be welcomed with 71% saying it was “moderately important” or “very important”.

Benefits of such a framework were identified as:

- To assist individuals in completing a curriculum vitae (e.g. Europass CV)
- To support Human Resource decision making and planning and assist in recruitment
- To support cross referencing of certifications and qualifications
- To enhance individual mobility through use of a recognisable description of skills
- To help quantify employees’ e-skills and highlight targets for improvement
- To provide a reference to National or European Qualifications Frameworks
- To assist individuals in identifying required skills to participate in the Information Society
- To evaluate training options or purchase training
- To provide a common framework for competence and skills planning and training

The respondents were asked about the level of detail that they would require in a framework. The options available ranged from a high level of detail (containing a category, skill set and skill item level), to a low level of detail (containing a category level only). As might be expected, individuals and training/certification organisations were interested in the greatest level of detail. The results were as follows:

![Figure 2. Level of detail required](image-url)
A question was asked about the number of proficiency levels required. The options available ranged from three proficiency levels to a single (yes / no) proficiency level option. While there was some difference between the groups, between 67 and 77% preferred a three level framework. Over two thirds of the respondents agreed that there was a need for the framework proficiency levels to link to appropriate levels of other frameworks, such as National Qualifications Frameworks (NQFs), the European Qualifications Framework (EQF) or the e-Competence Framework (e-CF).

The next section of the survey aimed to get feedback on the respondents’ preference for skills based or competence based framework. In this section, the respondents were provided with framework examples of both options and asked to choose their preferred approach. These examples were supported by the European Qualifications Framework definition as follows:

- **Competence** – “A demonstrated ability to apply knowledge, skills and attitudes for achieving observable results”
- **Skills** – “Ability to carry out managerial or technical tasks. Managerial and technical skills are the components of competences and specify some core abilities which form a competence”

![Framework - Skills based or competence based approach](image)

**Figure 3. Framework - Skills based or competence based approach**

All target groups were asked to choose the applications and associated skills or competence which they would require to be included within an end user e-skills framework. The results of the question showed that a wide range of applications would be worthy of inclusion, but the main office applications such as Word Processing, Spreadsheets, Presentations, web browsing and e-mail consistently returned the highest responses. These applications would appear to be the best starting point for any future development of an end user e-skills framework.

There were some reservations - human resources and recruitment respondents suggest that it may be difficult to explain the framework to local work councils and unions, as there may be a feeling that it may impact on compensation and benefits of employees. In addition, this target group suggested that it is important to keep the framework short and simple, and to clearly differentiate the framework from certifications. For training and certification organisations there were reservations about the ability to strike a balance between having a framework that is either too light and generic or too detailed and complicated. Additional concerns related to ensuring that the framework is flexible, that the content remains current and valid, and that the framework can be effectively positioned alongside existing national level frameworks.

### 4. CONCLUSIONS

The objectives of the project were to identify if there was a need for a framework to define the skills required by an end user of computing resources. The initial research produced a view of the European activities around existing frameworks which has demonstrated that there is activity and interest in this area.

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2 http://ec.europa.eu/education/lifelong-learning-policy/doc44_en.htm
The survey provides a clear indication that such a framework would have a variety of benefits for the identified target groups. It is clear that a future framework will need to have flexibility in terms of the level of detail and the number of proficiency levels. Research also points to a preference for the framework to be constructed with a competence approach. While it appears that an end user e-skills framework that has the potential to link to existing national qualifications frameworks would be welcomed, there seems to be limited support for any links to the European e-Competence Framework. The results of the research can be used in the development of a framework that can meet the needs of key users. Such a framework will have a variety of benefits and applications, including contributing to raising awareness of end user e-skills to maximise ICT inclusion and further promote the usage of ICT among all members of society.

REFERENCES


QUANTITATIVE ANALYSIS OF INDIVIDUAL DIFFERENCES IN NOTE-TAKING AND TALKING BEHAVIOR IN MEETINGS

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ABSTRACT

This paper describes a novel study on the quantitative characteristics of the personal note-taking and talking behaviors of meeting participants. We investigate the effects of gender, age, native language and functional meeting participant role on people's behavior using meeting data from the Augmented Multi-party Interaction (AMI) corpus. Our findings show that there are significant differences with participant's total note-taking activities and their frequency and duration of talking based on the individual differences of gender, age, native language and functional role within the meeting. These results are useful to the developers of information and knowledge management systems. They support the creation of automatic meeting summarization techniques in producing more effective approaches, for example, by assigning a higher feature score to speech and note-taking cues of more active participant roles.

KEYWORDS

Meetings, Note-Taking, Talking, Individual Differences

1. INTRODUCTION

Meetings are an essential activity in almost every organization today and people usually attend many such gatherings in the workplace (Renals, 2010). Often, the participants are interested in recalling key points of conversations or discussions and would benefit from access to a concise summary. However, the minutes of meetings are sometimes incomplete, or not available, and recordings of the meeting speech can be hard to access because of their serialized nature (Whittaker et al., 2008).

Meeting browser environments that present the content of meetings, such as audio and video recordings, speech transcripts and presentation slides have been developed to facilitate information retrieval from meetings (Wellner et al., 2004; Yu & Nakamura, 2010), but users may suffer from information overload when trying to satisfy their information needs. This has lead to the development of automatic summarization techniques for meetings (Buist et al., 2004; Castronovo et al., 2008).

One area that has received less attention has been the effect of individual differences on note-taking and talking activities in meetings, which could be used to support the generation of automatic meeting summaries. Related work on information seeking has shown that individual differences, such as age and domain knowledge, have an effect on people’s searching behavior and success (Thong, et al., 2002). Similarly, in this paper we investigate whether individual differences - gender, age, native language and functional role – have an effect on people’s behavior in meetings. These novel insights are clearly important for the development of future automatic summarization techniques that employ features derived from speech, such as pitch or volume of spoken utterances or term frequency statistics from transcripts, but could be extended by information about the occurrence of differences in participants’ note-taking and talking activities as features for generating automatic summaries of meetings.

The remainder of this paper is organized as follows. In Section 2 we discuss related work on meeting activities. Section 3 describes the methodology of this research. In section 4, we present the findings of this study and a subsequent discussion. Section 5 concludes this paper and provides recommendations for future work.
2. RELATED WORK

Previous research into user requirements for meeting information has found that, in practice, people are particularly interested in important action items that they have to do after the meeting and in decision points that were determined during the gathering (Lisowska et al., 2004). Meeting participants usually take comprehensive, personal notes that record important facts of the discussions within a meeting (Khan, 1992; Whittaker et al., 2008). The properties of these note-taking activities could be utilized by automated language processing techniques to generate meeting summaries. Notes can represent keywords. They appear to be a good means for indexing audio or video recordings (Whittaker et al., 2005); such an approach would facilitate the fast and efficient search for the most informative meeting regions.

People traditionally used to prefer hand-written notes, as opposed to laptop keyboards (Whittaker et al., 2005), but digital note-taking on mobile pen-based devices is getting more important these days. However, recent work has found no differences between the media of note-taking in terms of the quality and quantity of the notes taken (Kalnikaite & Whittaker, 2008).

Prior research has shown that people differ considerably when it comes to agreeing on what is summary-worthy, and what is worth writing down (Salton et al., 1997; Whittaker et al., 2005). According to a previous study, individuals take notes at different times and about a diverse range of meeting agenda items (Whittaker et al., 2005; Whittaker et al., 2008), but groups of people according to gender, age, native language and functional role were not investigated.

Issues related to cognitive effort may also influence the activities of individuals in meetings (Piolat et al., 2005; Tracy & Albers, 2006). Not only production of the written notes, but also comprehension of the spoken utterances, is necessary to generate good notes. Note-takers must select the information that they consider worth writing down (Piolat et al., 2005).

Previous work on meeting behavior using the AMI meeting corpus (Carletta, 2006) found that the functional participant role of project manager in a meeting is generally more involved in the talking activities and will tend to utter more summary-worthy information, such as decisions (Hsueh & Moore, 2007). Meeting leaders are responsible for the agenda (Banerjee & Rudnicky, 2006), and thus, they are likely to talk more frequently and for longer than less responsible functional roles in order to inform the other participants about agenda items. Project managers may have to produce the official meeting records and minutes and are more likely to write more often and for longer than other meeting participants in different functional roles.

In this paper, we observe what groups of people show different behavior based on individual characteristics in terms of gender, age, native language and functional role, as this is something that has received little previous attention.

3. METHODOLOGY

In order to examine note-taking and talking behavior in meetings, we used 124 meetings taken from the Augmented Multi-party Interaction (AMI) meeting corpus (Carletta, 2006). This corpus has been developed to support research on new technology that helps to understand and summarize meeting content. The meetings were recorded in specially-developed ‘smart’ meeting rooms that were equipped with various cameras and microphones. These rooms were identical in three locations in Europe. The corpus also contains speech transcripts and other human annotations of observed behaviour.

The chosen meetings were about the development of a new TV remote control in a company and had four participants. This scenario was selected by the creators of the corpus in order to establish a controlled environment for the general meeting topics. Unplanned events such as budget limits were incorporated in the meeting scenarios, just as would occur in practice. The meeting participants were allowed to behave as naturally as possible, with no restrictions regarding talking or note-taking activities. Personal notes were taken with digital pens on paper. Each person was assigned with and thoroughly trained for a functional participant role such as project manager, user interface designer, industrial designer, and marketing expert. There was no designated scribe. The average length of a meeting was 30 minutes. There were 327 male and 169 female participants, their age ranged from 18 to 58 years and around half of the participants were native English speakers.
The meetings were analyzed regarding the total number and total duration of written note items taken per individual and per meeting. We also calculated the total number and the total duration of the spoken words uttered in the meeting discussion for each person. Statistical analyses were conducted for the meeting participants’ gender, age, native language and functional participant roles in the meetings.

4. RESULTS AND DISCUSSION

4.1 Participant’s Gender

Female participants wrote significantly more frequently ($t(266)=6$, $p<0.01$) and for longer ($t(272)=5.6$, $p<0.01$) than male participants. The effect size for the t test was 0.3, which represents a medium effect. Women noted 20 items on average; men only 11. This suggests that females are more careful or more likely to think they may forget the salient information of a meeting. However, males talked significantly more frequently and for longer in the meetings. This may be because men historically tend to be in leadership roles at work, especially in technical professions. The results for the t test on the total number of the spoken words ($t(409)=2.5$, $p<0.05$) and duration ($t(425)=3.3$, $p<0.01$) of the words spoken showed only a small effect.

4.2 Participant’s Age

We correlated the participants’ age with the total number and the total duration of the notes written and words spoken (see Table 1). There is a slight positive correlation, which is significant in all cases except for the total duration of the notes written. The older the participants, the more frequently they took notes and the more often and longer they talked.

Older people have more life experience and general knowledge; therefore, they may talk more in general. They may also think they forget important points more than younger people because memory, as well as other bodily functions, tends to degrade with age. Older people may be accustomed to physical note-taking; younger generations not. Therefore, older participants seemed to appreciate the value of taking notes more. Also in practice, seniority in organizations usually means more responsibility for the meeting outcomes due to leadership roles (Belbin, 2010); thus, there is a need to retain salient meeting content for action-taking purposes and documentation.

Table 1. Participant’s age and total number and total duration of written notes taken and spoken words uttered (*$p<0.05$)

<table>
<thead>
<tr>
<th>Correlations between:</th>
<th>Total Number of Notes Written</th>
<th>Total Duration of Notes Written</th>
<th>Total Number of Words Uttered</th>
<th>Total Duration of Words Uttered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant’s Age</td>
<td>r=0.13*</td>
<td>r=0.07</td>
<td>r=0.11*</td>
<td>r=0.15*</td>
</tr>
</tbody>
</table>

4.3 Participant’s Native Language

The t test for native language showed that native English speakers wrote significantly more often ($t(473)=5$, $p<0.01$) and for longer ($t(419)=6.1$, $p<0.01$) than non-native ones. The effect was relatively small, as 18 notes items were taken by native English speakers and non-native English speakers recorded 11. This is likely due to cognitive effort issues that imply it is easier for native English speakers to write and process information (Piolat et al., 2005). The increased cognitive effort may have made it harder for the non-native speakers of English to take notes from the meeting and also to participate.

Regarding the talking behavior, we found that the total number of spoken words ($t(491)=1.2$, $p>0.05$) and total duration of spoken words ($t(491)=0.2$, $p>0.05$) compared with the native language data, using a t test, did not provide a significant result. The participants seemed to contribute equally, regardless of their native language. However, although not significant, the non-native speakers talked slightly longer but uttered fewer words in total, which may be caused by the characteristically slower speaking rate in non-native speech (Koumpis, 2002).
4.4 Participant’s Functional Role

An ANOVA for the four different participant roles was significant for both the total number (F(3, 258)=13, p<0.01), as well as the total duration (F(3, 259)=7, p<0.01) of the written notes taken. The project manager wrote significantly more frequently and for longer than the other three roles. This leading role noted items about twice as many times as the other roles and wrote almost double as long. In terms of the participant roles and the total number of words spoken, the ANOVA was also significant (F(3, 260)=19, p<0.01). The same was true for the total duration of the words spoken (F(3, 259)=29, p<0.01). The project manager role spoke more often and for longer. This may be because the project manager role is usually responsible for the meeting as a whole. They run the assembly, oversee time and budget restrictions and create the meeting minutes. In accordance with related research that found more decision-related utterances (Hsueh & Moore, 2007), this role requires more frequent and longer writing and talking activities in the meetings we explored.

It can be inferred that in general meeting leaders are more involved in important meeting events than less important functional roles. However, people’s work experience can play a role in practice; for example, a speech recognition expert may dominate a meeting discussion on this topic. Expertise may also influence the note-taking behavior, as people’s confidence of remembering may be higher. The analysis of Belbin’s team roles at work (Belbin, 2010) would provide further insights into the social interactions in meetings.

5. CONCLUSIONS

It can be concluded that there are significant differences between the groups we tested. Women wrote more frequently and for longer than men; males talked more and for longer in meetings. The older the participants were, the more notes they took and the more and longer they talked. Native English speakers wrote more and longer than non-native English speakers. The functional participant role influenced the note-taking and talking behavior in meetings. Project managers recorded more frequently and for longer and also talked more often and longer, as they led the meetings. Our findings support prior research on individual differences in meeting activities but extend the knowledge in this area by establishing broader categories of differences, i.e. we examined groups according to gender, age, native language and functional participant role.

The data set used for this work was restricted to only one collection of meetings and thus, a limitation of this research is that the results may not generalize well across other types of meetings, e.g. about other topics, with a different duration or with more participants. The relatively large number of meetings we explored may have influenced the findings towards statistic significance, i.e. the effects we found may be small in practice.

There are various implications of this work for current advances in computer supported co-operative work. Video conference systems may support project managers by suggesting possible note-worthy points in ongoing meetings, which would free cognitive resources for participation in the meeting discussion and aid the production of official meeting minutes. Shared note-taking areas in meeting browsers facilitate group work, as other people’s ideas are visible. Less involved meeting participants could have access to documents, e.g. resources on the Internet that may be useful for the meeting discussion. A display of notes as keywords may help non-native speakers of English to better understand the meeting content. Social networking sites such as Facebook or Twitter can be used for presenting short meeting summaries to younger people.

Generally, these results are interesting for developing information and knowledge management systems about the content of meetings. The categories showing significantly more activities may be helpful as providers for automatic meeting summarization information, e.g. by assigning higher feature scores to speech and note-taking cues of more active participants.

In future work, it could be examined to what extent such cues may be utilized in new applications. Personal notes could also be used as indices into the underlying speech or video of meeting recordings. Temporal note-taking overlaps among multiple participants are likely to point to important meeting events. The implementation of such novel approaches requires further research.
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REFERENCES


INFORMATION SYSTEM IMPLEMENTATION AND ITS EFFECTS TO WORK SYSTEM: A CASE STUDY IN PUBLIC SECTOR

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ABSTRACT
This research focuses on upcoming information system implementation in the public sector. Theoretical foundation used is Alter’s (2006) work system method. In order to gather research data an ethnographical case study is done in a center for asylum seekers in Finland. Research question is, how could the implementation of a new resident registration system change current work systems in the case organization. Although the research is in progress, some preliminary results can be presented.

KEYWORDS
Work System, Information System Implementation, Public Sector, e-Government, Ethnography

1. INTRODUCTION

Implementation projects are often studied in the field of information systems (e.g. Caron, Järvenpää, & Stoddard, 1994; Grant, 2003; Majchrzak, Rice, Malhotra, King, & Ba, 2000). Especially the success and reasons behind it has been in the keen interest of various researches (e.g. Francalanci, 2001; Sanders & Courtney, 1985; Yetton, Sharma, & Southon, 1999). In recent years some studies have focused on defining certain factors, like user resistance, which are believed to affect the success of the information system implementation (Hrycej & Buckner, 2009; Kim & Kankanhalli, 2009; Sharma & Yetton, 2007; Sykes, Venkatesh, & Gosain, 2009). However, other papers, like Kim’s and Kaplan’s (2006) study on implementation as co-evolution between the developers of the information system and the end-users of information system, promote the need for holistic and multi perspective research on information system implementation.

From these bases this research concentrates on studying a governmental information system implementation project in Finland. The information system in question is meant for registering all the immigrants, who are applying for residence permit in Finland, and it will be implemented in autumn 2010. This research is limited to one part of this information system which will be used as a resident registration system in the reception centers for asylum seekers. This registration system will have a common database between all the reception centers, the police, the Finnish Border Guards and the Finnish Immigration Service. This is a major difference compared to the current resident registration system of the reception centers. Nowadays, each reception center has an individual database for their resident registration system, although, the same program is used in all the centers across Finland.

The goal of this research is to evaluate information system implementation from a holistic viewpoint; thus, work-systems method (Alter, 2006) is used as a theoretical background in this paper. Work systems are defined in the terms of the work instead of technology, and thus the focus is in “the work that is being done and the results that are being produced for customers” (Alter, 2006, pp. 35). The information system should exist for supporting the work system which can produce either physical products or services for customers. Elements of work systems are customers, products or services, work practices, participants, information, technologies, environment and strategies.
In order to study information system implementation from the perspective of work system method an ethnographic case study was chosen as the research method. Research focuses on one reception center for asylum seekers. Due to the need of receiving some information about the new information system also the team which is planning the information system implementation is studied. Hence, the research question is how could the implementation of a new resident registration system change current work systems in the case organization. The research is in-progress; however, the preliminary results can give partial answer to this question based on the current stage of the research.

2. RESEARCH METHOD

Ethnography is relatively new research method in the field of information systems but since 1990s it has been used in various studies about information system development and information system implementation (Kim et al., 2006; Myers & Young, 1997; Schultze, 2000). For this research ethnography was found suitable because it strengthens the holistic approach deriving from theoretical background. Participant observation and unstructured interviews (for further discussion about these methods see e.g. Karasti, 2001) are primarily used research methods for gathering research data in this study. The nature of the work prevents it being recorded or filmed. Thus, notes are taken along with observing or unstructured interviewing. In addition to these methods semi-structured interviews are essential for accruing more information about work practices which can be observed only in rare occasions. Notes are done during semi-structured interviews, although, they are also recorded.

The empirical research in the case organization (later referred to as the CENTER) begun in November 2009 and will continue until December 2010. Thus, it covers the preparation to implementation as different phases of adaptation because the implementation itself is scheduled to take place in between August and October 2010. From November 2009 until March 2010 total of 84 hours were spent in the field. In addition six semi-structured interviews were conducted to social workers, secretary and the leader of housing service personnel.

3. EMPIRICAL RESEARCH

3.1 Case Organization

CENTER is a reception center for asylum seekers which is situated in Finland. There are several reception centers for asylum seekers in Finland, and the amount of the reception centers has doubled during last two years. Reception centers for asylum seekers are governed by the Finnish Immigration Service. However, a variety of institutions have responsibility for the administration of an individual center. These institutions can be Finnish Immigration Service, municipalities or non-governmental offices. CENTER is managed by a non-governmental organization. It is the main reception center for asylum seekers in its geographical area and other reception centers in the same area are under its supervision.

CENTER is in charge of housing, social and medical services for asylum seekers. In addition, it organizes meetings for asylum seekers with their lawyers or government officials. Thus, the work practices in the organization vary greatly. Some of the employees are solely responsible for social services, health-care services or administration tasks. Important part of the staff is offering housing services along with social and medical assistance for asylum seekers. There are also workers who are in charge of maintenance, cleaning and security of the facilities.

3.2 Work Systems in the Case Organization

Three core work systems could be identified in the CENTER. These are offering housing services, offering social services and administrating the organization. Until now the research has concentrated mainly on work systems offering housing services and social services, which are presented in this chapter. The administration of the CENTER will be studied in the future research.
The customers for all work systems are asylum seekers. In addition to the asylum seekers participants in the housing services include housing services staff, security guards, maintenance personnel and cleaning staff. Customers are also participants in the social services but other participants in this work system are social workers and administration staff. An additional work system is offering income support to asylum seekers. In this work system participants are customers, social workers, administration staff and housing services staff.

Obvious work practices in the housing services are: welcoming a new asylum seeker, organizing rooms, offering access to household facilities and security services. However, an essential work practice in housing is also informing asylum seekers of various issues. Some of these issues relate to messages that asylum seekers receive from Finnish officials such as the police or the Finnish Immigration Service, thus, communicating with government officials is also a relevant work practice. Furthermore, helping asylum seekers with various purposes, like translating documents or giving advice, are very important work practices.

Social services also include various work practices. An essential work practice is helping asylum seekers adapt to the Finnish society, for example by informing them about education, working and leisure activities. Social workers can also help customers when they have mental problems. If a customer is going through severe crises s/he can receive psychological services from private clinics or a non-governmental office. In order to receive these services the customer needs to have accompanying letter from the social worker. Social workers also support asylum seekers, when they receive a negative or positive decision concerning their permission to stay in Finland. When an asylum seeker receives a residence permit of Finland, a social worker helps her/him apply for the place of residence in some Finnish municipality. If the asylum seeker continues living in the reception center after receiving the residence permit, the social worker can help her/him to reunite with hers/his family.

Offering income support consists of three work practices. The first is making a decision about the customer’s right to income support. Based on customer’s economical and social conditions, a social worker decides whether the customer has a right for income support or not. The second work practice is the payment of income support. This work practice is usually carried out by the administration staff, although, income support can also be paid by housing services staff or social workers. Income support is paid to customers in cash once per month. Each month the payment takes place at the same date and time in the facilities of the CENTER. If a customer does not claim her/his income support at this time, s/he may not receive it in full afterwards. The third work practice is controlling the right for income support which is done by social worker, administration staff and housing services staff. The main purpose of this work practice is to ensure that income support is not paid to customers who have other means of support. For example, if a customer is employed, s/he is no longer entitled to income support. Income support can be cut off also from customer who has violated the rules of the reception center. Mainly this means that the customer has moved to another place and has not notified the reception center about this. In this case the workers of the reception center must assume that the asylum seeker is absent without leave and report her/him as missing.

3.3 Current Information Systems and their Relation to Work Systems

Currently the workers of the CENTER mainly use three information systems. These are: the residence registration system, the reporting system and e-mail. The residence registration system and the reporting system are essential technologies in the work system of housing services. Before a new asylum seeker arrives, his or her information is faxed to the reception center by the police. This information is recorded to the residence registration system and updated when changes occur in the situation of the asylum seeker. If an asylum seeker is invited to a meeting with the police or with Finnish Immigration Service the time and the place of this meeting is marked to the resident registration system. When an asylum seeker confirms that s/he can participate in this meeting the confirmation is also marked to the resident registration system. This information can be seen by all the workers of the CENTER but it cannot be accessed by the other Finnish officials. The reporting system is used for writing down relevant or unexpected happenings during the day. It is an important tool for sharing information between employees who work at different times of the day. The reporting system is usually read by the housing staff, the security guards and the cleaning personnel in the beginning of their shift, because they need to know what has happened before they came to work. E-mail supports communication with the housing staff and the workers of the immigrant office. However, phone and
fax are the most commonly used technologies, for communication between personnel of the CENTER and other government officials. Participants of the housing services do not use e-mail often to communicate with their colleagues in the same organization.

Technologies in the work system of social services are: resident registration system and e-mail. The reporting system is not commonly used by social workers; instead they use e-mail to communicate with their colleagues in the same organization. The social workers have some extra functions in the resident registration system compared with the housing staff. They can also write and save notes about the meetings they have with their customers. These notes can only be seen by other social workers and administration staff. However, in 2009 the social workers did not write about each meeting that they had with asylum seekers into the resident registration system. However, in January 2010 a new social worker started to work in the CENTER. This increased the need of registering information about the meetings that asylum seekers have with social workers in order to facilitate information sharing between social workers. Since then, the social workers have tried to write more about the meetings that they have with their clients to the resident registration system. In addition, a common decision has been made in the CENTER that each meeting that a customer has will be marked in the resident registration system from the beginning of 2010. These meetings can be with social workers, nurses, doctors or lawyers. Previously these meetings were marked on a paper calendar. This calendar is located on a desk in the reception room and it is accessible to all the workers of the CENTER. It is still used for marking events that asylum seekers have, excluding meetings with the social workers, nurses, doctors and lawyers.

The resident registration system is also a part of the work system of offering income support. In the resident registration system the social workers and the administration staff have a functionality which enables them to make the decision about an asylum seekers’ right to income support. Administration staff can also print out a complete list of all the customers who are allowed to receive income support from the resident registration system.

As a conclusion, it can be said that information systems are important tools for producing housing and social services. However, they are not capable of doing any work practice themselves; instead a participant is always needed for creating the service. In addition, it is interesting to notice that none of the work systems include an information system which would participate in the division of work, supervision of work hours or in following the productivity of an individual worker. Neither is it possible for the workers of the CENTER to see information about the asylum seekers who live in some other reception center in Finland.

3.4 Preliminary Results

In the future the current resident registration system of the CENTER will be replaced by another resident registration system (later called as RRS). RRS has several differences compared to the current registration system. This will probably cause changes in work systems. This paper concentrates on the changes which are connected to the information sharing between CENTER and other public organizations.

RRS will share a common database with all the reception centers as well as between the police, the Finnish Immigration Service, the Finnish Border Guard and the reception centers. In order to control user rights, the users of the RRS will be divided into different user groups. There are three user groups from the viewpoint of the previously mentioned work systems. All these user groups have access only to information about current or previous asylum seekers. The most limited user group has only reading rights to the basic information of the customer. The most common user group has reading and writing rights to customer’s basic information. This user group is meant to include especially the housing services staff in the reception centers. The most extended user rights are in the third group which is designed for the social workers. This group has reading and writing rights to customer’s basic information and social services information. Any member of one of these three user groups can look up information on any customer in any Finnish reception center.

Nowadays, when asylum seekers move from one reception center to another their information is sent manually between the reception centers. This means that the initial reception center creates an individual file about the information of the customer. Then this file is transferred to the new reception center trough the secure data network. Accordingly, each reception center also transmits copies of all data in their resident registration system database to the Finnish Immigration Service once a week trough the secure data network. Due to RRS, these data transmitting processes will not be needed in the future. Information about asylum seekers can be sent automatically between reception centers. In addition, the Finnish Immigration Center can
see directly how many customers are in each reception center. Also, direct information transfer between the police and the reception centers becomes possible, although, only certain pieces of information can be shared between these organizations because different privacy protection regulations apply to them. For example, basic information about the asylum seeker is shared between the police and the reception centers. In the future, when a new person applies asylum in Finland, the police or the Finnish Border Guard register her/his information to the same database from which the RRS in reception centers receives its customer information. Thus, basic information about the asylum seeker is visible in the reception centers as soon as s/he is registered by the police.

Changes in the information sharing between the CENTER and other public organizations affect all the previously mentioned work systems. One of the work practices in the housing services is the registration of a new customer. This task will probably become more efficient because the basic information about the customer is already registered by the police. Accordingly, the housing services staff do not any longer have to update the customer information in the case that a customer’s name or birth date is corrected, because this information is also recorded either by the police or the Finnish Immigration Service. Because the basic information about the customers is going to be more accurate, the work systems of the social services and the offering income support will gain benefits as well. At present, participants in these work systems sometimes have problems finding information about the customer from the current registration system. Reasons for this can be that the customer has not been registered to the resident registration system or the customer’s new name has not been registered to the system. In both cases, the identification of the customer is very difficult and time consuming.

4. CONCLUSION

The outcomes of this research are twofold, when considering future research. On one hand, the description of current work systems can be used for studying the changes that the implementation of a new information system is bound to cause in the case organization. On the other hand, it is possible to monitor whether the expectations presented in this paper will actually come true and how will they affect the work systems.

The research presented in this paper is limited by concentrating to only one organization even though the same information system will also be implemented in other reception centers for asylum seekers. In the future, the research might be expanded to other reception centers. Also the research method is restricted to ethnography which has been criticized for its lack of generalization. Thus, a survey could be used to expand the research to multiple organizations. In addition, the research as a whole is constrained to information systems used in one field in one country; hence, future research could compare it with the implementation of public information systems in other countries.

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SHORT HAUL DRIVERS’ WORK AND DIFFERENT WORK ENVIRONMENTS OUTSIDE THE CAB – NEW TOOL FOR TWO-WAY ASSESSMENTS

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ABSTRACT

Short haul truck drivers’ face various risks at their work. Most of the accidents and risk situations occur at work out of the cab in various different work environments. Different parties open cooperation is needed to succeed in development work. Also new solutions and tools are needed to manage risks and efficiency at mobile work. A video and computer based analysis method, VIDAR served as the main data analysis tool for risks. On the basis of the VIDAR analyses a new ICT based quality and risk assessment application was created in cooperation with interest parties. The objective of this study is to represent the participative creation process of the application and the VIDAR and analyses that were utilised in the processes. The tool contains sections for drivers to assess customers’ environments and activities and for customers to assess drivers and transportation company’s work and performance. According to the test results the tool provides new data on driver’s mobile work and it helps to bring out possible risks but also positive feedback from both parties work and actions. The more profound testing of the tool is still continuing.

KEYWORDS

Mobile work system, Risk assessment, Short Haul Distribution, VIDAR method, Work environment

1. INTRODUCTION

Transportation work is one form of mobile work (Lilischkis, 2003). Truck drivers usually work alone in different work environments. Drivers’ must be able to work independently and to have enough skills to solve coincidentally upcoming and often surprising challenges and problems. For example electronic businesses and electronic bills of freight, vehicle data, and navigation solutions are already available in existing solutions. These are also researched by various directions (Özcelik, 2010).

Technological development is not enough. A major challenge is to ensure that operations and processes also support the development of human resources and individuals. The relationships between humans, technologies and environmental aspects must be understood in order to be able to make comprehensive choices. Besides tools and techniques also employees - their values, needs and knowledge and organisational reward and authority structures should be recognised and utilised (Coakes & Coakes, 2009).

Information about the work and its requirements and existing good practices are needed at all personnel levels (Shibuya et al., 2010). Managers and sometimes other stakeholders need the more precise data of the work in order to make decisions about company strategy and actions for executing it (Wholey, 1991). More precise information about the risks is also needed to plan proper and safe routes. Often the routes and stops are planned so that the only aim is to minimize total collection and delivery costs (Baptista, Oliveira & Zúquete, 2002). Workplace safety practices are not fully understood as sources of risk to logistics and transportation firms. Safety should be seen as an important part of company’s social responsibility (Cantor, 2008) and they should address enough resources also on that work. Also customers need more precise data about the drivers’ work. The companies, both customers and suppliers are in lack of objective channels to discuss safety matters. Often the demands regarding to the customers’ area are limited due to the commercial nature of the relationship (Shibuya et al., 2010).

Transportation industry needs new practical tools to enhance work. This study included two aims. The first one was to study what kind of risks and demanding situations short haul drivers are facing in their daily
work and to divide these into different origins in which they appear. The second aim was to introduce a new ICT solution for managing the typical risks of truck drivers’ work.

2. METHODS AND MATERIAL

In this study, a constructive design science research approach (Järvinen, 2004) was emphasised. It was executed by researching how different work environments could be improved by innovating and adapting to use new solutions to work environment management. This study is quite analogous to the participative ergonomics design approach (PERDA) studies (Väyrynen et al. 2006). These have many similar features like individual, organisational and stakeholder level’s strong participation in design processes.

This study includes risk assessments and discomfort analyses which form a basis for creating ICT based quality and risk assessment solutions for mobile workers’ work. Macroergonomics and sociotechnical and organisational ergonomics aspects were also emphasised besides logistics management and design processes.

A Swedish video and computer based work analysis method, VIDAR, served as a data analysis method in this study. VIDAR is a participative video based method for ergonomic assessments. In VIDAR employees are video recorded while they are performing their daily work. The employee does an assessment of physically and psychosocially demanding situations and risks on the basis of the video material. The basic assumption in VIDAR is that the employees should be recognised as the experts of their own work at least in the familiar work tasks that are done routinely and that the employees provide valid assessments in the analysis sessions (Kadefors & Forsman, 2000; Forsman et al., 2006). VIDAR has been previously used only on analyzing monotonous work.

VIDAR version 4.1 was used in Finnish with a laptop computer and a digital camcorder. The data collection was made in 8 separate filming occasions in the midwinter of 2008. The data was collected in northern Finland, from two transportation company’s practices. Altogether 1200 minutes of video material was collected and analysed. VIDAR was used in 8 individual analyses with short haul truck drivers (7 male and 1 female, average age = 32.9 years, SD = 10.6 years).

Focus groups (Langford & McDonagh, 2003) were utilised in design processes after the VIDAR analyses.

3. RESULTS

In total of 106 discomforts or risks were identified in the VIDAR analyses. A large part of those was related to physical discomforts (67 identifications; 63.2%), such as lifting, manual movement outside the cab, carrying by hand and handling objects. The psychosocial discomforts (19 identifications; 17.9%) were related to factors such as time pressure, bad planning, difficulties of reaching, non-properly working tools and limited spaces. Risk identifications (20 identifications; 18.9%) were of possible risks for own or other people accidents or to the risks of damages and losses to materials.

Each identified discomfort can include one or more different alleged origins (Table 1). Over half (52.7%) of the identified discomforts and risks are related to different work environments. These VIDAR analyses and focus group sessions within participating companies indicate that there is a need for new risk assessment solutions. Mobile work can’t always be assessed efficiently within traditional forms of risk assessment and new solutions are needed. The assessments are also dependent on the driver’s skills and abilities. More precise data is especially needed from the different customers’ different work environments.
Table 1. Identified physical and psychosocial discomforts (106) divided into their alleged origins (207). Each of the discomforts includes one or more different origins.

<table>
<thead>
<tr>
<th>Major group</th>
<th>Alleged origin</th>
<th>In total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work environment</td>
<td>Customer’s premises</td>
<td>47</td>
<td>22.7</td>
</tr>
<tr>
<td></td>
<td>Customer’s courtyard</td>
<td>22</td>
<td>10.6</td>
</tr>
<tr>
<td></td>
<td>Customer’s loading platform</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>Tailgate loader</td>
<td>22</td>
<td>10.6</td>
</tr>
<tr>
<td></td>
<td>Cargo space</td>
<td>12</td>
<td>5.8</td>
</tr>
<tr>
<td></td>
<td>Common area</td>
<td>5</td>
<td>2.4</td>
</tr>
<tr>
<td></td>
<td>Work environment in total</td>
<td>109</td>
<td>52.7</td>
</tr>
<tr>
<td>Technology</td>
<td>Roll cage</td>
<td>19</td>
<td>9.2</td>
</tr>
<tr>
<td></td>
<td>Dolly</td>
<td>18</td>
<td>8.7</td>
</tr>
<tr>
<td></td>
<td>Remote control</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>Hand truck</td>
<td>6</td>
<td>2.9</td>
</tr>
<tr>
<td></td>
<td>High roll cage</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Lifting hook</td>
<td>7</td>
<td>3.4</td>
</tr>
<tr>
<td></td>
<td>Pallet truck</td>
<td>9</td>
<td>4.3</td>
</tr>
<tr>
<td></td>
<td>Rack with wheels</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>Pallet converter with wheels</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Fork truck</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>Technology in total</td>
<td>66</td>
<td>31.9</td>
</tr>
<tr>
<td>Manual tasks</td>
<td>Manual tasks in total</td>
<td>32</td>
<td>15.5</td>
</tr>
<tr>
<td></td>
<td>In total</td>
<td>207</td>
<td>100</td>
</tr>
</tbody>
</table>

These results and assumptions served as a basis for product development in this study. Participatory ergonomics and product design procedures were utilised in focus group sessions, in which transportation company’s representatives, researchers and selected customer’s representatives participated. Broad participation was assured by arranging also different personnel groups’ internal meetings. As a result for the participatory, sociotechnical-inflected design process an ICT based “Developing Feedback” (KePa in Finnish) application to an existing hand terminal was created (Table 2).

Table 2. The main topics and their explanations of the assessment sections in KePa. The topics are composed of different claims where the evaluator gives assessments on a scale of 0-5.

<table>
<thead>
<tr>
<th>Section A (For the driver to assess customers)</th>
<th>Section B (for the customer to assess drivers)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Approaching the customer premises within vehicle</td>
<td>1. Transportation company’s performance</td>
</tr>
<tr>
<td>- How are the roads maintained and signals placed?</td>
<td>- How are the customer relationships maintained?</td>
</tr>
<tr>
<td>2. Outdoor areas and buildings</td>
<td>2. Delivery and customer satisfaction</td>
</tr>
<tr>
<td>- How are the roads maintained for humans?</td>
<td>- Are the right, non-damaged products are delivered at the right time?</td>
</tr>
<tr>
<td>- Is there enough space for the vehicle and unloading activities?</td>
<td></td>
</tr>
<tr>
<td>3. Unloading and loading circumstances</td>
<td>3. The driver’s performance in customer’s premises</td>
</tr>
<tr>
<td>- How are the loading and unloading platforms maintained and cleaned?</td>
<td>- How is the behaviour of the driver?</td>
</tr>
<tr>
<td>- Are there enough signals?</td>
<td>- How are the drivers working manners?</td>
</tr>
<tr>
<td>4. Fluency of communication procedures</td>
<td>- Is the driver working safely?</td>
</tr>
<tr>
<td>- Does the driver get help easily if needed?</td>
<td>- Does the driver take into account environmental issues?</td>
</tr>
<tr>
<td>5. Physical load in unloading and loading activities</td>
<td>4. Fluency of communication procedures</td>
</tr>
<tr>
<td>- Does the driver need to work in difficult (and repeating) working postures</td>
<td>- Is the driver willing and able to communicate and give more information if needed?</td>
</tr>
<tr>
<td>- Are motorised devices available if needed?</td>
<td></td>
</tr>
<tr>
<td>6. Psychosocial load in unloading and loading activities</td>
<td></td>
</tr>
<tr>
<td>- Is there enough information for the driver to perform the work?</td>
<td></td>
</tr>
<tr>
<td>- Are there any exterior risk factors?</td>
<td></td>
</tr>
</tbody>
</table>
KePa is a portable ICT device for assessing the quality and risks of mobile work. KePa contains assessment sections for both sides of the value chain of the delivery transportation. It contains its own section for drivers to assess customers’ environments and activities. The tool also contains a section for customers to assess drivers and transportation company’s work. The main topics of both parties’ assessment sections are presented in Table 2.

The participants also made usability testing for the device and the usability test results were dealt within focus group sessions. The first version of KePa was made on the basis of these sessions. The participating companies also made some field tests within KePa’s first version. The information gathered from the assessments is not extensive enough for any scientifical analyses at the moment. The performed test phase nonetheless gave the participating companies new data on drivers work on customers’ premises and it helped to bring out some possible risks but also positive feedback from both sides work and actions. Besides being a portable device, KePa can also be used by using web browsers in home terminals. This lowers procurement costs and makes implementation easier.

4. DISCUSSION AND CONCLUSIONS

Two transportation companies and their drivers’ work outside the cab were analysed in this study. A computer based VIDAR tool was utilised as the analysis method for solving the possible discomforts and risks of the work. As a participatory approach VIDAR seems to stimulate active discussion about work related risks and discomforts, but also about possibilities for improvements.

Delivery truck drivers’ risks and accidents are mainly related to work outside the cab. Driving is just a part of the work (Okunribido et al. 2006). The work day is completed with various work tasks such as unloading, loading, movement, maintenance and other miscellaneous tasks. Many of these activities are performed manually and involve different kinds of physical and psychosocial loads and risk factors. The work outside the drivers’ cab is carried out in various places which contain various risks. It is very challenging to harmonize and standardize these circumstances.

Drivers work usually alone. Because the distributions are often scheduled to be performed at nights or early morning there is a possibility that there are either customer’ employees at the premises. Often there is lack of proper and objective ways to communicate. That is a problem also from the risk management point of view. There is a possibility that the possible risks are not fully identified and eliminated.

4.1 KePa as a Mobile Work’s Risk Management Tool

A new application for the risk assessment of mobile work was introduced in this study. Companies need that kind of risk management data for their safety work and to enhance their performance and competitiveness inside the value chains and when negotiating new contracts. Some preliminary tests have been made for the tool. Also the usability of the tool has been tested. The research will most probably continue on a larger scale. Tests will be performed later more largely in two-three different branches, such as large industrial plants and shopping malls.

The tool contains the features of total quality management because it also takes into account environmental and quality issues. An important feature for KePa is that it gives feedback also on the positive aspects of both parties performance. KePa may also give rapid feedback if needed.

Cognitive changes in individual’s manners and performances are attainable if the individuals notice that their notices get response. Often the needs for improvements are fulfilled within very little changes. Positive feedback also motivates employees. KePa is designed so that it requires more than one assessment on the particular work environment before the analysis data is given to participants. KePa collects common databases for certain work environments and gives only average values from the performed assessments. The individual and subjective impressions are minimized through several different assessments. The more detailed individual data is only accessible for the researchers.

This kind of new analysis material is also needed by various other stakeholders and parties. For example the design processes of new stores and malls still don’t always take into account logistics and it’s requirements. This kind of possible upcoming national database, containing hundreds of assessments on different locations gives data also for these design purposes and so can affect largely other parties also.
KePa gives concrete data about risks at the driver’s mobile work. KePa and its upcoming larger databases may well act as one starting point towards national logistics standard. The final outcome, the national standard was also attained through little steps and right parties’ cooperation in the Swedish brewery sector’s example of successful cooperation (Målqvist & Parmsund, 2008). Sociotechnical thinking and organisational changes are required for to success participative design processes of this kind.

Incorporating the above-mentioned VIDAR analyses and results and KePa issues into periodic trainings for the drivers (Directive 2003/59/EC) would supposedly result in stable and lasting effects on drivers’ work. KePa is most likely a suitable tool for being utilised in other mobile workers’, such as cleaners’ or couriers’ work’s assessments within certain adjustments.

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OFFICE ERGONOMICS: EFFECTS OF A TRAINING BASED INTERVENTION IN JAMAICA

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ABSTRACT
This research examined the impacts of a web based ergonomics training intervention on a sample of office workers employed at an insurance company located in Kingston, Jamaica. Baseline data was collected through a self-administered questionnaire, which was followed by an ergonomic workstation self-evaluation conducted through a checklist. The training intervention consisted of an electronic presentation and a brochure, and was administered after participants completed both initial surveys. The post-training survey focused on changes in knowledge and behavior, and reaction to training. This project sought to examine the effects of training on ergonomics knowledge, as well as if this increased knowledge affected the behavior of workers. The results from comparisons of pre- and post-intervention data revealed that the training intervention was successful in increasing the ergonomics knowledge of subjects. The intervention was also successful in changing the behaviors of participants, leading to more ergonomically sound practices at the work place. These findings can be used to assist in further study of the effectiveness of training in the area of office ergonomics in Jamaica, and further, in the wider Caribbean region.

KEYWORDS:
Ergonomics, office work, training, musculoskeletal disorders, prevention

1. INTRODUCTION
Computers have become an increasingly common feature of offices in Jamaica over the last fifteen years, after a tax exemption on their importation was established. The increased use of computers in office settings has been associated with significant gains in quality and productivity. However, musculoskeletal complaints have been considered a common adverse effect of computer use, and numerous studies have pointed to an association between neck and upper extremity pain and extent of computer use (Blatter and Bongers, 2004; Brandt et al., 2004, Jensen, 2003). Gerr et al. (2002), based on a sample of 632 newly hired workers, reported that within the first year of starting a job in which computer use was required, over fifty percent of them reported musculoskeletal disorders and symptoms. Similarly, long hours of computer use have been associated with increased rates of MSDs in the arms and hands (Gerr, Marcus and Monteilh, 2004).

Economic conditions prevalent in developing countries such as Jamaica raise additional concerns as the scarcity of financial resources limits investments on suitable computer workstations and office furniture. In many workplaces antiquated office furniture, unsuitable for computer-based work, has been used with improvisations and overall poor fit between users and tasks. Furthermore, local organizations and individuals often have limited or no knowledge of office ergonomics and of musculoskeletal disorders (MSD) preventive measures. Although an effort to develop an occupational safety and health infrastructure has been conducted in Jamaica in the last few years, no guidelines or mandatory standards are available, and neither are national statistics on MSD.
Worker education and training have been often emphasized in the literature as key components to injury prevention efforts. It has been proposed that education could increase workers’ knowledge and skills necessary to reduce MSD incidence, as it improves their ability to recognize risk factors leading to injury and, presumably, allowing them to control their exposure to these factors. Some studies evaluating educational approaches as a way to control MSD incidence have, however, disputed their effectiveness, especially in the absence of other workplace changes.

King (1995) in a review of the literature on ergonomics training noted the wide variety of methodologies and practices being applied, including differences in structure, content and method of delivery. The author concluded that these inconsistencies, plus a number of other obstacles, affected the acceptance and effectiveness of training programs. He recommended the application of adult education principles to improve program planning and training practices. Street et al. (2003) based on a small sample of workers suggested that a short-term, minimally disruptive, participatory ergonomics education program may have a rapid effect on improving work posture, which in turn may reduce the incidence and severity of MSD associated with heavy computer use. Brewer et al. (2006) in a systematic review of the literature on interventions to control MSD and visual effects in office settings concluded that there was insufficient evidence to determine whether both exercise training and stress management training could influence musculoskeletal outcomes. The authors also indicated that there was mixed evidence on the effect of ergonomics training on musculoskeletal outcomes.

Montreuil et al. (2006), in a study involving 207 office workers who were given six hours of ergonomics instruction, indicated that the training proved effective due to the participants’ post-training ability to self-diagnose and subsequently improve their workstation by both making adjustments and requesting new equipment. Greene et al. (2005), in a study looking at the effects of an active training on workstation ergonomics, concluded that it can improve work postures, work practices, risk factor exposure, and pain.

The present study aims at evaluating the effectiveness of a web based ergonomics training for office workers with computerized workstations. It was anticipated that the intervention would increase workers’ knowledge of MSD risk factors associated with their workstations. It was also expected that the intervention would foster a proactive safety behavior.

2. METHOD

The study utilized a pre and post-test assessment design. Baseline information on ergonomic knowledge and work behaviors were gathered during the pre-training period. Subsequent to the training administration the participant’s knowledge of ergonomics and work behaviors were again assessed. Three criteria for measuring the impacts of this intervention training were used, as established by Kirkpatrick (1994): knowledge, behavior, and reaction to training.

The pre-training questionnaire was made up of 61 questions divided into ten different areas of interest: demographics, computer use profile, ergonomics training, knowledge of related administrative procedures, work behaviors and practices, perceptions of pain, previous injuries, MSD experience, workstation satisfaction, and ergonomics knowledge. Following the administration of the pre-training questionnaire, participants were asked to conduct a workstation self-evaluation using a survey tool derived from an OSHA assessment checklist (OSHA, 2009). The self-evaluation survey was designed to provide a snapshot of the ergonomics issues at workstation level. It contained 38 questions focusing on work postures, chair, keyboard and input devices, monitor, accessories, work surfaces, and workstation configuration. Next the post-training questionnaire was emailed to the participants. It contained 31 questions divided into three major areas of interest: reaction, behavior, and ergonomic knowledge.

To ensure understanding and streamline the questionnaires a pilot test was conducted with five office workers belonging to a different organization. The training components were also pre-tested with the help of these individuals.

All elements of the study were delivered via the participant’s email. Flexibility was given with regard to the time limits for completion of each segment, provided that participants followed a specific order, namely: 1) pre-training questionnaire, 2) workstation self evaluation, 3) training, and 4) post-training questionnaire.
The ergonomics training module consisted of a brochure created by WorkSafeBC (2001), along with a PowerPoint presentation summarizing the information presented in the brochure. The brochure and the electronic presentation were structured as follows:

A. Introduction to ergonomics: definition, objectives, workstation overview, consequences of poor design
B. Injuries and Risk Factors: MSD, risk factors, common symptoms
C. How to improve your workstation: neutral postures, chair features and adjustment, workstation components and layout, lighting
D. Multi-user and multi-task workstations
E. Organization of work/job design
F. Stretching
G. Summary

The study was conducted at an insurance company located in Kingston, Jamaica, among sales and administrative staff utilizing computerized workstations. The company did not have an ergonomics program and employees did not receive any prior ergonomics training. Thirty nine employees volunteered initially to participate in the study. Complete data was obtained for twenty eight participants as two respondents moved to a different facility, five respondents withdrew due to time constraints, and four participants were non-respondent.

3. MAIN FINDINGS

The study population was predominantly female (84%), aged 29 years and younger (80%), was well educated (82% with graduate and post-graduate degrees), and were working at that location for less than five years (82%). The majority of respondents (54%) spend an average of twenty hours or more weekly on computer tasks.

Seventy five percent of respondents regularly adjusted their work posture, and ninety six percent were aware of all the adjustments their chair was capable of. Fifty seven percent of respondents had experienced pain, aching or discomfort over the past year. No respondent had been diagnosed with a MSD. Most respondents (71%) did not know who to go to with their ergonomic concerns regarding pain.

Data collected regarding the size and arrangement of the workstation revealed that forty one percent of respondents thought that their workstation had sufficient space, while sixty eight percent of respondents had rearranged their workspace for comfort previously.

Eighty one percent of respondents interspersed their typing and mouse activities with other tasks, and seventy nine percent reported taking breaks while doing computer work, with 10% performing stretching exercises.

After participating in the training respondents improved their ergonomics knowledge with higher scores being observed for ten out of the twelve questions. The average score improvement for these ten questions was forty nine percent. Seventy two percent of the respondents implemented a change to their workstation after the training, and eighty six percent reported having changed a work behavior.

Reactions to the training were overwhelmingly positive as most of respondents found the modules to be well presented (86%) and informative (97%). All participants agreed that the training would be useful in their daily work activities, and felt they were able to put the ergonomic principles learnt into practice.

4. DISCUSSION

The results from comparison of pre- and post-intervention data revealed that the training intervention was successful in increasing the ergonomics knowledge of subjects. The intervention was also successful in improving the reported behaviors of participants, leading to more ergonomically sound practices at the workplace.

It was found that most respondents practiced good work behaviors prior to the intervention. Most had already been adjusting their chairs and postures regularly, as well as taking breaks while doing typing and mouse activities at the workstation. Most respondents also took breaks to stretch, with a few of them
practicing stretching exercises. These results were somewhat unexpected, as the majority of respondents had never had any prior ergonomics training. Very few respondents took time to rest or change their visual focus, however.

A majority of the respondents reported having adjusted their workstation layout post-intervention. This outcome was consistent with the web based training as it provided participants with an increased ability to identify a proper workstation setup. This finding is in agreement with previous studies (e.g., Ijmker et al., 2008).

Individual behaviors appeared to be changed as result of the intervention. More individuals learnt what to do for ergonomic related complaints. An increased number of participants were taking stretching breaks, adjusting their posture more often, and had begun resting or changing their visual focus frequently. Studies conducted by Robertson et al. (2008) and Greene et al. (2005) also found a positive change in participant behavior post ergonomics training. Translation of information learnt into action was also positive, with most participants feeling more inclined to rearrange their workstation after taking the training. Most respondents also reported that they felt the training should be given to all employees at the facility.

The study presented some limitations including its small sample size, which limited the use of inferential statistics. Its short duration (i.e., eleven weeks), which was insufficient to assess changes in pain and discomfort. A third data collection effort a few months after the training intervention would have served the study better. This additional data collection point would have aided the study in determining the degree of knowledge retention and allowed the mapping of the direction of behavioral changes over time. This would have facilitated the determination for the need for re-training and or refresher courses.

Finally, in the Jamaican context, where knowledge on office ergonomics is limited, one can hope that this study will provide a platform for further research and better practices.

REFERENCES


WHY CONSUMERS RESIST APPLICATIONS PERCEIVED USEFUL? CASE E-INVOICING

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ABSTRACT
Favorable attitude towards a technology is conventionally thought to lead to its acceptance. Why, then, consumers often fail to act despite their favorable disposition? This paper looks into factors explaining user resistance. The data were collected through semi-structured consumer interviews about using electronic invoicing, the Comparative Method was used to analyze it. The analysis suggests two behavioral patterns leading resistance: 1) perceptual avoidance combined with regret avoidance prior to trying out the technology and general drive for consistency, and 2) situational factors.

KEYWORDS
Adoption, resistance, consumer applications, electronic invoicing, the Comparative Method.

1. INTRODUCTION

The adoption of information systems (IS) has been studied largely having the starting point on the aspects that get people to adopt, such as usefulness of the technology. Another perspective of the phenomenon would be resistance towards new applications. The mainstream of IS adoption research has been occupied with Technology Acceptance Model (TAM) (Davis 1989) dominated theories (Benbasat and Barki 2007), i.e. extending TAM (e.g. TAM2, Venkatesh and Davis 2000), testing it in various contexts (e.g. Szajna 1996) and combining it with other models (UTAUT, Venkatesh et al. 2003). The basic constructs for this stream are behavioral beliefs and intentions that are expected to predict actual behavior. When consumers’ attitudes towards new IS are examined and their intentions to adopt the system, the expected figures are typically much higher than the actual adoption rates. It is quite hard to reliably predict the success of a consumer IS application using the current body of knowledge. TAM (Davis 1989) does quite well in predicting the adoption of work related IS within organizations, but beyond that other factors start playing a greater role.

When trying to improve the adoption models in this research stream, it is also found that habits might play a significant role when explaining behavior or behavioral intentions (Gefen 2003, Kim and Malhotra 2005, Limayem and Cheung 2008) and circumstances in which the habits occur is a key issue in trying to change the habits (Wood et al. 2005). As habits, but also environment do impact largely the actual adoption situations, no wonder that relying on attitudes and followed intentions is not always enough to give accurate predictions.

An alternative perspective for this problematic prediction for adoption is change resistance. Resistance towards new is everywhere: within organizations and in personal lives. Clearly the resistance is not equal over all situations, Kleijnen et al. (2009) note that the two main groups impacting the resistance are the degree of change required and the level of conflict with the consumer’s belief structures.

Sometimes there is a good reason for resistance. Change resistance occurs if the new system is perceived useful i.e. it would be beneficial or the new system is inevitable, but it is still resisted. In an organizational context the change is typically inevitable for the individuals but still useful. However, in consumer context the change is typically voluntary. In voluntary consumer context the change resistance is thus about if the new system is perceived useful but one still resists it regardless of the added value one would get for oneself.

The chosen study context is electronic invoicing (e-invoicing) offered for consumers. In this paper, first the theoretical constructs are briefly introduced followed by presentation of methodology and context. The fourth part shortly summarizes the results, closing the paper with discussion.
2. CHANGE RESISTANCE AND THEORETICAL CONSTRUCTS

Change resistant appears differently in organizational and consumer contexts. Very often consumers do have a reason to resist a new IS application as it is not found useful, thus it is not about resisting change. There might be no need for it, no added value for its adoption, or the required equipment (internet in this case) is not possessed. As long as the application offered is not just purely for fun, there needs to be the possibility and a reason why the new application would be beneficial for the individual consumer. Why else adopt? If the application is perceived useful and its adoption would be beneficial but no adoption occurs for irrational reasons, change resistance appears. Thus, the positive beliefs and attitudes about the usefulness of a new application are invalidated by change resistance, conceptualized in this research by the following equation: \[ \text{[attitude]} - \text{[change resistance]} = \text{[overt behavior]} \].

To be able to reduce the impact of change resistance, it is necessary to understand its roots. When looking into the change resistance process, first is awareness or attention to the new application. More specifically lack of awareness i.e. ignorance. This concept notes the importance of awareness knowledge as a starting point for the future adoption (Rogers 2003). Typically social norms i.e. others’ impact is also relevant. Others’ impact is largely recognized in social psychology (Tajfel 1982, Schein 1996) but also in IS by for example Kim and Kankanahalli (2009) in the context of status quo bias (Samuelson and Zeckhauser 1988) thinking. In addition to social norms, Kim and Kankanahalli (2009) also involve other reasons to explain status quo bias (Samuelson and Zeckhauser 1988). Three types of reasons are discussed. The third type is most relevant in this context, involving e.g. regret avoidance, and drive for consistency, thus underlying psychological reasons. These are somewhat unconscious and likely contribute strongly to change resistance. In addition, at the end the situation and the context in which the possibility for adopting the new system occurs might be the final straw. Habit has been offered as an important factor when predicting behavior (e.g. Bhattacherjee 2001, Gefen 2003, Kim and Malhotra 2005) but Wood et al. (2005) demonstrate in their research that circumstances play a major role in determining which habits remain. Therefore is reasonable to admit the importance of the particular situation one gets into.

3. METHODOLOGY AND CONTEXT

Data were collected through qualitative semi-structured consumer interviews. The study context needed to be a consumer service offering practicality thus is not used for fun. E-invoicing was chosen, referring to a service that offers invoices directly to consumers’ electronic bank (e-bank) account instead of paper invoices, saving time and effort in paying process. E-invoice is a consumer service offered for all e-bank customers.

The selection criteria for respondent population were following. First of all, the respondents needed to be adults handling their own financial matters. Young respondents would make e-invoicing not relevant, whereas old consumer group would increase the likelihood of technological illiteracy which again would make the service not relevant. Secondly, they needed to be educated, again to avoid computer illiteracy. Also the respondents needed to belong to approximately same age and educational group with each others. Having a homogenous respondent group enables creating a picture of the common reasons underlying resistance, excluding other potential uncontrolled factors created by too heterogeneous group. The sampling strategy is what Marshall (1996) names judgment sample, referring to the researcher actively selecting the most productive sample for the particular research question. The snowball effect i.e. subjects suggesting potential additional candidates were also utilized. The accessibility and costs was also considered referring to convenience sampling strategy. (Marshall 1996) The respondents ended up being between 25 and 31 years old, holding at least a Bachelor’s degree from a University. 8 had also already accomplished a Master of Science degree within the last 5 years. Out of the total of 14 respondents 5 were male and 9 were female.

The interview questions are in the form of direct propositions. The idea is to capture the basic idea of the underlying theory or construct into one proposition and use it as a foundation for interview discussion. This method is utilized at least in qualitative attitude research in the field of social psychology (e.g. Vesala and Peura 2005). One is directed to evaluate the propositions from one’s own viewpoint and justify and argument own views, to reveal the thinking and argumentation related to adoption or resistance of e-invoices. The propositions were presented one at a time, written on a separate paper sheet (Vesala and Peura 2005).
Table 1. Theoretical constructs and empirical proposition.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Proposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness</td>
<td><em>I do not pay attention to information related to e-invoices</em></td>
</tr>
<tr>
<td>Social norms</td>
<td><em>When I make decisions concerning using e-invoices, I would like to consider the opinions of people who are important to me</em></td>
</tr>
<tr>
<td>Regret avoidance</td>
<td><em>If e-invoices do not turn out to be as good as promised I would regret not sticking with my current way</em></td>
</tr>
<tr>
<td>Drive for consistency</td>
<td><em>As I am already using a system that I find practical, there is no point in switching to e-invoices</em></td>
</tr>
<tr>
<td>Habit versus situation</td>
<td><em>My use of e-invoices might depend on whether I end up in a situation where it is most practical to use it</em></td>
</tr>
</tbody>
</table>

All interviews were recorded and transcribed for analysis, resulting in about 6 to 13 pages of transcribed text per interview, depending on the interviewee. The data was coded using QSR NVivo 8. To ensure the uniqueness of each interviewee’s case, the transcribed material was in addition manually arranged by pen and paper to create a mind map for applicable reasons leading to use or resistance for each interviewee separately.

4. RESULTS

5 out of the 10 interviewed used e-invoices at least for one invoice; only one used it for all possible invoices. The most common way of paying was receiving invoices on paper and manually typing the payment information into the e-bank system. In addition direct debit was used for some of the regular invoices. Each participant did control his or her own finances.

All of the interviewed had a positive attitude towards e-invoicing in general. This was not explicitly asked but evaluated from how they spoke of e-invoicing during the discussions. The positive attitude was typically expressed by the interviewee stating that he/she believed/understood that e-invoicing would be practical, easier and useful, for these reasons making sense to adopt it. For non adopters these attitude statements were then followed with “but”, reasoning and discussion why it was still not used regardless of the positive view. No one showed negative attitude towards e-invoicing as such, although some did towards its adoption.

The findings are summarized in the following table. Number 1 indicates applicability of the construct for the particular respondent. It can be seen that awareness and situation are the most often applicable constructs followed with social norms and regret avoidance.

Table 2. Summary of results.

<table>
<thead>
<tr>
<th>Proposition →</th>
<th>Awareness</th>
<th>Social Norms</th>
<th>Regret Avoidance</th>
<th>Drive for Consistency</th>
<th>Situation</th>
<th>Use=1</th>
<th>Resist=0</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>R2</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>R3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>R4</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>R5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>R6</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>R7</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R8</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>R9</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>R10</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

The Comparative Method presented by Charles Ragin (1989) was applied to find common patterns within the data. The constructs leading to adoption or resistance were summarized as follows. Combinations leading to adoption were: $A_NRD_S + A_{RD}$. According to the Comparative Method these can be summarized to $A_{RD}$. Thus as awareness (A) and situation (S) are applicable and regret avoidance (R) and drive for consistency (D) are not, the adoption occurs. The resistance is a result of following scenarios: $A_{RD} + A_{NRD} + A_{NRD} + A_{NRD} + A_{NRD}$. When summarized the combinations leading to resistance are finally: $RD_S + AD_S$. Thus as awareness (A), regret avoidance (R), and drive for consistency (D) are found applicable but situation not OR
situation alone dominates while awareness and drive for consistency do not. These two patterns lead to resistance. How these dominant constructs appeared, are now discussed.

Awareness typically was indicated by interviewees stating that they had seen information related to e-invoicing but they never read the information as not being interested. On the contrast interviewees to whom awareness was not an applicable factor for resistance, explained that they do pay attention and read e-invoicing related information and might have also discussed it with others.

Regret avoidance appeared to interviewees in that they did consider the potential risk laying in this unknown situation prior to the trial. What if something would go wrong? They were not ready to take the risk at this point. For those who regret avoidance was not relevant explained that this would mean thinking too far ahead and these things typically did not cross their minds. Drive for consistency appeared in either making illogical reasoning for not using or in willingness to remain within a consistent paying system.

Finally, situation: some had been in an optimal situation for adoption already but did not let it seduce them for trial. Also it was explained that they would not impulsively decide to adopt in a situation before thinking it through. Others, to whom situation was found applicable, indicated the situation as one of the most important factors as it determine whether they are able to receive answers to their questions or be able to avoid the effort of the painful adoption situation.

5. CONCLUSIONS

E-banking is adopted by all respondents of this study. The use of e-invoice is possible for e-banking users and adds some practicality in the system of paying invoices as manual typing of invoice details could be left to past, still maintaining the control on actual paying and due date. Still e-invoicing is not that highly adopted, although generally consumers do believe it could make invoicing more effortless.

To conclude the findings on how change resistance can be explained in a voluntary consumer context, the most often applicable constructs are: lack of awareness i.e. ignoring the information, regret avoidance, drive for consistency and adoption situation itself. Regardless of knowing that e-invoicing exists, it is not felt that one has enough information on how to start using e-invoicing and on all the features it has. They feel that it is not on their responsibility to waste their time on trying to search for more information: the service provider should make the effort and invest in promoting the service. Some think that if the service provider does not actively offer it, then it is not a practical solution. It seems that this could be caused by our culture. Service providers spend amounts of money on marketing and creating needs for consumers. Service not aggressively offered does not manage in the competition on consumers’ attention. However, it was noteworthy that all the information is available – the consumers tend to ignore it.

For some consumers, the service is assumed to be useful but still not to add that much extra value to make it worth wasting effort on trying to figure it out. The effort invested in finding out how to start using e-invoices is perceived exceeding the added value. This extra value is not communicated well enough or it truly is not enough. It is quite general perceived that the manual paying system is not perfect, but still it is such a low involvement behavior that the discomfort is tolerated or ignored. If the benefits would be communicated more clearly and the service more aggressively offered, the perceived value could exceed the effort.

As it is not fully known what the outcome will be prior to the trial, some consumers avoid possible risk by resisting adoption until they are sure of the outcome and thus regret avoidance is emphasized. Also as one has no own experiences and is not fully certain of the new service, social norms have stronger emphasis as uncertain consumers seek for their peers’ experiences and opinions in order to fill the gap of e-invoicing related knowledge.

These findings have significance for both practitioners and researchers. For researchers to understand low adoption rates it is important to look into underlying reasons. The focus should not be only on application related beliefs (as in mainstream research building on TAM, Davis 1989), but on thought process and situational factors. As this study shows in e-invoicing context, it is not enough to evaluate whether one believes the application would be useful or easy to use, there are still several other factors contributing to resistance. Therefore the adoption situation is of key importance in adoption research.

For practitioners working with e-invoicing or similar types of applications it is of value to understand the reasons behind low adoption among consumers, to respond to consumers’ concerns and improve the launch process. E-invoicing resistance could be decreased and adoption rates improved by individual organizations
if more systematic steps were taken. Organizations and banks are doing effort in spreading information and creating stimuli for adoption. However, this stimuli is yet too unattached to practice. Consumers tend to listen to their peers more than general marketing material; organizations could make the most of this information by utilizing their customers who already use e-invoicing. Also the adoption situation could be made easier and more personal if this topic would be brought up in personal customer service situations.

This study also has some limitations. This study is focusing on a group of consumers characterized by relatively young age and high education. Therefore older or less educated consumers could perceive the constructs differently. Also the sample is of Finnish consumers and Finland has some cultural characteristics such as individualist orientation (Hofstede and Hofstede 2005) which naturally reinforces certain behavior. To further investigate the topic, this research setting could be repeated in the context of another application or another consumer group with different characteristics.

REFERENCES


DEVELOPING AN INSTRUMENT OF ASSESSMENT FOR ICT LITERACY FOR TRAINEE TEACHERS: THE PRELIMINARY FINDINGS

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ABSTRACT
The purpose of this paper is to report upon the preliminary findings of a doctoral study underway in Australia that seeks to identify possible indicators of information and communications technology (ICT) literacy for trainee teachers in Malaysia by investigating their ICT proficiency and their attitudes towards computer technology. To evaluate the trainee teachers’ ICT literacy in a more ‘authentic’ setting, the data collection used a two round Delphi technique. Based on the findings from this Delphi data, a simulative task instrument will be developed. At the end of this study, a suitable instrument to effectively evaluate ICT literacy for trainee teachers will be constructed.

KEYWORDS
ICT literacy, trainee teachers, smart school, Delphi technique

1. INTRODUCTION
The word ‘Smart School’ has been defined as a school in which students think about what they are learning (Perkins 1992). In a sense this term unifies the notion of ICT tools adoption in information age schools where knowledge construction and knowledge use are the primary pedagogical goals and the primary activity of the school (Todd 2001). Others define this term as being a school that uses a technology platform on which distance learning and specific teaching expertise are made available to remote locations (Ministry of Education and Human Resource Development 2007).

We suggest that teachers in general, and more specifically in Malaysia, need intensive training in the use of information technology (IT) to facilitate integration into classroom activities in ways that enhance thinking and creativity (Mat-jizat & McKay 2009). Moreover in the short term, Malaysian Smart School teachers also need to learn how to facilitate and encourage students to take charge of their own learning (Multimedia Development Corporation 2007). While in the longer term, we recommend that to remain confident in their knowledge of technology applications, these teachers need to enhance their skills regularly and stay up-to-date through continual professional development.

In Malaysia, teaching and learning elements such as higher order thinking skills and moral values are required to be incorporated into all pre-service training curricula. Furthermore, we believe that the teaching methods of all subject areas require a fresh orientation towards a more experiential and student-centered approach, which is supported by interactive ICT multimedia tools and IT/information systems (IS) network learning (Multimedia Development Corporation 2007). The overall objective is to produce trainee teachers in Malaysia who are computer literate and comfortable with their adoption of technology in their lesson design and delivery.

However, in a report by the Institute of Strategic and International Studies in 2002, most teachers in Malaysia were found to not have sufficient training in facilitating the use of computers for teaching and learning. Instead, computers were used to enhance their traditional teaching methods that include: exercise drills and rote learning. This practice is due to the lack of emphasis on ICT literacy during their teacher training programs (Institute of Strategic and International Studies 2002).

The findings from this paper will aid the researchers in the next research phase, which is the development of a ‘task-based’ assessment instrument. As an integral part of a doctoral research study, this paper reports on
the preliminary investigation to identify suitable ICT literacy indicators that are appropriate for trainee teachers in Malaysia.

2. METHOD

This study is divided into three research phases (see Figure 1). The first phase identified appropriate indicators for ICT literacy through the literature and requirements of the Malaysian Smart School project. In the second research phase, the indicators were evaluated by a specially chosen panel of experts through a two-round Delphi technique. The final phase will use the newly developed ‘task-based’ assessment instrument, and test them on trainee teachers.

This paper reports the preliminary findings from the Delphi panel interaction in phase 2 (steps 2 to 5). Based on the outcomes from this Delphi panel, the researcher will develop a ‘task-based’ ICT literacy assessment instrument.

The Delphi technique that was chosen for the second research phase is currently used in the US for technological forecasting (Linstone & Turoff 2002). This well known technique is effective in other contexts that require judgemental information, including: normative forecasts, determining values and preferences, simulated and real decision making, identification of potential measures that might be taken to explain a given problem, and assessment of the proposed measures with regard to their feasibility, desirability and effectiveness (Zikmund et al. 2010).

The Delphi technique involves the researcher identifying a panel of experts who are: 1) in the field of educational technology (academics), 2) consultants for the Smart School project from the Multimedia Development Corporation (MDeC); and 3) teachers from the current Smart Schools in Malaysia. The panels participated in a two-round Delphi technique. The method for implementing this technique included:

Delphi rounds:
1. Distribute literacy indicator (LI) Questionnaire;
2. Panels evaluate and give suitable feedback via the given Questionnaire;
3. Feedback summarised and distributed back to the panel members, together with the amended LI;
4. Panels given an opportunity to modify or refine their views based on previous feedback.

Earlier, in Phase-1, twelve ICT literacy indicators were identified from previous research and the requirements statement from the Malaysian Smart School project (ACRL 2009; ETS.org 2008; Katz & Macklin 2007; Markauskaite 2007; McNaught 2006; Smart School Project Team 1997). The indicators included: plan/define, access, integrate, evaluate, manage, create, assess, communicate/collaborate, reflect/judge, utilise basic ICT tools, analysis and production with ICT and navigation and search.
For Phase-2, each panel of experts was given a Questionnaire with the list of identified ICT literacy indicators. For each of the indicators the panel members were asked to recommend whether they feel that the indicator were relevant to ICT literacy. Each panel member operated in an independent and anonymous manner. The expected skills and the appropriate context of use for each of the indicators were briefly explained in the Questionnaire.

The identified panel of experts were asked to:
1. suggest the level of relevance of each indicator, to trainee teachers in Malaysia on a scale of ‘0: not relevant; 1: fairly relevant; 2: relevant; 3: extremely relevant’;
2. give comments or suggestions for each indicator;
3. suggest an appropriate measurement of quality; and
4. suggest other indicator(s) (if appropriate).

3. FINDINGS AND DISCUSSION

Based on the Delphi technique, the panel members scored all indicators either relevant or extremely relevant, with a mean score between 2.50 and 3.00 (see Table 1).

Table 1. Mean score for relevance of indicators

<table>
<thead>
<tr>
<th>No</th>
<th>Indicator</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Utilise basic ICT tools</td>
<td>3.00</td>
</tr>
<tr>
<td>2</td>
<td>Plan / Define</td>
<td>2.75</td>
</tr>
<tr>
<td>3</td>
<td>Access</td>
<td>2.75</td>
</tr>
<tr>
<td>4</td>
<td>Manage</td>
<td>2.75</td>
</tr>
<tr>
<td>5</td>
<td>Create</td>
<td>2.75</td>
</tr>
<tr>
<td>6</td>
<td>Communicate / collaborate</td>
<td>2.75</td>
</tr>
<tr>
<td>7</td>
<td>Perform analysis &amp; producing appropriate document</td>
<td>2.75</td>
</tr>
<tr>
<td>8</td>
<td>Navigation &amp; search</td>
<td>2.75</td>
</tr>
<tr>
<td>9</td>
<td>Assess</td>
<td>2.63</td>
</tr>
<tr>
<td>10</td>
<td>Integrate</td>
<td>2.50</td>
</tr>
<tr>
<td>11</td>
<td>Evaluate</td>
<td>2.50</td>
</tr>
<tr>
<td>12</td>
<td>Reflect / Judge</td>
<td>2.50</td>
</tr>
</tbody>
</table>

* score 0=not relevant; 1=fairly relevant; 2=relevant; 3=extremely relevant

Seven indicators scored 2.75 (mean): plan/define, access, manage, create, communicate/collaborate, analysis and production with ICT and navigation and search. The assess indicator scored 2.63 (mean), while integrate, evaluate and reflect/judge scored the lowest with 2.50 (mean). However, as all indicators scored between relevant and extremely relevant, all indicators will be included in the new ‘task-based’ assessment instrument.

One indicator obtained a perfect score with a mean of 3.00 (extremely important). The ‘utilise basic ICT tool’ indicator was expected to score well. Some of the comments from the panel of experts were,

“Yes, this is absolutely a must before teachers can be labeled as ICT literate”

“The trainee teachers must have basic ICT skills and be able to use the ICT tools available to them because it has become a culture for the teachers and pupils in Smart Schools to use ICT to do their tasks”

“All users of ICT should acquire these basic skills in order to progress further”.

Unlike previous research studies, the panel of experts agreed that the ability to “use ICT tools to assess” indicator must be include as one of the important indicator for ICT literacy. Previous research has not included the ability to assess student learning as one of the computer ability or skills for ICT literacy (see International ICT Literacy Panel 2002; Katz & Macklin 2007; Markauskaite 2007; Wong 2002). This is possibly due to the fact that none of the instruments were developed specifically for trainee teachers. Further comments by the expert panel members were;

“Schools are being equipped with on-line based assessment systems. Trainee teachers must be able to use these tools to assess student learning in schools”

“Teachers have to prepare an on-line quiz that provides instant grades”.

Aside from substantiating relevant ICT literacy indicators for trainee teachers, the panel of experts were also required to suggest an appropriate measurement of the quality for each of the indicators. Almost all
panels agreed that self-assessment style of evaluation is not appropriate to effectively evaluate trainee teachers’ ability to utilise basic ICT tools; a task-based assessment would be more suitable. The findings also validates that it is important that when designing an instrument to test the skills in utilizing basic ICT tools, the task must not be limited to only computer application, it must also include skills in using other ICT tools such as a digital camera, digital video, scanner, printer and digital projector. Also, instead of ‘telling’ the trainee teachers what to do and what tools or computer applications to use (see Wong 2002) the ‘task-based’ instrument may give the trainee teachers an authentic educational ICT-related task, and allow them to perform the task, with whatever tools or computer applications that they think is suitable. This way, the task will not only test their declarative and procedural knowledge, it also tests their meta-cognitive knowledge.

Different levels of knowledge dimensions will be tested in the new ‘task-based’ assessment instrument (see Gagne 2000; Krathwohl 2002). These levels are declarative knowledge (verbal information skills and intellectual skills); procedural knowledge (intellectual skills and cognitive strategy) and meta-cognitive knowledge. Declarative knowledge includes facts, terminology, or elements that one must know or be familiar with for them to understand or solve a problem. Procedural knowledge entails the additional knowledge that one has, which may help them to do something specific in a discipline, subject or area of study. They are able to integrate their knowledge in a new situation, recognise unstated assumptions and know the ‘how’. And finally, meta-cognitive knowledge describes having a strategic or reflective knowledge about how to go about solving problems, or the ability to ‘think about thinking’.

These preliminary findings also verify the research expectation for the need to develop a new ICT literacy assessment instrument that conforms to the needs of trainee teachers and the use of a ‘task-based’ assessment instrument. Previously, many research studies use self-assessment (or self-efficacy) to evaluate performance in using computer or ICT tools (see example Markauskaite 2007; Wong 2002). In 1989, guided by Bandura’s self-efficacy theory and Schunck’s model of classroom learning, a Computer Self-efficacy Scale (CSE) was developed by Murphy, Coover & Owen (1989) to measure capability regarding specific computer-related knowledge and skills. They argued that self-efficacy can be reliably measured and can be used to assess a combination of affect, cognition and performance. Nonetheless, when assessing skills and cognitive ability, there is a penchant for people to under or overrate themselves (Ballantine, McCourt Larres & Oyelere 2007). This type of self-assessment outcome is more apparent between high achievers and low achievers. High achievers tend to underrate themselves and low achievers overrate their skills (Boud & Falchikov 1989).

4. CONCLUSION

This paper briefly reports the initial preparations to evaluate Malaysian trainee teachers’ ICT literacy in an authentic setting. To achieve this end, a panel of experts were chosen according to their professional educational technology practice and experience in the Malaysian academic Smart School project. The data collection employed a two round Delphi technique. Twelve ICT literacy indicators were verified. One indicator identified by the panel, which was not suggested in previous research studies, is the ability to use ICT tools to assess student learning. Based on the findings from the Delphi data, a simulative ‘task-based’ instrument will be developed later. The panel of experts agreed that self-assessment is not sufficient as a tool to assess ICT literacy. When assessing skills and cognitive ability, there is a propensity for people to under or overrate themselves when using self-assessment. Moreover, self-assessment does not provide an ‘authentic setting’ for computer knowledge and skill evaluation. Valuable information will be lost if the assessment is not conducted using ‘real’ settings (International ICT Literacy Panel 2002). Thus, this doctoral study will develop an assessment instrument that requires participants to complete a series of tasks, which incorporate all ICT literacy indicators agreed by the panel of experts, and use ‘real’ computer applications and digital accessories to carry out the tasks.
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ONLINE-COUNSELING FOR TEACHERS VIA INTERNET FORUM – A COMPARATIVE STUDY BETWEEN NORWEGIAN AND GERMAN USERS

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ABSTRACT
During the last years, counseling via internet has been established more and more in settings which are traditionally face-to-face. The “Lehrerforum” is a professionally supervised internet forum for teachers and teacher students seeking information, advice or guidance for occupational or even personal problems. The concept was developed in Germany and later on transferred to Norway. Study 1 examines the differences in topics posted by the users in both countries. For all 264 initial postings we found 5 main categories and 25 subcategories in Germany, where about 77% of the postings are concerned with legal issues. A small sample from Norway shows a different distribution. Study 2 examines differences and similarities between the perceptions of the forum by the users with a questionnaire implemented in both countries. Participants experience the Lehrerforum as a helpful support source for job-related problems.

KEYWORDS
Online-counseling, learning community, internet forum, teacher education, teacher’s health

1. INTRODUCTION
Teachers have to deal with numerous problems for which they have not had adequate training. Mobbing, ADHD, aggression, amok running students are some of the most present themes in the focus of the media. They are accompanied by disadvantageous circumstances like too many students per class, high peaks on stress level without sufficient time for breaks, inadequate working space in school, noise exposure in insufficiently soundproofed rooms and buildings.

These and other examples contribute to the demanding – and often over-demanding – conditions in which teachers have to work. The facts on teachers’ health such as high percentages of teachers with psychosomatic and psychological disorders which sometimes render them incapable to work (cf. i.e. Schaarschmidt, 2007; DAK et al. 2006) show that this is not only a matter of serious personal misfortune but also an economic problem as the employers have to pay for early retirements or psychosomatic treatments.

Solutions to these problems like decreasing the class size, providing more time for trainings, improving school resources or employing more assisting staff are not implemented at the moment due to high costs. Another problem is the ratio between students and school psychologists who could support teachers in their daily problems. The internationally recommended minimum ratio is 1:5000 (Dollase, 2010) – in Germany the actual ratio is 1:16549. In the international study of Jimerson et al. (2006), only in China there are fewer school psychologists.

Looking for less expensive ways to support teachers and schools, Sieland (2004) started the internet forum www.lehrerforum.de that was also implemented in Norway in 2006. The main idea was to combine the advantages of peer and professional counseling with the new potential of online counseling. Barak et al. (2008) explain the online disinhibition effect which shows an increase in honesty and self-disclosure in online communication, possibly contributing to a higher benefit from online support groups. We assume the same effect for our professionally supervised peer counseling Lehrerforum (Sieland & Rahm, 2007), as many teachers are still afraid to give the impression of not being able to solve a problem alone. Especially the
anonymity but also the asynchrony of communication should prevent this effect. In detail we see the following advantages for the users of the Lehrerforum (cf. Sieland & Rahm 2007):

a) The better we understand our own problem, the closer we are to the solution of it. Users of the Lehrerforum are required to describe their problems in detail so that the counselors and other users are able to understand the situation. As a positive and wanted side effect the writer will reflect and understand his own problem better just by writing and publishing it.

b) Problems are mostly unanticipated and often demand immediate action. Professional counseling services for teachers are often difficult to reach. The medium internet forum helps to shorten the time between the need for support and a first answer. That way it leads to a short-term decrease of the pressure caused by the problem.

c) Many teachers (as most people in general) are hesitant about asking for help. In the forum, as they can enter anonymously, they do not have to fear that their request for help will be perceived as a sign of incompetence by their colleagues. In addition, they can exit the counseling situation very easily.

d) In face-to-face counseling the counselee gets support from one person. As the problems in the forum are published to a broad community, counselees may get many different suggestions from many perspectives on the problem.

e) A lot of teachers still feel like lone fighters. Within the forum they can experience the support of a professional community.

In addition to that, we also assume the following systematical long-term advantages: 1) improving the professional quality of teachers’ actions, 2) improving the quality of teachers’ health, 3) efficient use of expensive professionals, 4) the experience of retirees remains accessible, 5) solutions to problems can be used by many others.

1.1 Research Questions

From the number of users and postings we know that the Lehrerforum is attractive to its users. In this article we will make an effort to understand this attractiveness by considering the following questions: What are the main effects that make the offer a successful support for some teachers? Do they feel a decrease in the pressure of their problem? Is the support of the community the most helpful effect? How do the users perceive the work of the counselors?

By comparing two similar forums in two countries we have a good opportunity to contribute to answering these questions from a broader perspective. In Study 1 we wanted to know what kind of questions are posted in the Lehrerforum to get ideas about the needs of German and Norwegian teachers. Study 2 used a questionnaire to find out more about how users perceive the effects and the quality of the Lehrerforum.

Before we can try to interpret similarities and differences in the results of both studies we need to describe some differences concerning the different school systems and the way both projects are designed and financed.

1.2 Different Conditions in Germany and Norway

Both the school system and the lineout of the projects in each of the countries are quite different. In Germany all 16 federal states have different school systems which are mainly based on the trisection of the school system, meaning that, according to ability, students are sent to three different types of school (Gymnasium, Realschule and Hauptschule). In Norway we find integration schools for all students with additional professionals to individually support any special need of the students.

There are also differences in the education of teachers: In Germany there are three different bachelor degrees followed directly by different master courses before teacher students are practically trained at schools and seminars. Norwegian teacher students complete their bachelor degree at a university college and normally start working afterwards. Most Norwegian teachers will later on participate in further education and specialize with a master degree.

Also the two Lehrerforum projects show several differences. While the project in Germany is financed mainly by a federal section of the teacher union VBE, Norway’s Lehrerforum has a far more substantial financing by the research board of the council in Oslo. Moreover Norway established a connection between the project and the pedagogical-psychological services while most German counselors in the Lehrerforum
have not had an official training in counseling and are mainly working on a voluntary basis. Additionally we find one main counselor in Germany who initially answers most of the postings, sometimes being assisted by other counselors in the further counseling process. The Norwegian forum tries to have at least two different counselors answering to any inquiry. Also the ways of how users are introduced to the forum differs significantly as in Germany most of the users find the Lehrerforum via internet search while most users in Norway are students in bachelor or in master education at the Bodø University College who have to work with the Lehrerforum as an obligatory study task. Therefore we have quite different user groups in each country.

2. STUDY 1 – ANALYSIS OF THE CONTENT

What topics and causes for counseling are most interesting for Norwegian and German teachers? A research team from Lüneburg, Germany categorized all initial postings (N = 264) from the year 2008 that dealt with a problem of a teacher (and left out topics like feedback to the forum or postings from students or parents). The process of finding the five main and 25 subcategories was inspired by the actual structure of the topics in the forum as well as a first test phase with 20 postings that were rated by each one of three raters to ensure a good interrater-reliability.

The main categories (in order of frequency) were:

1. Legal issues such as questions about work contracts, transfers to other schools or federal states, change of profession, copyright or certain laws (77%).
2. Professional matters containing inquiries about didactical and pedagogical issues like classroom management or standards on marks (12%).
3. Conflicts between teachers and parents, students or headmasters as well as other teachers (6%).
4. Health containing issues like burn-out-syndrome, depression, psychological and psychosomatic symptoms, prevention or stress management (4%).
5. Personal problems, not directly connected to the school or the teacher profession. Examples are cases of death in the family, divorce or coming out (1%).

In Norway we conducted an in-depth analysis with 18 initial postings and applied them to the categorical structure found in Germany. We found two postings in legal issues, one in conflicts and one in personal problems, none in health and 14 in professional matters. These findings show that the users focus on different topics in the two countries.

3. STUDY 2 – USER SURVEY

A questionnaire was developed and translated to find out more about the users’ perception of the Lehrerforum. The survey was published online and the recruitment was done via newsletter received by all registered users of the forum. Table 1 shows the number of registered users, total postings, counselors and participants in the survey.

<table>
<thead>
<tr>
<th></th>
<th>registered users</th>
<th>postings</th>
<th>counselors</th>
<th>participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norway</td>
<td>270</td>
<td>1007</td>
<td>9</td>
<td>N_Nor = 74</td>
</tr>
<tr>
<td>Germany</td>
<td>3105</td>
<td>10420</td>
<td>31</td>
<td>N_Ger = 135</td>
</tr>
</tbody>
</table>

Table 2 shows the items on usability, perception and effects of the forum and the results of a mean comparison t-test for independent samples. The items were rated by the users on a five-stage Likert scale. The most important results on item level show that the users in both countries have a positive perception of the impact of the Forum (only the variables 4 and 10 have means beneath average and only in Germany) and items are generally rated higher by the Norwegian users.
Table 2. T-test on mean comparison for independent samples

<table>
<thead>
<tr>
<th>No.</th>
<th>Please rate the following statements and check the best fitting alternative:</th>
<th>country</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The website contains good information on using the Lehrerforum.</td>
<td>Norway</td>
<td>74</td>
<td>4.41</td>
<td>.95</td>
<td>1.12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Germany</td>
<td>122</td>
<td>4.26</td>
<td>.71</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>It is easy to register in the Lehrerforum.</td>
<td>Norway</td>
<td>71</td>
<td>3.93</td>
<td>1.42</td>
<td>-3.69**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Germany</td>
<td>135</td>
<td>4.59</td>
<td>.66</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>The division of the topics is useful.</td>
<td>Norway</td>
<td>72</td>
<td>4.46</td>
<td>.90</td>
<td>2.54*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Germany</td>
<td>133</td>
<td>4.14</td>
<td>.82</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Using the forum contributed to professional discussions with colleagues.</td>
<td>Norway</td>
<td>66</td>
<td>3.55</td>
<td>1.18</td>
<td>2.89*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Germany</td>
<td>111</td>
<td>2.97</td>
<td>1.33</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>The forum provided new and relevant information for me.</td>
<td>Norway</td>
<td>71</td>
<td>4.07</td>
<td>.95</td>
<td>1.57</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Germany</td>
<td>130</td>
<td>3.85</td>
<td>.98</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>The forum provided me with skills which I can use in my daily work.</td>
<td>Norway</td>
<td>70</td>
<td>4.17</td>
<td>.83</td>
<td>4.39**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Germany</td>
<td>118</td>
<td>3.56</td>
<td>1.06</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>The forum contributed to the reflection of my own practice.</td>
<td>Norway</td>
<td>73</td>
<td>4.29</td>
<td>.91</td>
<td>4.44**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Germany</td>
<td>119</td>
<td>3.66</td>
<td>.97</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>The forum gave concrete advice concerning my pedagogical practice.</td>
<td>Norway</td>
<td>66</td>
<td>3.92</td>
<td>1.15</td>
<td>3.71**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Germany</td>
<td>115</td>
<td>3.31</td>
<td>1.01</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>The forum provided factual information which I can use in my pedagogical practice.</td>
<td>Norway</td>
<td>63</td>
<td>4.06</td>
<td>.98</td>
<td>2.39*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Germany</td>
<td>122</td>
<td>3.70</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>The forum increased my self assurance and well-being regarding my work.</td>
<td>Norway</td>
<td>60</td>
<td>3.22</td>
<td>1.09</td>
<td>1.53</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Germany</td>
<td>107</td>
<td>2.95</td>
<td>1.05</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>The forum helped to develop a more open attitude in professional topics.</td>
<td>Norway</td>
<td>64</td>
<td>3.42</td>
<td>1.12</td>
<td>1.76</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Germany</td>
<td>110</td>
<td>3.10</td>
<td>1.19</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>The forum enabled me to solve professional problems by myself.</td>
<td>Norway</td>
<td>65</td>
<td>3.66</td>
<td>1.05</td>
<td>2.88*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Germany</td>
<td>114</td>
<td>3.17</td>
<td>1.14</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>The forum encouraged me to try new things.</td>
<td>Norway</td>
<td>61</td>
<td>3.66</td>
<td>1.05</td>
<td>2.16*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Germany</td>
<td>106</td>
<td>3.30</td>
<td>1.01</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>The forum deals with the kind of problems that are relevant for my own practice.</td>
<td>Norway</td>
<td>70</td>
<td>4.39</td>
<td>.80</td>
<td>3.39*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Germany</td>
<td>126</td>
<td>3.95</td>
<td>.88</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>The forum increases my self-confidence in dealing with professional challenges.</td>
<td>Norway</td>
<td>66</td>
<td>3.76</td>
<td>1.07</td>
<td>3.56**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Germany</td>
<td>105</td>
<td>3.19</td>
<td>.98</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>I think the answers of the counselors were patronizing [in a negative way].</td>
<td>Norway</td>
<td>59</td>
<td>2.44</td>
<td>1.47</td>
<td>.74</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Germany</td>
<td>105</td>
<td>2.28</td>
<td>1.16</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>I think the answers of the counselors were of little relevance.</td>
<td>Norway</td>
<td>62</td>
<td>1.76</td>
<td>.86</td>
<td>-1.66</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Germany</td>
<td>105</td>
<td>2.02</td>
<td>1.05</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>I encountered support and acceptance in the forum.</td>
<td>Norway</td>
<td>58</td>
<td>3.50</td>
<td>.92</td>
<td>-.65</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Germany</td>
<td>86</td>
<td>3.62</td>
<td>1.14</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>The counselors showed real interest in my postings.</td>
<td>Norway</td>
<td>54</td>
<td>3.65</td>
<td>1.03</td>
<td>-2.28*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Germany</td>
<td>83</td>
<td>4.05</td>
<td>.99</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>I have confidence in one or more counselors in the forum.</td>
<td>Norway</td>
<td>62</td>
<td>4.47</td>
<td>.80</td>
<td>2.30*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Germany</td>
<td>76</td>
<td>4.09</td>
<td>1.06</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>There are one or two counselors that I specially appreciate.</td>
<td>Norway</td>
<td>48</td>
<td>3.38</td>
<td>1.20</td>
<td>-2.02*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Germany</td>
<td>67</td>
<td>3.84</td>
<td>1.21</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>In general I would say that the forum contributed to the improvement of my practice.</td>
<td>Norway</td>
<td>60</td>
<td>3.65</td>
<td>1.10</td>
<td>.33</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Germany</td>
<td>90</td>
<td>3.59</td>
<td>1.10</td>
<td></td>
</tr>
</tbody>
</table>

Notes: * p<.05; **p<.001; scale 1= totally disagree; 2 = disagree; 3= neither disagree nor agree; 4 = agree; 5 = totally agree; missing = not able to answer; Norwegian users received a questionnaire in Norwegian – German users in German

4. CONCLUSION

The two studies give a first insight to perceived effects of counseling in internet forums and especially of the Lehrerforum.

As the idea of the forum was born while considering teachers’ health and how to support teachers in their prevention against burn-out, we were quite surprised by the result that more than three quarters of the initial
postings in Germany dealt with legal issues. One explanation may be that Germany with its 16 school systems and many exceptions has indeed many complicated rules to understand and moreover insufficient information sources. Most of the Norwegian teachers are organized in teacher unions where it is easy to access information on legal issues. Moreover, solving personal legal issues may also have a positive effect on the performance and health of teachers. As long as a teacher is occupied with a serious problem for example about his or her contract he or she will have less resources left to deal with the every-day challenges of being a teacher for example preparing lessons or being attentive towards bullying processes in the class. With this in mind we assume that decreasing problem pressure in any topic might lead to improvement of the quality of teacher’s performance.

Furthermore, we found that many items (6,7,8,9,12,13,14&15) were rated significantly better by the Norwegian users. This could be explained by the above mentioned differences in topics of interest. The questionnaire was first developed in Norway where the researchers assumed that topics in Germany would be more similar to the ones in Norway. German users who were asking for help with legal issues would not easily agree with an item like The forum provided me with skills which I can use in my daily work. Further surveys should take this difference into consideration.

Looking at the items in general we can see that the participants in both countries agree on a very positive perception of the forum. However, as the sample was recruited via newsletter to all registered users we have to assume that mainly users that have had good experiences with the Lehrerforum were participating. It would be interesting to interview users that tried but did not profit from using the Lehrerforum.

With the results from our studies so far we are still on the level of exploration. It will be interesting to look deeper into the differences of the topics brought forward in both countries as they may also tell us more about different attitudes between German and Norwegian teachers. Furthermore, topics that are frequently asked for in the forums could uncover blind spots in teacher education. Can teacher students benefit if the Lehrerforum is part of their training for example in problem based learning seminars? It should also be interesting to focus on the mix of professionals and peers in the Lehrerforum. How can we compare effects from online support groups with professional one-on-one counseling and the learning community of the Lehrerforum? And which way is more effective for which type of problem? On the more technical side we would like to find out how we can increase the benefit for the users of the forum. What kind of instruction would be accepted by the users and could a good instruction improve the benefit from using the forum?

We think that the projects in both countries can contribute to improving teachers’ health and well-being and therefore should also have effects on the quality of schools. In the research field we suggested two ways of evaluating counseling via internet forums that will have to be further developed but can already contribute to evidence based results.

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CONVENIENT FOR WHOM? EXPLORATORY FINDINGS OF AN EXPERIMENT IN EMAIL WITHDRAWAL

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Kingston Lane
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ABSTRACT

“The danger of the past was that men became slaves. The danger of the future is that man may become robots.” Erich Fromm

Today, we live in a digitally networked world that enables an instant society – instant news, instant friends, instant gratification. In the 24/7 instant access society impatience is a virtue, so the marketing slogan goes. Mechanically answering messages and responding automatically to the electronic requests, problems and demands of others is emerging as a hallmark characteristic amongst frequent email users. Worryingly, these traits are how robots are defined! The mark of a human being, however, is the ability to respond rather than react; to make choices rather than being merely a stimulus-response animal (Covey, 1989). In this world of dense connections and immediacy where is the time to think, reflect, and then respond? This paper presents the observational findings of an experiment to (temporarily) withdraw from information distributed via email. The notion of availability rather than access emerged as a key finding that poses some interesting questions for the future of ubiquitous social connectivity.

KEYWORDS

Information overload, social networks, ubiquitous computing

1. LITERATURE REVIEW

Information overload is not a new issue. People have been reflecting on the consequences of ‘too much information’ since Vannevar Bush outlined his seminal reflections on the introduction of the Memex in 1947. The difference today is the ubiquity of the problem: digitally networked communication is exceeding the cognitive abilities of everyday users to respond (Stone, 2008, Kirsch, 2000). One reason is that ordinary people are using digital networks to create and publish content. Consequently, the total volume of information confronting an individual information user has increased exponentially (Bawden and Robinson, 2008). To put this in context, a weekly edition of the New York Times contains more information than the average person was likely to come across in a lifetime in seventeenth-century England and it would take over 200,000 years to ‘read’ all the Internet allowing 30 minutes per document (Bawden, 2001).

Similarly, the sheer diversity of information facing ordinary users is equally problematic (Hemp, 2009). Combining multiple formats (blogs, wikis, RSS feeds, etc) with different information channels (email, twitter, text messaging, etc) and varying perspectives on a given topic is intellectually challenging (Ljungberg & Sorensen, 1998). Integrating different modes of interaction hinders the ability of individual user’s to make sense of their information environment and respond appropriately. Too much mental stimulus from ‘being connected’ creates attention deficient behaviours such as distractability and impatience (Hallowell, 2005).

The capacity to respond has also become more difficult for individual users through the existence of ‘push’ technologies such as email. Designed to actively deliver information to a user without request, push systems are efficient channels for automatically retrieving information and disseminating digital content (Savolainen, 2007). Unfortunately, the key strength of push technologies – automatic access – is also their key weakness: users are robbed of the ability to determine what information they receive (Bawden and Robinson, 2009). Consequently, the potential for receiving irrelevant information increases. This is
problematic in a networked society where escalating numbers of contact points increases the total volume of information related to a single request (Hemp, 2009). The resulting ‘data smog’ (Shenk, 1997) can lead to increased stress and anxiety, sub-optimal decision-making and reduced satisfaction (Eppler and Mengis, 2004).

2. DESIGN OF STUDY

In contrast to published studies of information overload, which attempt to support cognitive abilities through technological development, this study was designed to closely monitor the affective responses of one information user - the author-as-participant - as they withdrew from email use. The idea was born out a combination of frustration, feelings of information overwhelm and intellectual curiosity. The study is not meant to be definitive or representative but simply exploratory. The research question simply asks “what would happen if I stopped using email?”

Information withdrawal, as defined by Savolainen (2007), was selected as the preferred coping strategy for two reasons. First, it is an affectively oriented strategy designed to “protect oneself from excessive information supply” (p. 618). Second, it seeks to reduce the level of anxiety associated with the inability to make use of the information received (Wurman et al, 2001) by radically reducing the number of information sources considered.

Email was chosen because it combined both professional and personal communication and had been configured to receive various RSS feeds and social alerts. Consequently, it was perceived by the participant / author as their single greatest source of information overload.

A two-week experiment was scheduled for the start of a new academic year covering Fresher’s Week and then the first week of teaching. The timing was deliberately chosen to create the maximum (potential) disruption to the participant during a highly-uncertain and highly stressful period which generally produced a significant increase in email traffic (i.e. student queries, final administrative announcements and last minute distribution of teaching materials).

Following the tradition of naturalistic inquiry (Lincoln and Guba, 1985), a journal was kept through-out the two weeks and notes were made each day about my attitude and communicative actions and those impacted by the experiment. A subjective rating was also made against the perceived feelings of satisfaction, productivity and creativity by the researcher. This was to assess any affective benefits of information withdrawal as outlined by Eppler and Mengis (2004). The notes and subjective ratings were reviewed at the end of each week and reflections added.

An out-of-office email response was created that explained the nature and purpose of the experiment. It clearly stated that the researcher would neither read nor respond to any emails sent during the two-week experiment. Alternative means of contacting the researcher were offered which included increased physical presence on campus for professional contact. Institutional permission was obtained to proceed with the experiment on condition that informally-captured responses would remain anonymous.

3. RESULTS

Table 1 displays the affective rating scores made by the researcher at the end of each working day throughout the experiment. The scale runs from very low (1) to very high (10). Satisfaction relates to a general feeling of happiness and well-being. Productivity is more task-orientated and relates to the perceived amount of work completed whilst creativity refers to perceived levels of originality and resourcefulness.
Table 1. Researcher-rated scores of affective attitude

<table>
<thead>
<tr>
<th>Experimental Period</th>
<th>Satisfaction</th>
<th>Productivity</th>
<th>Creativity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working Day 1</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Working Day 2</td>
<td>4</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Working Day 3</td>
<td>2</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Working Day 4</td>
<td>1</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Working Day 5</td>
<td>2</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Working Day 8</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Working Day 9</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Working Day 10</td>
<td>9</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>Working Day 11</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Working Day 12</td>
<td>5</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

The results show generally negative attitudes at the start of the experiment compared with extremely high levels of positive attitudes towards the end of the experiment. There appears to be little change in affective attitudes in week one with satisfaction reducing further towards extreme dissatisfaction. When cross-referenced with the journal there are two possible reasons for this. First, fear that loss of connection equated to missing important information increased the level of anxiety experienced by the researcher. Second, the researcher was notified verbally that a complaint had been lodged against them for “irresponsible behaviour”: a perceived lack of student access to the researcher appeared to be creating extra work for some staff.

Week 2 shows marked changes in affective response with significant increases in positive attitude recorded. Journal reflections note “a greater sense of mental clarity” and “enthusiasm for work”. Possible reasons for this are the lack of temptation to indulge in non-essential busyness. For example, “I can’t pretend I’m being efficient by constantly checking and responding to emails”, and “if I can’t distract myself with email then I’d better get on with some work!”

Of particular interest in the second week are the journal observations relating to general satisfaction. Here comments such as “being more open and smiling”, “engaging students in conversation” and “not using email as a protective barrier” are noted. The improvement in affective response also appears to be inversely related to email use, i.e. the longer the researcher does not use email the greater contentment they experience. This is weakly supported by researcher perceptions of other colleagues who appeared “stressed, very tired and despondent” during the second week.

Table 2 presents a numerical breakdown of the behavioral responses by people to the researcher’s withdrawal from email. These were people the researcher interacted with regularly and consisted of 15 professional and 8 personal ‘contacts’. Initial response refers to a contact’s response after reading the out-of-office email or hearing about the experiment for the first time. Final responses are those made to the researcher towards the end of the second week of the experiment.

Table 2. Contact point responses to experiment

<table>
<thead>
<tr>
<th>Contact Response</th>
<th>Critical</th>
<th>Bemused</th>
<th>Admiring</th>
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<tr>
<td>Initial Response</td>
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<tr>
<td>Professional</td>
<td>1</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>Personal</td>
<td>0</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Final Response</td>
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<td></td>
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</tr>
<tr>
<td>Professional</td>
<td>6</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Personal</td>
<td>2</td>
<td>6</td>
<td>0</td>
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</tbody>
</table>

The results show a positively skewed attitude towards the experiment with only one contact voicing a negative opinion at the outset. Almost two-thirds of professional contacts expressed some form of admiration towards the researcher. The predominant attitudes were divided equally between envy at what was viewed as a daring action (“how did you get permission?”) and their personal lack of courage in this matter (“I wouldn’t have the guts!”).

In contrast, no personal contacts viewed email withdrawal as a positive action. Instead all personal contacts were simply puzzled: “Why do you not want your friends to contact you?” A similarly bemused attitude was initially expressed by professional contacts with almost 50% wanting to know the rationale behind such action. For example, one contact asked “What are you going to do with all that extra time?” For many however, puzzlement stemmed not from an irrelevant behavioural response (à la personal contacts) but
from a concern with increased pain. This took the form of immediate inconvenience, discomfort and financial cost (“You are not going to be able to work from home as much”) to delayed misery “just think how many emails you will have to deal with when you go back online.”

Interestingly, a critical attitude began to emerge during the second week amongst both sets of contacts, though it was more marked amongst professionals. Journal reflections suggest that both professional and personal contacts became critical for the same reasons: when the sender’s planned activities were disrupted; extra effort was required on their part; or they had repeat information. Comments included “It’s less hassle to sort this out by email” and “Have you seen the photos I uploaded. Shame! We can talk about it when you are back online” and “I’ve printed the stuff out and left it in your pigeon-hole but I won’t do it again!”

4. LIMITATIONS OF THE STUDY

Due to the timing and length of this study 3 international emails were received from professional colleagues and none required an immediate response. Given the international nature and scope of academic collaboration, the author can imagine various situations were non-access to email would have negative professional consequences. Making requested revisions to accepted conference and journal papers within a short timeframe is one example of the personal cost (in terms of job security and professional advancement) of opting out of one type of business communication.

An area for future research would be to explore more fully the range and personal consequence of email withdrawal from international academic collaboration. Issues to consider here would include: assessments of the cultural attitudes and behavioural responses of international partners; the use of alternative modes of technologically supported communication (such as Skype, enterprise-based social networks, collaborative CMS, etc); the pressures to conform to standard practice and the resulting impact on inter-personal relationships and creativity.

It would be interesting to investigate the extent to which limited access to a person would encourage a more mature attitude toward information dissemination. Perhaps one based on an awareness of recipient relevance and interest rather than ease of transmission and sender convenience?

5. CONCLUSIONS

Email is an immediate access and information dissemination channel. Part of its purpose is to routinely push pre-set information updates to recipients irrespective of their wants or needs. The above analysis suggests that recipient availability rather than sender access is a key factor in determining the amount of information overload experienced, especially in a networked society. Availability – the extent to which a person has both the desire and ability to respond to a given request – is encouraged when the volume of information traffic is reduced. Further research is needed to investigate the nature and role of availability, rather than access, in developing new technologies for information communication and using alternative strategies to cope with information overload – ones that support the needs of human beings, rather than robots.

REFERENCES


THE MATERIALISTIC FALLACY SOME ONTOLOGIC PROBLEMS OF REGULATING VIRTUAL REALITY

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ABSTRACT
This paper shows, that there is a strong tendency in ICT to shape virtual objects like real objects. However, entities in the
digital realm are neither material nor individual, but abstract forms. Under some circumstances it might be necessary and
useful, to create the illusion of individual objects, like a moving pointer on a screen. But as a general policy this paradigm
stalls progress, efficiency and benefit in many other cases. Rather than just reproducing the limitations of the reality we
know, I opt for making better use of the possibilities that ICT offers.

KEYWORDS
ICT, Ontology, Data Expiry, eVoting, DRM, materialistic fallacy

1. INTRODUCTION
This paper is concerned with a very theoretic topic, which has, however, very practical implications. I want
to talk about the basic structure of the digital world - often not sufficiently known to users and designers -
and how this structure affects well-known problems like data security or intellectual property. This is, I think,
the little but valuable contribution that philosophical reflection can make to such debates: to point out the
conceptual patterns involved, and thereby contribute to coming to a more adequate understanding of ICT and
to envisioning better solutions for its most pressing problems.

2. THE ONTOLOGY OF ICT
Ontology is the science of what there is. It is concerned with the most fundamental categories of objects and
their logical connections. It's basic concepts are i. e. unity and multiplicity, cause and effect, form and matter.
I want to show that the latter distinction is of special importance for ICT.

The basis of ICT is the processing of data. This means the automatic execution of a clearly defined list of
instructions, the ingredients of which are loops, calculations, variables, and conditional instructions. In
philosophical terms this is a realm of pure forms. Its entities have no matter, they are not depending on a
particular substrate. By the use of ICT, information has therefore been freed from the bonds of reality as we
know it.

What are these bonds? Our reality has so far been a material one: Form and matter are not easily
separated from each other in a particular object. One of the effects of this is, that we are used to relatively
stable individual objects. Indeed it can be shown that only material things are indivual things (Strawson
1971). They persist, they are subject to deterioration and other laws of nature, and most importantly: they can
move. And when they are moved to a new place, they are not in the original place anymore.

In the digital realm however there are no individuals in the material sense, and thus there is no movement
of this type. The illusion of a moving pointer on a screen is only created by copying, pasting and erasing, and
the same thing happens with the transfer of data between folders or on networks.
Of course we cannot help mimicking movement by a copying-pasting-erasing-process. There is nothing wrong with that. Otherwise computers would just not be usable to us. And the problems that the less orderly of us face with version control, ending up with twenty copies of various stages of a text, shows vividly, that there is still room for progress on that front.

But only because we cannot help doing such things in creating User Interfaces, there is no need to do it to the utmost degree. My thesis suggests the opposite: That we should as much as possible not try to shape virtual reality in the picture of material reality. We should do it the other way around, to do it only where it is necessary, in order to maximize the benefit from freeing information from the bonds of materiality.

Let me add a brief remark on how existing research is related to what this essay is doing. For one, there is a discipline called ontology in informatics. This discipline, however, is concerned with developing frameworks and categories for the concrete body of things and relations we know. It is concerned with i.e. houses, and what should as their parts and what not, and how this is to be implemented in databases. Philosophers on the other hand talk about parts and categories only in the most abstract sense. Because of this difference in focus, one could maybe say, ontology in informatics is “Applied Ontology”, and this is why its findings are not of direct relevance to the thesis discussed here.

More relevant are works of critics of information culture, like Borgmann (1999) or Zittrain (2009). Borgmann, however, talks mainly about information with regard to reference, and shows the subtle ways in which technology has changed how we relate to reality. This is a different approach, but very interesting. It could be asked how a fuller recognition of the immaterial structures of ICT would also shape the way we deal with real things. Zittrain on the other hand proposes ICT to be “generative”, by which he means the openness to free reconfiguration of a digital device by the user. This is related to the materialistic fallacy insofar both ideas derive from the basic structure of ICT, which implies as such nothing short of full reconfigurability, and both describe a difference between free usage and a confined one. The respective dividing lines are different ones, though.

Nevertheless it would be interesting to pursue such comparisons in a paper longer than this one. The thought I am proposing here is obvious enough that it must have occurred in other works on information theory, too. This would indeed be good. It would be good, if it had already some allies, because I find it important to spread it. If we realised where we are unnecessarily limiting our own possibilities, this could make the world of ICT a bit better.

3. THE FALLACY

My main thesis is this: Those who have either not understood or do ignore the nature of data processing often try to impose on it regulations that make sense for material object, but don't do so for virtual ones. They treat the material way things take as the default paradigm. I will call this the „materialistic fallacy“. There are two effects of this:

- The imposed regulations stall many of the inventive possibilities and benefits ICT could provide.
- They often just don't work – because they are easily circumvented.

In this paper I can only give some brief examples for such outcomes. My purpose is to thereby map out the principle and show how it could be applied to pragmatic questions.

4. AREAS OF APPLICATION

4.1 Materialistic Fallacies in the Political Debate

4.1.1 Data Expiry

Materialistic fallacies occur both in the political debate and in business. A typical example for that is the suggestion, put forward by Viktor Mayer-Schönberger (2008), to have an inbuilt expiry date on data. This
sounds like a nice idea: An expiry date would, after all, facilitate problems of data protection, as well as avoid the eternal memory of the internet: That what is put online once, resides there forever.

The only problem is: This won't work. Or rather: It could only work under the most extreme conditions of worldwide data-control – an amount of control no current institution is anywhere close to be able to exert (and luckily so). The reason for this is the following: Of course in theory such a feature of data expiry can be implemented, either as a mandatory core module of all existing operating systems, or as an obligatory hardware solution similar to Trusted Computing. But essentially it does not lie in the nature of data to expire. Thus such a function will always be a separate module, a simulation like the moving cursor, – in Aristoteles' terms (1989 and 1998): an accidental feature of the functions that constitute the substance of data processing. Maybe such functions could be integrated with vital data-processing routines in a complicated way, but that would not change the fact that such features would always remain functionally separate and accidental – as opposed to the case of material objects, where deterioration is essential. It would be an unimaginable effort to implement such a structure and defend it from being removed by hackers, simply because it lies not in the nature of data processing that data should deteriorate.

4.1.2 eVoting

Another example, where this ontologic structure of ICT makes a decisive difference is the case of eVoting. The arument for making use of this technology is obvious. The core use of ICT is accounting – the quick processing of large, quantifiable databases. Large-scale elections are a typical case of application for digital technology.

Because of this very reason however, the use of ICT also poses peculiar problems. There is not only the security issue, which is rightly the first thing to be raised (cf. the latest study on Indian eVoting systems at http://indiaevm.org/). There is also the fact that once security is breached, the full power of automatic data processing lies at the hand of the intruder: Whether you forge 10 votes or 10 000 000 - it is just one line of code. The difference between local and global, great and small, is not the same as in material reality. It is not the same because objects do not count one by one, but can be treated formally, on various levels of abstraction. Therefore large scale modifications in a database are in principle no more difficult than singular modifications. I don't say that this alone must decide the issue. All I say is that it makes a difference. The ontology of data processing has to be taken into account when we discuss the matter and assess its possible risks and benefits.

4.2 Materialistic Fallacies in Business

4.2.1 Digital Rights Management

I don't say that Digital Rights Management is intrinsically wrong. The point I want to make is, that DRM, too, is often an attempt to shape virtual reality according to material reality.

Copy protection, the primary use of DRM, is a typical case of the materialistic fallacy. By additional measures it means to prevent a function that data processing intrinsically offers. The issue is not that someone wants to charge money for data access. The issue is that the charging is done per copy. That means the owner of the copyright has to turn each copy into what a material object is by nature: a stable individual, the form of which cannot be multiplied without effort or freely transferred onto different substrates. Preventing people from copying applications or files at will establishes a uniqueness and sameness for the copy, that does not lie in the nature of ICT.

The first effect of this is a psychological one. It is what Dolderer et al. (2008) have called “Digital Mentality": That the moral restraints to copy software, protected or not, are rather low. People would rather copy a computer game than steal a pear, even though the latter costs much less. The reason is that taking the object does not automatically result in someone else losing it. This logic, however, is what copy protection is trying to establish. And it is the logic of materiality. The same logic also lies in the rhetorics of copyright owners, who identify the number of illegal copies of their works with the money they lose (It is funny,
however, that this rhetorics is not used when it comes to the *resale* of copies). The switch from the paradigm of buying a copy to hiring software as a Service (SaaS) is certainly a progress on that front - at least in ontological terms. It retains the possibility of charging money, but does not use the rhetorics of material reality, or try to mimic it artificially.

The second effect is a technical one: Just because this is not its nature, the seeming uniqueness of a copy of data is difficult to maintain. The same reasons that account for data expiry dates do account for DRM, too: It is functionally separate and must be implemented as an addition. UBIsoft's new copy-protection requiring online access, said to put an end to pirating, has been cracked within 24 hours, and CSS or SDMI did not fare much better in their time. We have been witnessing this drama for more than 25 years.

I do not endorse pirating software. But I endorse acknowledging the basic structures of ICT because of which it is easier to pirat it than to protect it. And I endorse thinking about alternative ways of dealing with this. Instead of fighting the structures that are there, we should rather make use of them and the fundamental benefit they do provide: Feing reality from the limits of matter. In many cases, like in file-sharing, digital natives will otherwise always be one step ahead.

5. CONCLUSION

I don't doubt that there is much more to say in each of these cases. And I don't doubt that there is a lot more cases, where the materialistic fallacy plays a decisive role. Here I only wanted to describe the general pattern of how analogies between virtual and material reality can be misleading, ineffective and confining. I would like to hope that this type of thinking is generally on the demise, the more used we get to dealing with virtual reality. However, it is to be feared, that there are also cases where such thinking is further entrenched and will hinder future progress indefinitely.

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Reflection Papers
PRIVACY, DATA PROTECTION AND EMERGING SCIENCES AND TECHNOLOGIES: TOWARDS A COMMON FRAMEWORK

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ABSTRACT
This paper argues for a reconceptualisation of the notion of “privacy” due to the impact that new and emerging technologies (many of them being information and communication technologies) are having. The existing conceptual and legal framework was shaped in a time that was radically different from the networked society in which we live today. The values to be protected, however, remain generally accepted. Thus it is necessary to reflect what privacy will mean in the future and how it can be more effectively being protected. The authors argue in favour of a privacy impact assessment framework, perhaps one that also factored in ethical considerations.

KEYWORDS
Privacy, data protection, impact assessment, ethics, policy-making

1. INTRODUCTION

Privacy is a multifaceted concept that is currently challenged by many developments in science and technologies. Some of the most prominent examples are identification technologies such as RFID, social network service such as Facebook or the creation of large bio banks.
Privacy is a moving target. It is socially constructed and evolving over time. People define it differently and value it differently (Rössler 2005). Moreover, privacy often is balanced against other values, such as society’s safety and security. Empirical research is needed to determine how people value privacy, however they define it, in order to understand how citizens understand the right to privacy and its value within the whole context of other fundamental rights.
Privacy is not only respect for confidentiality, although it implies it. Privacy is not only the right to be left alone, although it includes it. Privacy is not only the right to control one’s own life, although it entails it. Nor is privacy only data protection, although it also concerns data protection. Privacy is all these things together, and more, because privacy is the word we use to describe an important aspect of one of the main, vital and constitutive polarities that shape human beings, that is, the tension between individuals and the community. How do new technologies impact on this complex and rich concept? What are the privacy issues arising from different emerging technologies? Multidisciplinary analysis is needed in order to appreciate the various philosophical, political, legal, ethical and social meanings of the word “privacy” in the contemporary technological world.
Privacy is also a salient topic in technology policy-making. There is a need for a new social dialogue on privacy rights that includes issues such as the new borders of the private domain, a new business ethics and a dialogue on the balance between civil and government rights. From the privacy problems posed by new technologies, a new taxonomy of privacy problems is needed to help policy-makers balance privacy against countervailing values, rights, obligations and interests.
2. DEVELOPMENT FROM A LEGAL PERSPECTIVE

Since the end of the 19th century, the notion of privacy has become progressively a legal notion. Today, privacy is recognised as a right in different major international legal instruments. The Universal Declaration of Human Rights, UDHR establishes it in Article 12, which states: “No one shall be subjected to arbitrary interference with his privacy, family, home or correspondence, nor to attacks upon his honour and reputation. Everyone has the right to the protection of the law against such interference or attacks” (United Nations 1948). The International Covenant on Civil and Political Rights includes a right to privacy in its Article 17, which is almost identical to Art. 12 UDHR (United Nations 1966). The European Convention of Human Rights, ECHR (Council of Europe 1950), recognises the right to privacy in its Article 8, whose scope seeks to protect four different areas of personal autonomy, not mutually exclusive: private life, family life, the home and one’s correspondence. The Charter of Fundamental Rights of the European Union explicitly recognises the right to privacy in Article 7 and in the same wordings as Art. 8 ECHR.

The right to privacy protects the fundamental political values of democratic constitutional states as it guarantees individuals their freedom of self-determination, their right to be different and their autonomy to engage in relationships, their freedom of choice, their autonomy as regards their sexuality, health, social behaviour, etc. It guarantees each person’s uniqueness, including alternative behaviour and the resistance to power at a time when it clashes with other interests (De Hert and Gutwirth 2006, p. 70). By default, privacy prohibits interferences of the state and private actors in the individual’s autonomy: it shields him or her from intrusions. The scope and reach of privacy are un(der)determined: it is up to the judges to decide when privacy interests are at stake and when their protection can rightfully be invoked. Legislators can also intervene to protect particular privacy interests, for example, through the enacting of professional secrets, the secrecy of communications or the inviolability of the home.

Art. 8 of the Charter of Fundamental Rights of the European Union recognises the fundamental right to the protection of personal data. The introduction of this article in the 2000 Charter has a long history: it was inspired by the Guidelines of the OECD (1980) governing the protection of privacy and transborder flows of personal data, the Convention for the Protection of Individuals with Regard to the Automatic Processing of Personal Data of the Council of Europe (1981) and by EU legislation, notably the EU Data Protection Directive (Directive 95/46/EC).

3. TOWARDS A NEW PRIVACY FRAMEWORK

Data protection is both broader and more specific than the right to privacy. The relationship between these concepts is certainly something that needs to be addressed for a reconceptualisation of privacy. Data protection is broader because data protection not only aims to make concrete the protection of privacy, but also tends to protect other rights and interests such as the freedom of expression, the freedom of religion and conscience, the free flow of information and the principle of non-discrimination. It is more specific since it applies every time personal data are processed. The application of data protection rules does not require an answer to the question of a violation of privacy: data protection applies when the conditions put by legislation are fulfilled. Furthermore, data protection rules are not prohibitive by default; they channel and control the way personal data are processed. Such data can only be legitimately processed if some conditions pertaining to the transparency of the processing and the accountability of the data controller are met.

Yet with the “technology revolution”, the notion of privacy has started a new journey, beyond the mere legal sphere, which is probably leading privacy to its original roots, the relation between the citizen and the “polis”. We are facing new contexts (think, for instance, of the so-called PAN, personal area network, which describes a technology that could enable wearable computer devices to communicate with other nearby computers and exchange data) and new concepts (as, for example, the idea of genomic and proteomic information), not to mention issues raised by technologies such as biometrics, RFID, smart surveillance systems, body implants, nano devices and the like.

1Note that the EU must generally respect the fundamental rights as guaranteed by the ECHR by virtue of Article 6(2) of the Treaty of the European Union.
New technologies have some specific features that make them quite different from traditional industrial technologies. In comparison with technologies that drove the industrial revolution – which were complex, based on collective action, social infrastructure, and technical know-how – emerging technologies are lighter. They are decentralised, dispersed and disseminated, and their control and use are largely in the hands of the individuals, citizens’ groups and small enterprises. They are network technologies (Castells 1996). In addition, new technologies reduce the complexity of human (social, biological, political, etc.) interactions and allow the individual to distance himself or herself from his or her observation. As Paul Virilio (1995) has emphasised, as every new technology emerges, the faster newer technologies will then emerge.

Emerging technologies also imply a change in the relation between science and politics. In the last few decades, representation of science has changed so much that some people may say that “doing science is another way for doing politics”. Indeed, the post-modern technological system is embedded in politics. Researchers are under increasing pressure to demonstrate the policy relevance of their findings and to deliver tangible results. In turn, policy-makers are under increasing pressure to justify their choices of technology to be developed and socio-economic goals to be pursued.

Furthermore, as emerging technologies often pose ethical challenges (for example, between perceived the greater social good at the expense of individual freedom), they provoke directly or indirectly a crisis, or at least a basic uncertainty with regard to ethical standards that are either sanctioned by law or remain tacit presuppositions. This amounts to a growing gap between citizens, technology and politics, notably when the individual’s private sphere conflicts with the notion of common good.

The European Commission (EC) is now recognizing the need for reconceptualising privacy, to develop suitable methods in order to assess the impacts that emerging technologies have and to think of privacy as a central element in the global governance of science and technology. As a result the EC is funding the PRESCIENT (Privacy and Emerging Sciences and Technologies) project, which will address these issues and aims to progress the state of the art in three main areas:

1. **Conceptualisation of privacy:** Until now, privacy has mainly been conceptualised as a legal issue or, increasingly, as a human right issue. Yet very little work has been devoted to privacy as a value and its role in the overall architecture of EU values as sketched by the Charter of Fundamental Rights of the EU. PRESCIENT intends to carry out case studies of five different, emerging technologies (including identification and surveillance technologies) to determine whether there are privacy problems posed by new technologies that do not fall easily within commonly used taxonomy of privacy problems, such as the one suggested by Solove (2008). The problem with framing privacy solely in individualistic terms is that privacy becomes undervalued. The interests aligned against privacy – for example, efficient consumer transactions, free speech or security – are often defined in terms of their larger social value. In this way, protecting the privacy of the individual seems extravagant when weighed against the interests of society as a whole. Ethical issues will also need to be addressed, especially as they are increasing with the proliferation of new and often complex technologies and/or technologies with advantages and disadvantages. Such ethical issues will require considerable effort to be understood as well as a considerable effort to formulate and justify good ethical policies. People who both understand the technologies and are knowledgeable about ethics are in short supply just as their need is expanding. Consider too that many of the emerging technologies not only affect the social world but also affect us as functioning individuals (Moor 2005, p. 118).

2. **Privacy Impact Assessment (PIA):** In Europe, policy-makers have been considering the adequacy of data protection legislation, the powers accorded national data protection authorities, the tension between facilitating trade and transborder data flows while ensuring personal data are protected and accessible and not misused once they leave European jurisdiction. There has been a primary focus on legislative consideration. At the same time, the European Commission and others have been concerned about the advent of new technologies and how their possible privacy impacts can be addressed. The EC’s RFID consultation, in some ways, can be considered as a groundbreaking initiative in the sense that the EC initiated a consultation with stakeholders on the introduction and deployment of a new technology, something that hasn’t really happened before. It also recommended the use of privacy impact assessments in new RFID applications. Although PIAs have been around for more than a decade in a few other countries, notably Australia, Canada, Hong Kong, New Zealand and the United States, they have only recently been introduced (by the UK Information Commissioner’s Office) as a tool in Europe (Bennett et al. 2007). Use of PIAs is likely to grow in the coming years.
years. The PRESCIENT project will make the case for more extensive use of PIAs modified to take into account ethical considerations. PIAs used in tandem with ethical impact assessments could do much to come to terms with stakeholder apprehensions and, more specifically, a lack of public and stakeholder knowledge about new technologies and their ethical implications before the technologies are widely deployed.

(3) Privacy policies: Technology, particularly revolutionary technology, generates many ethical problems. Sometimes the problems can be treated easily under extant ethical policies, but at other times – because new technology allows us to perform activities in new ways – situations may arise in which we do not have adequate policies in place to guide us. Sometimes we can anticipate that the use of the technology will have consequences that are clearly undesirable. As much as possible, we need to anticipate these and establish policies that will minimise the deleterious effects of the new technology (Moor 2005, p. 115).

Understanding and taking into account the role of stakeholders, including the public, is important because they colour our (social) notions of privacy and how we assess the impacts of new and emerging technologies. More importantly, we need to take these views into account as a matter of social equity: new technologies and the issues they raise will impact the public, so the public must be consulted and given the opportunity to participate in policy-making. The privacy and ethical impact assessment framework, to be developed by the PRESCIENT partners, will be a way of unearthing and assessing ethical problems associated with a new technology and involving stakeholders in the process. A final task of the project will be to formulate recommendations with regard to ethical approaches to the development of new technologies and to the weighing of privacy and data protection against other values.

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REFERENCES


A REVIEW OF POLITICAL BLOGS:
A MALAYSIAN STUDY

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ABSTRACT
The advent of Web 2.0 technologies such as blogging tools has meant that there are more opportunities for people to access and exchange information. In Malaysia, political parties and politicians are making use of web blogs to spread their political information. The interactive blogging activities through Web 2.0 have revolutionized the means of exchanging and disseminating political information, insights, and opinions everyday. As the usability of blogs is growing as a medium for political information, it has deliberative potential to influence citizens to participate in political activities. This paper seeks to understand how and why political web blogs are adopted in Malaysia. By exploring who are writing these blogs and the issues that are raised from these blogs, this paper also attempts to provide a review of using web Blogs as a tool to influence the political participation of citizens.

KEYWORDS
Blog, Web 2.0, political participation, information, media.

1. INTRODUCTION
The emergence of Weblogs has brought about a new medium of communication in which individuals can develop their own personal voice and expression. Originally, the term Weblog referred to a personalized webpage, maintained by the author in a reverse chronological diary form (Barger, 1997). In the past, research on personal blogs, were primarily focused on those that were similar to the traditional diary (Nardi et. al., 2004; Papacharissi, 2004). However, since the 2004 U.S. presidential elections there has been an increase in the use of this medium in making electoral voting decisions via political information. Blogs have moved away from being simple diaries to being valuable sources for political news that have potential role as a space for finding and discussing political issues. In additions, blogging has the potential to change the way many individuals obtain and disseminate information, insights, and opinions everyday. Therefore, with this in mind, the popularity of blogs as political medium for interaction and communication requires further understanding and exploration in the context of how web 2.0 tools impact on political participation amongst a nation’s citizen.

The study of Weblogs in Malaysia has become a new research area to explore. Malaysia has experienced a change, whereby people are now using Weblogs as an alternative to traditional media to disseminate political information. The study shows the higher interest of Malaysian blog readers had in political blogs as compared to several Asian countries (PR Newswire, 2006). In fact, blogs are becoming a platform for politicians and political supporters update information on local politics. The threat of socio-political instability called the Reformasi period in 1998 had strongly influenced the development of web-based alternative media in Malaysia (Felker, 2000). This incident was triggered because there was public distrust in mainstream media in the reporting of news. At the same time, government policy for freedom of speech on the Internet has be a catalyst in the use of blogs and online news. In the 2008 general election, the opposition parties relied on the Internet as a medium for their campaigns. This strategy first emerged in the 1999 general elections (Brown, 2004) but was only effective during the 2008 elections. After this election, the Prime Minister Abdullah Badawi admitted that his ruling party had ‘lost the Internet war’ (Brown, 2008). The Prime Minister conceded that it was a serious mistake by the ruling coalition to ignore the Internet in the latest election. Malaysia is a country that has recently been increasing its exploration in the use of Weblogs as a way to influence citizens in political participation, and therefore, this situation provides a rich and timely
environment to explore the effectiveness of this Weblog usage. This paper will explore various Malaysian Weblogs contents, issues and writers’ agenda in influencing political participation from the nation’s citizens.

2. WEBLOG ANALYSIS

In this research, an extensive review of political Weblogs was performed, analysing the issues raised in the blogs, the categories of blog writers, and the contents in blogs, and applications available on blogs. Specifically, 168 political Weblogs in Malaysia from both pro-government and opposition parties were analysed. The blogs were selected among ‘A List’ ranking of blogs. The criteria used to select political blogs were blogs that obtained the highest number of blogger participants, the highest number of visitor hits, and the blogs that were accepted as the most informative in terms of political content. These blogs were developed by political groups and individuals, and established between the period of 2007 and 2009.

2.1 Review of Political Blog Content

<table>
<thead>
<tr>
<th>Content Category</th>
<th>Content Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Articles of current political</td>
<td>The blogs contain information on the political activities and discussions about political developments. The opposition parties provide the issues concerning the wrong doings by government either in states or federal administrations. The government websites and blogs publish articles that promote politicians and government activities.</td>
</tr>
<tr>
<td>world issues</td>
<td>The blogs provide articles on the current political situations and political developments in other regions. Some of the discussions focus on the situation that relates to local politics.</td>
</tr>
<tr>
<td>News paper articles</td>
<td>Some blogs have included articles and news from local newspapers, particularly, news related to political programs and political parties. These blogs have made evaluations and posted personal views on issues from the newspaper cuttings.</td>
</tr>
<tr>
<td>Comments and feedbacks from</td>
<td>The political blogs offer discussion facilities and allowing the readers to give comment and feedback on the information and articles published. The writers are able to view comments from readers and respond immediately. Blogs provide the applications allowing users to chat and exchange ideas with other readers about political issues.</td>
</tr>
<tr>
<td>readers</td>
<td>The most common features in blogs are links to the other blogs that have same political interest. The links can be from the same group of bloggers who are in support of their political party.</td>
</tr>
<tr>
<td>Blog Archives</td>
<td>The blog provide archives that organised information according to the year and topic. The readers of these blogs can retrieve articles and issues published on a specific year by a specific topic.</td>
</tr>
<tr>
<td>Links to Youtube/ video online</td>
<td>The articles posted in these blog are supported by multimedia presentation and animation. In the personal blogs of politicians, their past election speeches are shown on youtube videos. Some online video and youtube shows clips on issues concerning political parties.</td>
</tr>
<tr>
<td>Polls / vote online</td>
<td>The blogs provide voting or polling online facilities on certain issues or political personalities. Bloggers can participate in online polling and the result will appear in the form of a graph. The polling is done on current issues and this application has received good response from readers.</td>
</tr>
<tr>
<td>Links to online Newspaper and</td>
<td>The political blog links to online TV and newspaper that give readers reference to the original source of current political issues. It provides bloggers with online information published by mainstream media that give clear understanding of specific political issues.</td>
</tr>
<tr>
<td>online TV news</td>
<td>Some blogs provide users with the ability to download music, MP3s, pictures and video. These entertainment applications can attract younger users to interact with the online community by allowing them to share their similar interests.</td>
</tr>
</tbody>
</table>

During the review of political blogs, the categories of blog contents were revealed as shown in Table 1. Bloggers in Malaysia are offered the latest information and issues on political activities in these blogs. At the same time, bloggers encourage their readers to participate in political discourse and exchange of political ideas through giving comment in blog. Political theorists who discuss political participation stress that participation in blog’s comment makes people feel that they have more influence on politics and political discourse (McKenna & Pole, 2004). Another rationale of using blogs is the information written can be easily updated, uploaded and deleted the information as necessary. It provides convenience to readers in getting
information, not only from articles published in blog, but readers are able to read online mainstream media for political information. This updated news is needed especially during elections where they want to know current political information in their own area. Indirectly, it provides blog readers the opportunity to examine information published before they make a decision to vote. Therefore, blogs provides an alternative medium for Malaysia citizens to actively contribute in the communications and exchange of political information.

2.2. Review of Political Blog Writers

Table 2. The categories of writers in political blogs

<table>
<thead>
<tr>
<th>Blogger</th>
<th>Content And Writers’ Agenda</th>
</tr>
</thead>
<tbody>
<tr>
<td>Politician</td>
<td>The blog contains information related to political activities, biodata, and articles associated with the blog’s owner. The politicians’ supporters can obtain information from this blog, which also links to other features like facebook, flicker, twitters and youtube.</td>
</tr>
<tr>
<td>Political Parties/organizations</td>
<td>The blog is the place of reference for members and non-members to have information about party and the political activities. There are also news and links to the related blogs and politicians. It provides links to political leaders’ blogs and other related sites.</td>
</tr>
<tr>
<td>Supporters of politicians</td>
<td>These blogs publish articles about activities of their favourite political leaders. The contents of articles that are written give support to politicians. The blog is used to show political activities performed by politicians and provide online polls on political programs organised by political leaders.</td>
</tr>
<tr>
<td>Freelance journalist / ex-journalist</td>
<td>This blog is developed by freelance or ex-journalists who have interest in politic. The content on these blogs were more organised and more convincing to readers. The writers have experience in journalism and they are able to write in a way that interests and persuades readers towards a particular view.</td>
</tr>
<tr>
<td>University students</td>
<td>These blog are developed by university students who have interest in political issues. The blog contents are developed to target young readers and students of higher education institutions. Apart from articles on political information, other issues concern the students’ education environment.</td>
</tr>
<tr>
<td>Independent blogger</td>
<td>These blogs have no interest to any political party but they give an analysis on political issues from the point of view of both pro government and opposition parties. These blogs post articles that evaluate the system and the administration of certain political parties.</td>
</tr>
</tbody>
</table>

As shown in Table 2, this paper has revealed the different types of blog writers and the contents of their blogs. Most of bloggers have their own agenda and objectives. The blogs have use applications that grasp the attention of readers to visit. Most of the writers have links to other blogs that share common agenda. The review also discovered that university students also contribute to the number of political bloggers in Malaysia. It shows positive indication of youngsters’ involvement in discussing political issues in the country. Furthermore, government freedom of speech on the internet for the dissemination of political information has be a catalyst in the use of blogs to express ideas to all citizens.

3. ISSUES IN POLITICAL BLOGS

This study has also identified issues regarding political blog in Malaysia. The digital divide, the language barriers and the credibility of information were focused as important issues in political blog. There are blogs that use various languages, which may not be understood by some readers. Apart from using the Malay and English languages, other native languages such as Mandarin, Tamil, Dayaks, Iban and Kadazandusun, were also used in blogs. Languages are based around the geographical area, type of ethnicity, and political parties in Malaysia. Therefore, the information can only be read and understood by a set group of people. This has the potential to hinder the process of using blogs to disseminate information instead of allowing blogs to be open and acceptable to all readers. Another issue relates to the digital divide which is critical for most people who live in the rural area. There is a lot of contrast between the Internet connections amongst cities in Malaysia. Despite governmental initiatives and strong emphasis put on multimedia, broadband usage level has remained relatively low (Yong, 2003). Poor infrastructure including the lack of electricity exists in many parts of rural Malaysia and this creates challenges to Internet and blog usability. Internet facility is not widely accessible in all parts of the country especially in geographically isolated regions due to inadequate ICT infrastructure (Siddiquee, 2008). The matter is worst for the people in Sabah and Sarawak where there are large number of villagers stay in remote areas. Other issues discovered in this research include the level of
accuracy and the credibility of the information provided by authors of blogs. There is scepticism concerning the accuracy of contents in blogs. Since information is written from the writers’ perspective and worldview, the material may be biased towards their opinion and beliefs. Johnson and Kaye (2004) cite the common argument concerning blog credibility, anyone can create a blog, there is no responsibility or accountability for content, information can be posted anonymously, and posters may not be bound by journalistic ethics. In addition, articles can be based around the personal opinions of the author and sometimes these articles may be built around the same source (newspaper or article) taken by other bloggers and treated as their content.

4. CONCLUSION

With the growing popularity of politicians and political parties using Web 2.0 technology, such as Weblogs, to improve the participation of a nation’s citizen in political matters, this paper has sought to understand and evaluate the merits of using Weblogs as a tool for political participation. This paper has revealed several categories of blogs’ writers and blogs’ content, and has highlighted issues associated with political blogs. As the usability of blogs is growing as a medium for political information, it has potential to influence citizens to participate in political activities. In regards to this matter, the next phase of this research is to explore the effect of political blogs on citizens’ participation through analyse interview data of bloggers, politicians, and political supporters who own blogs, and adopts the use of the Citizen Communication Mediation Model by Shah, et al.(2005). This model supports the notion that informational media (such as through online, traditional print, and broadcast media) encourages citizen communication, which in turns promotes civic participation. This extended model of the Communication Mediation Model (McLeod et. al.,1996) provides evidence that the use of news media affects participation through increasing political knowledge which leads to political efficiency and consequently, in political participation. The purpose of this is to identify the approaches used on these blogs to influence citizens to participate in political activities.

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