Editorial for the Special ICIME Edition of EJISE – ICIME2013

This special issue of the Electronic Journal of Information Systems Evaluation (EJISE) contains the full versions of eight papers that were presented at the 4th International Conference on Information Systems Management and Evaluation (ICIME) 2013 held at RMIT University (Vietnam Campus) in Ho Chi Minh City. This conference brought together groups of people from all over the world with different perspectives, experiences and knowledge in areas of work where information technology and management intersect.

The papers published in this special issue have addressed a number of challenges on how to manage and evaluate information systems effectively in the current information age. The first challenge comes from their complexity nature as information systems can include a variety of components that span across multiple organizations and geographical areas. The complexity makes it difficult to understand user experience, perceptions, attitudes and inhibitors in the context of system adoption. In the first paper, Kevin Johnston, Mei-Miao Chen and Magnus Hauman investigate the use, perception and attitude of 486 students from University of Cape Town (South Africa) towards Facebook and Twitter. The research findings suggest that social networking software should be made use in both personal lives and classrooms.

Easwar Krishna Iyer, Arathi Krishnan, Gaurav Sareen and Tapuan Panda’s “Sectorial Adoption Analysis of Cloud Computing by Examining the Dissatisfier Landscape” identifies and examines the four key adoption inhibitors that inhibit a widespread adoption of cloud computing across four industry sectors – SME, BDFS, education and hospitals. This understanding will be able to facilitate the cloud computing vendors to improve product conceptualization at the production level and fine-tine product positioning at the sales and marketing level to enhance market penetration.

Students with disabilities are enrolling even more with online courses with the hopes of a barrier-free learning environment. However, there are still some technical, communicational and interactional barriers existed in the learning environment. In the fourth paper, Bob Barrett aims to develop solutions to overcome these barriers that include designing training programs to educate instructors in the areas of disability awareness as well as virtual classroom accommodations and online interactions for students with disabilities.

In the eighth paper, Marius Mihailescu, Daniela Mihailescu and Sven Carlsson develop an explanatory framework based on a realist social theory and underpinned by a critical realist perspective, with the intention of describing and explaining IS/IT adoption occurrences. This study offers a foundation for future work that may contribute to a more coherent view on complex innovations and insights into their potential adoption.

Another challenge is to identify the manpower requirements (such as experience, competencies, skills, education level and knowledge) to analyze, design, develop, implement and manage various types of information systems. For example, Vince Bruno and Martin Dick examine two sets of usability roles in the paper entitled “Improving Usability Outcomes for each of the Usability Practitioner Roles”: the consultant vs. the organization based practitioner and the usability manager vs. the usability practitioner. The key findings show that usability managers look to strategic usability issues, by improving stakeholder collaboration and need to focus on the skillsets of the usability practitioners. Consultants had a higher tendency to focus on usability activities compliance within a process, selecting
and performing activities based on constraints, needed to have a degree of flexibility in their usability practice and often were used to validate usability practices in an organization. Organizational practitioners were more focused on nurturing and educating usability understanding within the organization and stakeholders involved in an IS project. A usability practitioner needs to be flexible enough to adapt to the situation they find themselves in when engaged in an IS project in order to maximize usability outcomes.

Financial Information Management Systems (FIMS) or Accounting Information Systems (AIS) is a cross-disciplinary subject in which educators have lamented high failure rates among students and professional bodies have reported that graduates lack sufficient meta-cognitive knowledge of information systems to perform their tasks. In the fifth paper, Hien Minh Thi Tran and Farshid Anvari present a five-dimensional reflective cycle framework that facilitates reflective practice among academic and professional instructors for designing, delivering and evaluating FIMS and AIS courses. This study also supports the view that reflection, within the proposed framework, is an effective strategy; and that Bloom’s Revised Taxonomy and the PEER Model are tools which can assist instructors to teach FIMS and AIS courses in a way that enhances participant’s learning abilities.

In the seventh paper, Val Hooper and Beverley Bunker conduct an explanatory research into the role and competency expectations of CIOs in public sector, and into the impact of the public sector context. The findings of this research indicate that CIOs and their business partners differ significantly in their views of required competencies. The findings extend the application of the RBV and also provide greater understanding of the competencies and roles of the CIO. It also provides insights for recruiters of public service IT professionals and CIOs, human resources managers, as well as for providers of training programs.

Last but not least, academics and practitioners have to overcome challenges to evaluate and manage the quality of information systems. The sixth paper authored by Aelita Skaržauskienė, Rūta Tamošiūnaitė and Inga Žalėnienė aims to provide insight into the concept of social technologies, to develop its meaning in information and knowledge society by evaluating social collaboration tools and technologies. The paper presents effects’ relation analysis with particular social collaboration tools and technologies. Each tool and technology was evaluated by all positive and negative effects simultaneously by setting hierarchical impact of the effect on a tool or technology.

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Guest Editor
Enabling Students with Disabilities with Computing Interaction and Empowerment through Enhanced Strategic Instructional Course Design

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Abstract: As more technology changes the learning environment for educators, this has caused a greater need for instructors to focus on the syllabus, subject content, administrative tasks, and students with varying learning styles. As more universities provide teacher training, the training may not be detailed enough to help instructors be prepared to work with classroom accommodations for students with disabilities. In particular, online instructors have another factor to work with in this situation, they have to work with students with disabilities virtually and offer similar or comparable accommodations. More educational institutions are seeing that more students are enrolling in online programs and courses, and they realize that there may be some additional barriers to learning in terms of this learning environment's technical process and structure. In particular, students with disabilities are enrolling even more with online courses with the hopes of a barrier-free environment. Thus, there are still some barriers still present in the learning environment in terms of technical/software application or interaction/communication problems. The purpose of this paper will be to look at how a university can address such problems and develop/create virtual solutions to these barriers by incorporating the help of others in the online community to brainstorm methods of inquiry and build virtual strategies. In particular, there needs to be a special emphasis given to online instructors to become better prepared and trained with technology in terms of structure and how to motivate all types of students, especially students with disabilities, to become more interactive online. While there is a growing need for more human computer interaction, rather than just selecting and clicking single choices, students with disabilities are finding technology to be more enabling than disabling at times. Consequently, universities need to design and develop training programs to help educate and train current and potential instructors in the areas of disability awareness, virtual classroom accommodations for students with disabilities, as well as to create strategies for better learning opportunities for these students. The key focus with this training program would be to create better strategies to help increase better human computing opportunities for all types of students. Even though many instructors may not be facilitating learning for this particular population at this time, the virtual learning environment is starting to attract more students with disabilities with a growing need to help them become more successful in their educational endeavors. Finally, this presentation will help to offer more insight as to the role and function of instructors in meeting the needs of students with disabilities.

Keywords: Accessibility, disability, virtual learning, interaction, teacher training, human computing

1. Introduction

People with disabilities have long been underrepresented in the workplace and the educational system due to various barriers they have encountered in their lives. While organizations and companies have made strides in employing workers with disabilities as an act of social responsibility, other entities have started to realize the need and value of this untapped human resource (Thakker, 1997). In addition, research has shown that employees with disabilities have low turnover rates, low absenteeism, and high motivation to prove themselves (Fersh & Thomas, 1993). Thus, executives will need to rethink their employment practices in order to compete for employees from the current, shrinking workforce. As the workforce has become smaller due to the retirement of the Baby Boomers, there is a growing need for a more educated workforce to operate the growing amount of technology used in the workforce. While many people have rallied for changes in the way computer software and hardware operate for all people, especially people with disabilities, there are still some concerns for this group's ability to have more accessibility and need for more human interaction.

Traditionally, many employers have relied on the assistance of academic institutions to help provide for them well-qualified job candidates. However, we need to reexamine whether educational institutions are still able today to enable, educate, and motivate all learners for the many changes in the workforce. In particular, are they able to equip all learners with the necessary technological skills and education to best prepare them for this new workforce outlook? Currently, 54 million Americans with disabilities use information technology (IT) at colleges and universities, which accounts for 20 percent of the population (Oblinger & Ruby, 2004).
Consequently, this will help to set the backdrop for this paper in understanding what has been problems for students with disabilities and whether or not if technology can help to break down some of these barriers (whether visible or invisible). For many centuries, education has been focused on the learning of course content, but the learning styles of the students have been ignored. As Knowles (1987) noted that “everyone [learners] should be able to participate and control their own learning process.” While most of the academic approaches have been centered on the mastery of course content knowledge, not all learners learn in the same way. As a result, different teaching techniques, strategies, and tools may be needed to help all students acquire, understand, and apply learning gained from the course content.

Thus, this leads to a larger question as to whether or not e-Learning can fill this void in helping to focus on the learning style and skills needed by learners, especially students with disabilities (Barrett, 1999). There are some obstacles or barriers in education that do prevent students with disabilities from succeeding in both the face-to-face and online learning environments, especially in certain courses. The focus of this paper will be on how accessibility to e-Learning, as a method of new computer teaching technology, can be used as a strategic tool to help overcome some of these barriers. In particular, this paper will approach the main research question of “how accessibility and human computer interaction can help to engage and motivate students with disabilities through more computer empowerment” in today’s learning environments? This newer form of engagement can be used as one way to linking modern day technology to learning content knowledge, as well as offering a more barrier-free learning environment.

As a result, this focus will look at the strategies used at one major U.S. virtual university system and how they are strengthening their use of human computing interaction and best practices to help motivate all students, especially addressing the needs of students with disabilities. Further, this paper will the literature to determine how the need to use e-Learning as a strategic tool to help engage and enrich the learning opportunities for students with disabilities. It is important that this particular student population be engaged with a variety of e-Learning applications to help students with disabilities to become more familiar and empowered to interact more with the computer technology and participate at a higher level in the online learning environment.

In particular, the paper will center its focus on the current need to use e-Learning, as another mode of instruction. It will also look at this type human computing interaction as a strategic tool for breaking down current educational barriers faced by students with disabilities in educational institutions. In the following section, there will be an overview of the current statistics of people with disabilities in the United States, along with an overview of distance education, which will also be referred to as e-Learning in this paper.

2. Disability statistics overview

Statistics helps one to understand what the current picture of a situation in order to consider what might need to be done in order to change the current outlook. This will provide a baseline for the reader to understand why instructors need to consider why students with disabilities are fighting not only barriers in the workplace, but also in the realm of academia. Before looking at the statistics in the U.S., we need to look at the global perspective. According to United Nations Enable, “The United Nations estimates that 650 million people around the world are disabled, about 10 percent of the world’s population.” (para.1). Besides looking at the U.S. statistics, we need to consider a larger global perspectives since many online learning courses enroll students from many global locations. Hudson (2005) reported the following:

The incidence of disabilities (and limiting illness) that restricts a person’s ability to function in everyday life, as recorded by government agencies in some countries:

- United Kingdom, 18% of the population (National Statistics, 2001).
- Australia, 17% of the population (Australian Bureau of Statistics, 2003).
- United States, 19.3% of the population (US Census Bureau, 2000).
- Canada, 12.1% of the population (Statistics Canada, 2001).
- New Zealand, 20% of the population (Statistics New Zealand, 2001).
European Union, across the 15 EU countries in 2001, 19.3% of the population was hampered by physical or mental health problem, illness or disability, with 9.3% severely hampered. (Eurostat, 2003) (Hudson, 2005).

Considering the above statistics, we can see that there are a certain percentage of these global populations that have people with disabilities that can benefit from the use of more accessibility to online learning and computer technology/interaction. According to several resources, the following statistics about the employment of people with disabilities was noted: “The total number of people with disabilities aged 16-64 is 33,153,211, [of which], the total number employed is 18,525,862. The percent of people with disabilities aged 16-64 employed is 55.8%” (Census, 2000, para. 4-6). These reports show that “18.6 million people disabilities employed aged 16-64, 60.1% of men with disabilities are employed, and 51.4% of women with disabilities are employed” (Census, 2000, para. 7). Thus, these statistics demonstrate that there is still a disparity between the employment rates of people with disabilities versus their able counterparts. Consequently, one way of changing these employment figures may be the use of technology and how it is offered and facilitated with people with disabilities (Disability Status 2000, Census 2000 Summary File #3; and Census 2000 Brief (March 2003) (C2KBR-17)).

While there is still a disparity between the employment rates of people with disabilities versus their able counterparts, one way of changing these employment figures may be the use of technology and how it is offered and facilitated with people with disabilities. If more students with disabilities focus on obtaining higher education, they may start to make a movement towards online education in light of physical classrooms. In this transition to a new learning venue (environment), they still anticipate the change with some level of apprehension, along with a certain amount of anxiety. Therefore, it is important for online administrative and instructional staff to focus on building virtual trust for these learners.

3. Distance/Virtual Education in Today’s Learning Environment

For the purposes of this paper, the term distance education and virtual learning may be used interchangeably for the same referencing of learning with computer technology in the context of understanding more about the use of technology and human computing interaction. Neal and Miller (2006) defined distance education as “education that takes place independent of location, in contrast to education delivered solely in the classroom, and that may be independent of time as well (para. 4). ASTD, an education/training & development professional organization, noted that “distance education can be characterized as an educational situation in which the instructor and students are separated by time, location, or both. Education or training courses can be delivered to remote locations via synchronous or asynchronous means of instruction (Neal & Miller, 2006, para. 5). Thus, we need to consider what is the role of technology for changing learning and promoting diversity and including more students with disabilities, as well as whether or not this new technology offer a change for them?

4. Learning and Technology Advancements in Virtual Learning Environments

Technology has made a major emphasis on learning in today’s adult learners. As a result, adult learners must have a different type of skills sets in order to compete in today’s online learning environment and workplace. Academic institutions must design, develop, implement different practices and procedures in order to prepare all students, especially students with disabilities, to compete for quality and meaningful employment. Thus, this paper helps to provide an open forum for the reader and others to determine if there is a need for change. If so, it also provides a chance for further research to be conducted to help examine how various schools of business, both traditional and online, can approach the career development segment of their course offerings and programs.

As more technology has become available in many parts of the globe, a new type of student population has emerged. While the traditional student image of higher learning has been somewhat limited in many countries, but given the impact of the Internet, this traditional “student body” has transitioned over to online learning environments (online learning communities). According to Preece (2000), these online communities “consists of people who interact socially as they strive to satisfy their own needs or perform special roles; a shared purpose that provides a reason for the community; policies that guide people’s interactions; and computer systems to support and mediate social interaction and facilitate a sense of togetherness” (p. 10). In the fields of education, business, and management, many educators have recognized the demographical changes of the student population. As a result, technology today has provided a powerful infrastructure, the
emerging technologies have allowed educational institutions, educators, and students to achieve education on a much higher playing field – in a virtual learning environment. Thus, more students with disabilities are enrolling in online courses. One reason for this increase in online enrollment is due to online learning environment allowing for more barrier-free opportunities to education for students with disabilities.

5. The Role and Impact of Online Instructors in Today's Learning Environment

Over the past two decades, educational reform has started to make changes in the classroom, along with the many technological improvements and changes to learning in general. Educators have started to see instructional methods moving from a sheet of paper to the computer screen. The role and function of these instructors has changed with the introduction and placement of personal computers in the classroom. As more technology to appear in the educational environment, schools started to find that computers had many different qualities. They had a larger storage capacity; were cheaper to purchase; easier software was being developed to navigate; students were starting to learn computers at an earlier age; and adaptation of course materials to the computer environment was being made easier for instructors.

In light of these many technological advances, schools systems still had to face other problems due to poor planning and constraining budgets. As the number of computers was limited in the classroom, it also had an impact on the number of users with the computers. In addition to budgetary problems, sometimes there was a limited use of software licenses due to the amount of budgetary investment. This limited training given to some instructors did impact how many students would receive quality technological instruction. While the focus on the instructor may be of a primary importance, we have to consider another key problem. Not all of this type of technology has been fully accessible for students with disabilities. Finally, not all instructors were trained to teach students with certain types of disabilities wishing to learn and operate computers and various computer software packages. These problems were only a representation of why some school systems sought additional funding to increase e-Learning opportunities for all students.

We need to consider the key fact here that E-learning is not for all students. For students with disabilities, these many facets or approaches that e-Learning offered more opportunities than ever before. For example, visual learners were able to benefit from applications in PowerPoint and Flash Multi-Media technology. Auditory learners could benefit from online classrooms with auditory lectures, Podcasts for students, as well as live chats. From a blended-approach perspective, some online programs offer both auditory lectures, as well as PowerPoint slide presentations. Also, live chats (both auditory and visual – i.e., Elluminate, Horizon Wimba, etc) offer more opportunities for a variety of learners. Thus, this leads us to another question for consideration. How can we train instructors to become more accessible with technology and help bridge the learning gap for new online learners, especially students with disabilities with assistive technology requests? First, we have to motivate our instructors to become more “computer literate” and want to use more technology in the classroom. Second, we need to show these instructors how to use various types of technology to achieve learning objectives in the online learning environment. Finally, we need to help instructors to learn different ways, approaches, techniques, and strategies to help motivate students with disabilities to use these new technologies and use it for more interaction. While not all instructors are educated or trained to work with students with disabilities, the use of technology can be quite helpful in this educational mission in order to bring this student population and instructor (and overall class) closer together during the learning process. During this time, it is important to focus on the building of trust to help engage the student with disability and to help encourage them to take advantage of this new technology.

6. Building trust during the learning process

It is important to focus on establishing and nurturing trust early on with the learning process, it can help all stakeholders involved in a learning organization to move forward rather than “freezing” or “unfreezing” during critical moments in their development, as noted by Lewin (Kaminski, 2011). However, not all instructors are willing to spend additional time and resources for trust, but later learn the importance of this key strategic element. We can see that the concept of trust has many meanings, but for this paper there will be a focus on trust in the context of swift trust. ChangingMinds.org (2010) focused on swift trust and how it affects certain groups and organizations. They stated that “Sometimes there is no time to build a trusting relationship, such as when group of people are thrown together and must start work immediately” (para. 4). As people are thrown together into a temporary setting, they may quickly organize and develop a temporary system in order to function as a group and meet their immediate needs (i.e., job duties, tasks, etc.). While in some educational
institutions classes are large or a variety of learners are placed in learning environments with barriers, the use of online learning has helped to change some of these learning impediments and help encourage more people to return back to education.

7. Course Preparation and Strategic Planning

Can instructors find other ways to motivate students to seek additional resources and ways of preparing course assignments and projects during the learning process? Why is this important to the students and instructors? While an instructor’s key goal is to teach the course content, what happens if he or she also motivates the students along the way to want to discover and inquire more on their own? Therefore, if an instructor wants to carry the same momentum from the live classroom setting into the world of online learning, there are several areas to consider, as noted below. Also, during the instructional period, the instructor needs to determine the level and extent that all students achieve in terms of mastering the learning objectives for the course. One way that online instructors can help changed the level of learning, quality of instructions, and adapting the course material for all types of learning styles is by assisting with the creating and design of the learning course. It should be noted that not all online schools permit instructors to design and develop courses, but many do encourage the use of additional teaching and learning materials. Finally, selected assessment activities of student learning can be done in terms of live chats, discussion threads, assignments, quizzes/exams, and/or projects. In order to consider such items within a course design, one needs to look at key areas to incorporate each of these items.

8. Impact of Teaching Strategies, Tools, and Techniques

Not all teaching tools work or apply in all given learning environments. However, as some teaching tools may be viewed effective in one learning environment, they may not be as successful in another type of learning situation. Therefore, since each environment is unique, as well as the learners in it, the educator needs to assess their online environment and determine if change is necessary currently or for later. However, not all educators may be as flexible in their teaching method, and they may not be willing to change. This leads us to the next question for exploration. Do educators incorporate different teaching strategies and techniques to meet the ever-changing needs of these virtual learners in terms of learning from their cultural differences in order to enhance the learning experiences of all? Further, can these instructors also address the changing learning needs of all adult learners, especially people with disabilities? Therefore, this type of learning environment has helped to break down a few of the barriers as previously discussed in this paper. Also, this new type of learning environment has helped to “level” the playing field, in which students can act, react, and be proactive in the learning process. White (2002) noted “Nowhere is thinking more evident than in the textual environment of the online classroom. If writing is thinking, then online students display their thinking throughout the course, illustrating their individual styles and changing attitudes” (p. 6). Consequently, educators can incorporate various strategies to help draw upon the experiences of all class members – rather than just a select few. This helps to demonstrate the beauty of online learning – because online learning is a continuous process (not limited to a set time and place as a traditional course is scheduled).

The creativity and innovative ways of teaching must also continue to change. Educators and course designers need to enhance and modify their online programs. While many educators will agree that learning concepts, principles, and theories are necessary in establishing a good foundation of learning in any course, this may not be enough to reach all of the learning needs of today’s online learners. While these educators may have a challenging position of motivating and keeping the attention of young learners, we can also see the same problem with adult learners. It is important to note here that the challenges that online instructors may face in motivating and keeping the attention of virtual learners when there are issues of differences in generational learning, time zone challenges, technology skills, and perceptions of course value.

As we look at the various evolutionary steps of technology in today’s learning environment, we can see how it has influenced the diminishing workforce. If we look at the impact of changes in the workplace, we can see some impacts as a result. This may have caused many human resource professionals to search for information and ideas on best practices in human capital management (Fitz-enz, 1997). Thus, these changes in technologies have occurred in the workplace, as well as changes in the various federal, state, and local laws, and there has been a shift from these changes to human problems, especially behaviorally, one can see on the individual group, and organization levels. Chin and Benne (1969) discussed this shift to the human problems as “dealing with the resistance, anxieties, threats to morale, conflicts, disrupted interpersonal communications, and so on, which prospective changes in patterns of practice evoke in the people affected by the change” (p.
...Therefore, those individuals involved in technological and human asset management work as “change agents” to help facilitate change in terms of best practices.

Fitz-enz (1997) described best practices as: “an enduring commitment to a set of basic beliefs, traits, and operating strategies. These are the guidelines for an organization: the driving forces that distinguish it from all others” (p. 98). In early 1990, The Saratoga Institute conducted a formal research project on common traits of the best human asset management companies. The question that they used over and over with each participant was, “Who is good at _______?” The identified eight factors that appeared constantly in their study as: “1) value; 2) commitment; 3) culture; 4) communication; 5) partnering; 6) collaboration; 7) innovation and risk; and 8) competitive passion” (Fitz-enz, 1997, p. 100). This Institute wanted to find out what was being done better in each of these factor areas. The study was to help them to identify what was being done right and if it was part of the individual’s interaction with their organizational culture. Thus, as many people have researched and interviewed others to learn more about best practices, the educational arena has had to work even hard to develop, create, implement, and share best practices with others in order to help improve upon the current approach to online learning and teaching. While we can many reasons why most online instructors may have to “rethink” and “reevaluate” their teaching approaches, strategies, and techniques, the fact remains that students with disabilities need a different approach by their instructors to help motivate and encourage them to use this new technology in order to improve their possibilities for equal and better educational opportunities.

9. e-Learning as a Strategic Tool for Diversity Awareness and Accommodations

Besides being a strategic tool for learning, e-Learning offers a good platform for educating students, faculty, and administrators in the areas of diversity awareness and accommodation. The following list represents how e-Learning can be used to help educate all users.

- E-Learning is a technological tool, as well as a tool for learning and socialization.
- E-Learning can be used to educate not just one group of learners – but many others.
- E-Learning can help to promote “diversity awareness.”
- E-Learning can help to accommodate learners with disabilities and accommodate the needs of instructors and educational institutions.
- Is E-Learning at its prime or still in its infancy stage in terms of helping all types of learners?
- Can e-Learning help to break down barriers and be used as a tool to increase our knowledge base by including the viewpoints of a more, diversified group of learners?
- Finally, is e-Learning a strategic approach that benefits business more than education?

We need to realize that adult learners have different learning styles, as so do teachers have different teaching styles. Further, what happens when a student with a disability takes a course where the instructor is not prepared to accommodate the student’s particular disability? In the United States, the passage of the Americans with Disabilities Act of 1990 (ADA) changed many factors affecting the lives of persons with disabilities. In particular, it mandated that in field of education, changes had to be made to accommodate the needs and rights of persons with disabilities. Even though this federal mandate has been in effect for more than two decades, some universities and their instructors still have not brought their courses up to par. Further, this paper will provide some suggestions and recommendations to help educators and trainers to improve upon their strategies for teaching online course. For illustration purposes, the next section will focus on the discussion of various potential research courses strategies.

10. Proposed Research Course Strategies

Whether an instructor teaches live, Face-to-Face (F2F) courses or online courses, they can use a variety of methods to teach all students. However, not all students learn or think in the same way. RIT (2010) noted some generalizations about adult learners and their thinking styles and characteristics in the following chart:
Thinking Styles | Characteristics
---|---
Reflective Thinkers | • view new information subjectively
• relate new information to past experiences
• often ask "why?"
• examine their feelings about what they are learning

Creative Thinkers | • like to play with new information
• always ask "why?"
• make excellent troubleshooters
• create their own solutions and shortcuts

Practical Thinkers | • want factual information without any "nice-to-know" additions
• seek the simplest, most efficient way to do their work
• not satisfied until they know how to apply their new skills to their job or other interest

Conceptual Thinkers | • accept new information only after seeing the big picture
• want to know how things work, not just the final outcome
• learn the concepts that are presented but also want to know the related concepts that may not have been included (p. 3).

It is important that instructors contemplate the various thinking (learning) styles, as discussed above, along with considering the needs of students with different learning needs, it is important for instructors teaching research methods to consider different approaches in teaching course content. Take a moment and consider how each of these thinking styles may affect the way a learner made consider each topic in a research method course. If one considers how researchers operate, do they all conduct research in the same manner? No, each researcher has their own unique style and approach of conducting, analyzing, and reporting research. As a result, one needs to think of ways to present material in different formats in order to reach all learners.

Why is this important? In light of the many technological improvements over the past several decades, research has become more accessible for many people. While an instructor’s key goal is to teach the course content, what happens if he or she also motivates the students along the way to want to discover and inquire more on their own? Therefore, if a teacher wants to carry the same momentum from the live classroom setting into the world of online learning, there are several areas to accomplish this, as noted below.

Zhu, Payette, DeZure (2006) noted several areas of consideration when one is creating an online course: 1) course content; 2) delivery of instruction; 3) communication and interaction; 4) student time spent on learning tasks; and 5) assessment of student learning. The course content will remain the same, but the delivery of instruction will be given either synchronous or asynchronous learning formats. Instead of live discussion in a physical classroom, the discussion/dialogue will be done in a chat session, discussion thread, and/or video session. The student’s participation in the course will depend on the learning format, as designed. Finally, assessment of student learning can be done in terms of live chats, discussion threads, assignments, quizzes/exams, and/or projects. In order to consider such items within a course design, one needs to look at key areas to incorporate each of these items.

Consequently, Salmon (2000) offered a five-step model that focuses on interaction between students and students and their instructors in terms of the quality and intensity of their interactions.
Step 1 - Access & Motivation. One objective to good interaction in a research class is discussion and contact.

Strategy: How to encourage more access and motivation? An instructor could develop a PowerPoint Presentation (PPT) to help overview the concept of research. Not all students will read the first chapter of any textbook or required readings, but rather they will skim the material until they realize “what they need to know.” Also, in a class setting, there could be students with learning disabilities (i.e., dyslexia, dysgraphia, dyscalculia, dyspraxia, non-verbal learning disorder, etc.) (DO-IT, 2010).

Step 2 – Online Socialisation. Students may be slow at times to interact, unless they are required or if something “captures their interests.” While many people have argued about the loss of socialization in the online learning environment, many instructors have focused on this particular area. Irwin and Berg (2006) wrote that “Socialization is about people being able to mingle and establish connections on one or more levels. They speak [with] one another; share ideas and information and confirm the connections made through an agreed upon means.” (para. 3).

Strategy: What is socialization? The first main discussion should be based on what is research. It is important to determine a baseline of what the students know now, perhaps in a form of a type of pre-assessment. Since some students may freeze up with the term “assessment,” a general discussion with probing questions inserted along the way by the instructor can help to assess the general knowledge of the class. In many classes, there are students with identified or undeclared disabilities. In order to help them participate and offer more insight into this area, an instructor could focus on disability in general or a particular disability as they illustrate a research methods concept.

Step 3 – Information Exchange. During this phase, the students need to know how to look at problem situation and determine the factors affecting the person(s), situation(s), event(s) and/or location(s). It is during this time that the instructor can play a major role to involve all students – and focus on their learning styles.

Strategy: How is research collected? In order to meet the learning of various learners in the course, it is recommended that the instructor offer PowerPoint Presentations, audio lectures, as well as text-based documents. Why? Some students are more auditory than others. If one has a student who is legally blind, then an audio component would be helpful. However, one could have a person who hard of hearing or deaf, so a text-based component would be beneficial. If the student cannot receive the proper instruction, how can they be successful in the course?

Strategy: How to organize and sort data? The same learning activities, as noted above, are helpful in the discussion of the organization and sorting of data. However, here is another dimension that has to be considered. Some statistics programs are more oriented for the student without certain types of disabilities than for a student with a given disability. Therefore, it is a good idea for the instructor and course designer to consider possible changes in the course learning activities, should a student need an accommodation in the classroom.

Step 4 – Knowledge Construction. How research is used and how it is approached is important in this process. While some students may be more auditory than others, there will also be visual, kinesthetic, and environmental learners (further discussion will be held later on this topic).
Strategy: How is research analyzed? As discussed in the previous strategies, the methodology taught by the instructor and used by the student is important. Depending on the student’s learning style, the use of various learning activities and methods of teaching will either help enhance or detract from the learning experience. One way that an instructor can try to figure out what works or needs to be changed in the course is to do a quick needs assessment. This can be done by asking the students what type of learning they preferred. Some will want more visual activities, and others may want auditory tools for learning. On the other hand, some will want a mixture. A quick way to view this is research methods in general. Some instructors and schools prefer the use of qualitative versus quantitative research methods, but some like a mixed design. As a result, this approach is a good way to start the discussion and help the instructor to learn more about his or her learners.

Step 5 – Development. The final part of any course is the development of the final project and connection to all components of the course at this stage. As noted in the above strategies, it is the intent of the course to cover all course objectives, provide learning activities, as well as offering a final assignment, project or exam in which the instructor can assess the final level of learning for students.

Strategy: How is research organized and written up? This is one area that many instructors will argue or agree upon – the format for writing up research. In many cases, the final decision is a report. However, for students with short attention spans (ADD, ADHD, etc.), the paper format might be a challenge. Therefore, the teacher might assign a slide presentation in lieu of the paper (but with the same APA style requirements). For a student with a sight disability, a recorded presentation might be a different approach, but with the option for the instructor to question the student about various aspects of the research methodology and data analysis. While this does seem to be more work for the instructor, rather he or she will be able to give some variety in evaluating the work of a student with a disability.

As noted in the above paragraphs, these strategies are currently used in several American universities and colleges. In particular, these practices are helpful with students facing challenging courses, such as a research methods course. While students may appear to be having challenges in the normal course of the term, there is yet another problem. While this is typical for all students – the issue of trust versus mistrust is a key factor here. Why? Well, students, especially with students with disabilities, may have an underlying fear of the online learning environment. Take a moment and consider the history of most adult learners. During their early years of formal education, they have attended some type of formal learning environment. The thought of changing this routine over to one of a computer being logged into a virtual classroom may be daunting for many. Thus, herein lies with one of the main factors that have caused students to avoid online courses – or to be very cautious going into a virtual learning environment. The following section will discuss in more detail about various trust and mistrust concerns held by adult learners.

11. Conclusion

In consideration of the key points noted in this paper, we have to consider several final questions. How and when do instructors start to help motivate students with disabilities with the use of technology? Do they hope that technology will provide the necessary motivation or should they be more socially present to help ensure the motivation is there and continues throughout the learning process? While overviewing the concepts of disability, learning, and technology, we do need to think further about the role and function of e-learning for the student with disabilities, as well as the instructor. Can E-Learning be used as a strategic tool for students with disabilities and encourage them to become more interactive with the course technology and achieve even higher levels of course interaction in terms of participation and use of computer technology? Yes, they can, but educational institutions may need to rethink how they present material and in what types of software applications they may offer their students to help motivate them to become more “involved” with the course, course members, and instructor. Further, e-Learning has provided many unique and creative opportunities for instructors and learners to learn and grow from each other’s personal and professional experiences. As more students with disabilities enroll in online programs, more educational institutions are noting a growing need to train more instructors to learn additional computer technology, increase teacher educational offerings, as well as helping them to learn new methods and strategies for motivating online student participation and human computing interaction.
References


Improving Usability Outcomes for each of the Usability Practitioner Roles

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Abstract: This paper examines two sets of usability roles: the consultant vs the organisation based practitioner and the usability manager vs. the usability practitioner. This paper will review the current literature discussion of the usability practitioner’s role and present findings from interviews with industry practitioners. This research interviewed twenty one usability practitioners with five or more year’s industry experience. The interview transcripts were then analysed using the grounded theory methodology. The analysis provided various findings which highlighted concepts that impacted on the usability outcome of an IS project. The analysis produced twenty seven concepts which were formed into four themes, which included usability mindset, collaborative approach, usability practice and project constraints. The findings present and describe eleven of these concepts in some detail. The concepts presented are directly related conclusions discussed. This paper will focus on the noticeable differences between the various usability roles in relation to the resulting twenty seven concepts. The key findings show that usability managers look to strategic usability issues, by improving stakeholder collaboration and need to focusing on the skillsets of the usability practitioners. Consultants had a higher tendency to focus on usability activities compliance within a process, selecting and performing activities based on constraints (which include technological constraints, time and budget constraints), needed to have a degree of flexibility in their usability practice and often were used to validate usability practices in an organisation. Organisational practitioners were more focused on nurturing and educating usability understanding within the organisation and stakeholders involved in an IS project. A usability practitioner needs to be flexible enough to adapt to the situation they find themselves in when engaged in an IS project in order to maximise usability outcomes.

Keywords: usability, practitioner, role, industry, usability outcome

1. Introduction

The concept of usability (Bruno and Al-Qaimari 2004) and the range of usability activities (Ivory 2001) available to be performed have been in use for many years. The ICT industry, organisations, and the users have not matured enough in many instances to embrace usability as an important part of the development process. The credibility and benefits of usability can often suffer with the lack of usability maturity (Jokela, Siponen et al. 2006) within project teams and organisations. The usability literature has a strong focus on performing individual usability activities. The effective performance of these usability activities is clearly important in achieving a successful usability outcome. However, it is necessary to ask, is it sufficient to ensure a successful usability outcome for a project just by performing these activities correctly.

The gap in usability knowledge between research and industry practice is well documented in the literature (Parush 2006). It is important to understand what the critical issues in industry that impact the success of usability outcomes. It is also important for the usability research literature to reflect practice and add value to practice. The industry practice can inform the literature and help give it focus. This paper provides insight into the practice of usability practitioners, highlighting key concepts that can impact on a usability outcome. The focus of this paper is to examine the role played by usability practitioners and how this can impact the usability outcome of a project. The data used is from usability practitioner interviews that focused on what enables a good usability outcome to be attained in a project. This paper highlights the higher level roles of a usability practitioner, i.e. Managing or Practice, and organisational vs consultant based practitioners. Section 3 will examine some of the current literature relating to usability practitioner research on usability outcomes. Section 4 will describe the methodology being used to gather and analyse the data. Section 5 will describe some of the findings of this research, while Section 6 will look at the analysis done.
2. Literature review

The research literature does describe various aspects to the role of a usability practitioner in practice of usability activities in an ICT project. Usability practitioners have been given many titles in industry practice, like usability practitioner, human factors specialist, user experience expert... etc. The title could include the management role. Iivari (2006) discusses various usability practitioner roles within an engagement in a project. This looks at the predominant activities performed by usability practitioners when engaged to perform usability. These include: Informative role, Consultative role, Participative role, and Configurer role.

The literature covers a lot of the skill and practice orientated aspects of usability practitioner’s role. The role of improving usability understanding to promote usability adoption (Robertson and Hewlett 2004; Seffah, Desmarais et al. 2005). The need to evangelise usability (Dayton 1993; Levi, Melo et al. 2007) to sell and convince project stakeholders of its importance, these include organisational stakeholders (Bloomer and Croft 1997). Promoting of the value of usability during usability activities (Bernhaupt and Weiss 2007), as something done to introduce usability (Levi, Melo et al. 2007) where usability maturity is low (Nielsen 2005). The need for a usability champion during early stages of introducing usability in a low usability maturity organisation (Nielsen 2005) to help evangelise usability.

The role performed by usability practitioners is often not valued and lacks credibility with the IS project team (Rosenbaum, Bloomer et al. 1999; Sherman 2006; Wilson 2007). Often when integrating usability into an organisation credibility needs to be attained (Fellenz 1997; Mayhew 1999). Various surveys (Gulliksen, Boivie et al. 2004; Ji and Yun 2006) have also produced some key findings that improving usability’s credibility and that the usability maturity of organisations needs to be increased. The role of a usability practitioner is continuously changing (Wilson 2005). As the usability practitioner becomes more involved in projects and with organisations, and the usability maturity improves across the industry, it is inevitable that the role will change.

As discussed at the start of this section, there are various communities of practice (Iivari 2005) for usability practitioners, which highlight the changing role of usability practitioners.

The need for a usability practitioner role has been identified as important, i.e. Boiver et al. (2006) believes ‘that usability issues require a “specialist” role’. Having usability practitioners whose role and responsibility lies with usability can ensure the performance of usability activities throughout a development process. Ferrara (2005) highlight that often a usability practitioners practical role is given to other ICT project team members on top of their other role in the project. This paper looks beyond these practice orientated roles that can improve the usability outcomes of ICT projects. This paper looks to the established usability practitioner roles within ICT projects. It examines the differences between organisational vs consultant roles and managing usability vs performing usability.

3. Research methodology

This research paper will attempt to answer the following research question:

“How do the organisation roles played by usability practitioners impact on their perceptions of how to improve usability outcomes in IS projects?”

This question arose while examining data that was elicited from current industry usability practitioners, where the questioning was focused on the usability outcome attained in projects. The usability practitioners interviewed had a minimum 5 years’ experience in the usability industry. During each interview four open questions were asked:

- Describe academic background, and work experience of practitioner
- Describe a typical day’s work as a usability practitioner.
- Describe a project, that you were involved in, where usability had a good impact on the outcome.
- Describe a project, that you were involved in, where usability did not have a significant impact on the outcome.

Participants were recruited using various means. This research started with an email on the CHISIG (2011) mailing list (an Australian mailing list for usability practitioners), which provided many volunteers. Various locally based usability consultancies companies were also contacted. The practitioners interviewed also
provided other contacts of usability practitioners. This research will continue to perform interviews until saturation of data is attained, i.e. when no significantly new concepts are appearing in the analysis.

Ethics approval was obtained for the audio recording of each interview session. Each interview was then transcribed into text and loaded into a qualitative analysis tool, i.e. Nvivo7 (QSRInternational 2011). The tool facilitated the “coding” of interesting concepts in each transcript, things that may be significant for the general area of this research question and warrant more analysis.

The research process employed was Eisenhardt (1989), which specifies eight stages, see Figure 1. The research methodology being used to analyse this rich source of data is grounded theory (Strauss and Corbin 1990). This methodology provides a mechanism to iteratively gather and analyse data and build a set of concepts. This grounded theory analysis stages have been superimposed onto the Eisenhardt research process that allows for an iterative interpretivist analysis of the primary data to derive a theory.

Figure 1: Eisenhardt (1989) theory building process combined with the grounded theory analytical process (Strauss and Corbin 1990)

The dotted ellipses (i.e. (a), (b) and (c)) indicate the iterative loops performed during the analysis phases of the research process. This paper takes up the research process, for an additional set of analysis iterations to shape a different hypothesis (Axial Coding) and then generate theory (selective coding) which is enfolded with related existing literature.

Initial results were published (Bruno and Dick 2007) and the final results will be published shortly. This paper is looking to describe a separate phenomenon that fell outside the scope of the primary research. This paper looks to answer a different question, as specified earlier, to the initial project research question.

4. Findings

This section will provide a summary of the concepts that have emerged from the initial research (Bruno 2011). These findings provide the basis for the additional analysis done in relation to these separate phenomena that this paper is presenting.

4.1 Demographics

The interviewed usability practitioners, as can be seen from the demographic data presented in this section, are a very diverse group of professionals. This is indicative of the usability profession, based on two survey studies conducted (Gulliksen et al. 2004; Vredenburg et al. 2002).
Table 1: Practitioner Gender

<table>
<thead>
<tr>
<th>Sex</th>
<th>Number of practitioners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>13</td>
</tr>
<tr>
<td>Female</td>
<td>8</td>
</tr>
</tbody>
</table>

Gender is shown in Table 1, showing slightly more male practitioners were interviewed. There was no significant difference in the concepts discussed by the male and female practitioners.

The context in which usability practitioners performed usability activities was an important characteristic to examine. Understanding the different issues impacting on organisational based practitioners and consultancies have produced some interesting results. Table 2 provides a summary of the practitioners interviewed from the context of practice. The ‘Mixed’ practitioners had worked in both an organisational environment and in a consultancy environment.

Table 2: Practitioner context of practice

<table>
<thead>
<tr>
<th>Context of Practice</th>
<th>Number of practitioners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usability Consultant</td>
<td>8</td>
</tr>
<tr>
<td>Organisation based usability practitioner</td>
<td>7</td>
</tr>
<tr>
<td>Mixed</td>
<td>6</td>
</tr>
</tbody>
</table>

The usability practitioners interviewed had two different roles within the usability area. This was either a usability management role over a usability team (which also involved performing usability activities) or a usability practitioner role (which involved predominantly performing usability activities). Table 3 provides an overview of this distinction in the participants.

Table 3: Practitioner role

<table>
<thead>
<tr>
<th>Role</th>
<th>Number of practitioners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usability Manager</td>
<td>12</td>
</tr>
<tr>
<td>Usability Practitioner</td>
<td>9</td>
</tr>
</tbody>
</table>

The diversity of the various academic backgrounds, in Table 4 and Table 5, not only indicates the multi-disciplinary nature of usability practitioners, but also agrees with the idea that the discipline of usability within educational institutions is in its infancy. Many practitioners commented on wanting to do an academic program that focused on usability, human factors, ergonomics and HCI. One practitioner described it as ‘An amazing diversity of people’. Working with this diversity provides an opportunity for practitioners to enhance their skills. One of the interviewed usability practitioner expressed this, ‘The skillsets that they [usability team] brought along, I was able to work with many different people from PHD backgrounds through people who have been [company workers]’. The literature agrees with these statements of diversity in usability practitioner backgrounds (Gobert et al. 2002).

Table 4: Academic Undergraduate degree

<table>
<thead>
<tr>
<th>Undergraduate Program</th>
<th>Number of practitioners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Science</td>
<td>3</td>
</tr>
<tr>
<td>Psychology</td>
<td>4</td>
</tr>
<tr>
<td>Commerce/Arts</td>
<td>3</td>
</tr>
<tr>
<td>Multimedia/Graphic Design</td>
<td>4</td>
</tr>
<tr>
<td>Industrial/Mechanical Engineering</td>
<td>1</td>
</tr>
<tr>
<td>Information Technology and Information Systems</td>
<td>2</td>
</tr>
<tr>
<td>Economics</td>
<td>1</td>
</tr>
<tr>
<td>Accounting</td>
<td>1</td>
</tr>
<tr>
<td>Others unknown</td>
<td>2</td>
</tr>
</tbody>
</table>
Not all interviewed practitioners had done academic study. Some had started their working careers within an organisation, having been subject matter experts (users), and moved into a usability role through opportunities within the organisation. Some of the practitioners expressed an interest in doing graduate diploma studies within this area, but there was nothing on offer that focuses on this area. The broad age range of the usability practitioners interviewed can be seen in Table 6.

Table 6: Broad Age brackets of practitioners

<table>
<thead>
<tr>
<th>Age Brackets</th>
<th>Number of practitioners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 30</td>
<td>6</td>
</tr>
<tr>
<td>Between 30 and 50</td>
<td>12</td>
</tr>
<tr>
<td>Over 50</td>
<td>3</td>
</tr>
</tbody>
</table>

All the usability practitioners have worked for more than five years in the usability area and all are currently working in Australia. Usability practitioners interviewed were located in Sydney (three), Canberra (two) and mainly Melbourne. The experience of a practitioner, shown in Table 7, has been broken up into those with ten or more years of experience and the other with less than ten years experience.

Table 7: Usability Experience of practitioners

<table>
<thead>
<tr>
<th>Band</th>
<th>Year of Experience bracket</th>
<th>Number of practitioners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Between 5 and 9 years</td>
<td>8</td>
</tr>
<tr>
<td>High</td>
<td>10 years and over</td>
<td>13</td>
</tr>
</tbody>
</table>

4.2 Key themes

Four major themes were highlighted in this research, which include “Collaborative Approach” (C), “Usability Mindset” (M), “Usability Practice” (U) and “Project Constraints” (P). These high level themes were derived from grouping emergent concepts (discussed in section 4.3).

Analysis of these themes has highlighted various relationships between them. Figure 2 shows the major themes and relationships on which this papers analysis is based. The relationship emerged between one or more concepts between themes or within themes. All relationships shown were significantly strong in this theory, both between themes and within themes. The key finding of this framework is the importance of the relationships between the collaborative approach and usability mindset themes.

The relationships “project shared vision” and “prevailing usability mindset” highlighted a very strong correlation between the concepts in the two themes involved in these relationships. This strong relationship is the key outcomes for the research.
4.3 Emergent concepts

There are twenty-seven emergent concepts that makeup the four themes described in the previous section. These concepts highlight various issues or considerations that were highlighted by usability practitioners when describing their involvement in performing usability in a development process.

Table 8: List of twenty seven concept that impact on the usability outcome of an IS project

<table>
<thead>
<tr>
<th>Code</th>
<th>Concept Name</th>
<th>Related and discussed in this paper</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>Establish a shared usability vision using collaboration</td>
<td></td>
</tr>
<tr>
<td>C2</td>
<td>Involvement by all project stakeholders enhances the collaborative approach</td>
<td>Yes</td>
</tr>
<tr>
<td>C3</td>
<td>Crucial involvement by IS project team members</td>
<td>Yes</td>
</tr>
<tr>
<td>C4</td>
<td>Senior organisational stakeholder involvement</td>
<td></td>
</tr>
<tr>
<td>C5</td>
<td>Project stakeholder relationships must be fostered</td>
<td>Yes</td>
</tr>
<tr>
<td>M1</td>
<td>Create and follow the usability requirements</td>
<td></td>
</tr>
<tr>
<td>M2</td>
<td>Nurture usability understanding</td>
<td>Yes</td>
</tr>
<tr>
<td>M3</td>
<td>Making usability real to create a shared vision for project stakeholders</td>
<td>Yes</td>
</tr>
<tr>
<td>M4</td>
<td>Project decisions embrace a usability mindset</td>
<td></td>
</tr>
<tr>
<td>M5</td>
<td>Usability goals promotes a usability mindset</td>
<td>Yes</td>
</tr>
<tr>
<td>M6</td>
<td>Usability maturity requires transformation of the organisational culture</td>
<td>Yes</td>
</tr>
<tr>
<td>M7</td>
<td>Usability activities involvement enhances usability mindset</td>
<td></td>
</tr>
<tr>
<td>P1</td>
<td>Usability activities compliance within a project lifecycle</td>
<td></td>
</tr>
<tr>
<td>P2</td>
<td>Constraints dictate usability activity selection &amp; performance</td>
<td></td>
</tr>
<tr>
<td>P3</td>
<td>Technological constraints</td>
<td></td>
</tr>
<tr>
<td>P4</td>
<td>Allocating resources to usability activities</td>
<td></td>
</tr>
<tr>
<td>P5</td>
<td>Organisational constraints external to project</td>
<td>Yes</td>
</tr>
<tr>
<td>P6</td>
<td>When usability is initiated</td>
<td></td>
</tr>
<tr>
<td>U1</td>
<td>Demonstrate value in engaging usability practitioners</td>
<td></td>
</tr>
<tr>
<td>U2</td>
<td>Measuring usability goals</td>
<td>Yes</td>
</tr>
<tr>
<td>U3</td>
<td>Maintain flexibility with usability practice</td>
<td></td>
</tr>
<tr>
<td>U4</td>
<td>Managing stakeholder involvement</td>
<td></td>
</tr>
<tr>
<td>U5</td>
<td>Evangelising usability to project stakeholders</td>
<td></td>
</tr>
<tr>
<td>U6</td>
<td>Skillset and experience of usability practitioner</td>
<td>Yes</td>
</tr>
<tr>
<td>U7</td>
<td>Validation of usability practice</td>
<td></td>
</tr>
<tr>
<td>U8</td>
<td>Usability team practices</td>
<td>Yes</td>
</tr>
<tr>
<td>U9</td>
<td>Usability education of project stakeholders</td>
<td></td>
</tr>
</tbody>
</table>
This analysis that follows is based on these findings, information on these concepts and themes please refer to the thesis (Bruno 2011) on which it is based. The following sections will provide a description of the emerging concepts that are part of the analysis in Section 5 of this paper.

4.3.1 Crucial involvement by IS project team members

The essence of this concept is that involvement of IS project team members is a crucial activity in relation to improving the usability outcome for a project. It’s by making the usability issues real to them that improves usability credibility and their own understanding of usability for the project. This involvement is preferred to user advocacy by usability practitioners. This involvement also allows usability practitioners to understand the technological constraints. Lack of understanding of these limitations can create pushback or disregard of usability findings by developers. This involvement must be throughout a project lifecycle.

‘The positive of working within an organisation and being a usability person for that organisation, is that you have more access to subject matter experts within the organisation. You have more access to the technologists and the developers, so you have a clear understanding of the limitations.’ #15

4.3.2 Skillset and experience of usability practitioner

The essence of this concept is that gaining an appropriate level of skills and experience improves the usability practitioner’s performance. Experiencing a variety of domains, a mix of technological environment and a range of stakeholders provide usability practitioners a good base to enhance their social skills and know how. This experience also provides a comfort with ambiguity and flexible with performance and understand iteration required when performing usability activities, with due consideration for project constraints. Skills are obtained through education, practice or mentoring by a more experienced usability practitioner. Consultants may be used to satisfy skill or resource shortages in organisational usability team or to provide education.

‘It really also depends on the skill set of the staff involved in the process. We have varying levels of people, the outcomes usually do change, depending on who’s involved in the project.’ #12

‘I think the activities are important, but its knowing and having the right skills set to determine when to use the right activity at the right time.’ #20

4.3.3 Nurture usability understanding

The essence of this concept is that the promotion and improving of usability understanding throughout a project lifecycle is an important role. It’s about understanding the various usability elements that add value to usability for the project and promoting them. These elements may include: what usability is for a project; articulating the usability goals and requirements; choosing the most appropriate usability activities and being flexible in their performance, examination and reflection on the usability findings and their implication for the usability goals. Incorporating various perspectives into the usability requirements may have an impact on the usability understanding, these perspectives may include the project stakeholders, organisational issues and/or project constraints. It is important to nurture this usability understanding to gain usability credibility by project stakeholders and reduce resistance to it.

‘...what we have found is that we have worked with those stakeholders in different ways on different projects so they are all probably at different levels of their understanding and appreciation. So, for some we are still, like, evangelising and for some, they wouldn’t consider doing a project without involving us.’ #05

4.3.4 Involvement by all project stakeholders enhances the collaborative approach

The essence of this concept is that involvement by all project stakeholders provides many benefits to a project that will enhance the usability outcome. Involvement is not one way and not restricted to the primary users. It is for all project stakeholders to be continuously engaged in usability activities, throughout a project lifecycle, in various collaborative approaches. Involvement can be through participation, observation or presentation of usability findings. Involvement is preferred over the usability practitioner being a user advocate. Involvement can provide usability data but can also provide project stakeholder feedback that can enhance the usability mindset for project. Involvement provides an opportunity to improve the acceptance of the value of usability
and develop this beyond simple acceptance. Maximising the opportunity of project stakeholder involvement is important for usability credibility.

'We designed it, the concepts and took it to users and went through a collaborative process and refined the concepts and so on and then took it back to the business and again the business analyst in that project was very involved in every activity with me but we took it back to the business to talk about here is the design and so on but as we done this stuff and in fact you know the good enlightened client.' #08

4.3.5 Project stakeholder relationships must be fostered

The essence of this concept is that the development and fostering of good relationships between the various project stakeholders is the basis for improving involvement in usability activities. The fostering of good relationships promotes feedback, communication, usability value and acceptance of usability. This is done through presentation of usability findings, establishing a living usability document containing the usability mindset and evidence of the usability issues. Senior project sponsors help lubricate the relationships with project stakeholders and enables continuous involvement through a project lifecycle.

'We had a good engagement on the client side, we worked with them very closely, because we had worked into bigger and bigger bits of work until we had got this. We just, really really, set up that relationship well that time, they were in a different space, they were very willing to learn.' #17

4.3.6 Making usability real to create a shared vision for project stakeholders

The essence of this concept is that making usability issues real to project stakeholders can have a significant impact on the creation of a shared usability vision for the project. Usability practitioners can use this real evidence and present it in discussion to aid in usability decisions. Project stakeholders can participate or observe usability activities in order to allow a project-shared vision to be established. A usability document should be used to maintain the evidence obtained during the project as a usability memory for project stakeholders not involved, or engaged later in the project lifecycle, to attain the shared usability vision. Establishing and fostering project stakeholder relationships is a key way of gaining involvement that can aid in making usability real to them. A usability champion is needed to help make usability real to the other project stakeholders, especially when a usability practitioner is not present throughout the project lifecycle.

'I think that form of usability testing and allowing people to observe it really sells itself. Because people, they can see when people – it’s one thing to just say “look I’m a professional and this is something I think people are going to have trouble with” and people might go “oh yeah, whatever”. But when they actually see people really, really struggling or really frustrated, where you can see it in their face and their vocal mannerisms coming out – it’s just that kind of, “oh my goodness”.' #14

4.3.7 Usability goals promote a usability mindset

The essence of this concept is the articulation of usability goals as a part of the usability requirements provides the heart of the usability mindset for project. These usability goals need to be done early in a project lifecycle. The usability goals need to consider the various project elements, such as the various stakeholders groups, project constraints and project lifecycle. The usability goals will often be found to conflict and require balancing or prioritising. Involvement by project stakeholders will aid in the elicitation and understanding of the usability goals and their concordance. A defined set of usability goals provides the basis for a project’s usability mindset.

'Well, and see that’s the thing I am quite strong on here now in my role, is this stuff all the goals, principles and relationship stuff. And it is important for two reasons: one is because it guides your practice and what your focus is and that kind of stuff, good stuff; and the second is that if you have got this kind of stuff going on and you act on it and say and you articulate it to your stakeholders, then you are more likely to be perceived as rational and therefore credible.' #08
4.3.8 Usability maturity requires transformation of the organisational culture

The essence of this concept is that organisational usability maturity requires transformation of the culture within an organisation. It requires the usability mindset to go beyond the value of usability, the selection of appropriate usability activity and beyond the shared project usability vision. An organisation with an internal usability team has a better opportunity to attain an organisational usability mindset. Usability consultants have the opportunity to improve the usability maturity in relation to acceptance of usability value to a project and the selection and performance of usability activities. They find it much harder to change the organisational culture to take on a usability mindset. Because an organisation does not embrace change quickly, a cultural shift needs to be done bit by bit.

‘We have educated clients who will come to us and say we need a Heuristic evaluation done on a design. That’s great and those clients are great. And sometimes other clients have not got a clue, and are very new to the concept of usability and we need to do a lot of hand holding and coaching along the way.’ #10

4.3.9 Organisational constraints external to project

The essence of this concept is that various organisational goals and constraints may have significant impact on the primary usability goals of a project. Organisational constraints that contribute or impact on usability goals may include political issues, rigid organisational processes, upselling requirements, outsourcing usability activities, ambitious usability requirements, loss of key stakeholders, and vendor resistance to requested changes. Usability practitioners need to be sensitive to these organisational aspects, incorporating them into the usability mindset. It’s through involvement that these organisational aspects can be elicited and that any conflicts can be highlighted to project stakeholders for resolution or usability practitioner for concordance. A usability champion is needed from each of the project stakeholder groups to champion their perspective (e.g. organisational, primary user, technological constraints). This conflict between usability goals can occur anytime during a project lifecycle, but mainly at the start if most goals and constraints are elicited at that time, therefore a usability mindset is needed to concord them.

‘Awful lot of legislation around what you should and shouldn’t, can and can’t, and must do, that you need to know.’ #01

4.3.10 Measuring usability goals

The essence of this concept is that measurement of usability goals improves usability credibility and usability understanding for project stakeholders. The measuring of usability goals is done to gauge how well the project has stacked up against them. Measuring often produces qualitative data that, for organisations and project stakeholders with low maturity, can be seen as discretionary. In these cases, quantitative measures provide hard facts that enable gaining usability credibility and support of usability findings that leads to ratification of requested changes. The usability goals provide the core elements to the usability mindset for a project usually represent four to six usability goals, measured throughout a project lifecycle.

‘If you check our website about the results we have achieved, our case studies, results, there about thirty items which are 500% numbers. I want numbers, if I don’t get the numbers, if I don’t do it like this I won’t get the numbers. To prove it, you gotta prove it, because people think this stuff is discretionary.’ #16

4.3.11 Usability team practices

The essence of this concept is that performance of usability in a team improves the productivity of usability outcomes. The best group size being two usability practitioners or a usability practitioner and another IS project team member. Usability teams of two allows for mentoring of novice usability practitioners. A usability team can bounce ideas around and discuss usability findings, while an individual practitioner must rely on reflection and self-evaluation, time permitting. Usability teams may need to establish credibility within an organisation with low usability maturity or rigid project lifecycles. Allocation of usability team resources needs to be done carefully by usability managers.

‘From my experience, it works much better when two of you are working. You work much faster and you also, you are much more creative when you work with somebody.’ #13
5. Analysis

This analysis looked at comparing what was said by practitioners in various roles across the 27 usability concepts outlined in findings. The findings also describe in more details the concepts that form the basis of the analysis presented in this section. This will help understand, based on the role, what is more important or possible for a usability practitioner to focus on during their engagement in IS projects.

The practitioner roles highlighted by this research include:

- Organisational based usability practitioners
- Usability Consultants
- Usability Managers
- Usability Practitioners

This research examines a number of comparisons to highlight key differences among the concepts based on the usability practitioners role, which will be discussed in the following sections.

5.1 Usability manager vs usability practitioner

When examining the interview data, each usability practitioner was coded as either a usability manager or a usability practitioner. The usability managers (twelve practitioners) were those who headed a team of usability practitioners, and whose role included managing and allocating usability resources to projects. The managers also, if in a consultancy company, may be looking for the next usability engagement, which requires usability selling. The usability practitioners (nine practitioners) were those who did not have usability manager responsibilities, and were focused on the performance of usability activities in projects, either as a usability consultant or an organisationally based usability practitioner.

Table 9: Usability manager vs usability practitioner, percentage of interviewees that discussed concept

<table>
<thead>
<tr>
<th>Concepts</th>
<th>Manager</th>
<th>Practitioner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crucial involvement by IS project team members</td>
<td>100%</td>
<td>55.6%</td>
</tr>
<tr>
<td>Skillset and experience of usability practitioner</td>
<td>75%</td>
<td>44.4%</td>
</tr>
</tbody>
</table>

There are two concepts that had significant (more than 30%) difference in the number of usability managers and usability practitioners that refers to it, as shown in Table 9. Both usability managers and usability practitioners discussed the importance of involving the IS project team members in the concept “Crucial involvement by IS project team members”. All twelve usability managers discussed the importance having the IS project team involved and understanding the usability value. It was predominantly discussed in the typical day (4 usability managers), good story (6 usability managers and 3 usability practitioner) and bad story (5 usability managers and 1 usability practitioner) during the interviews.

In the bad stories, the IS members involvement was low, usability ownership was questioned, vendors were part of the project and resisted involvement, understanding of the usability value was low and technological constraints were not understood. This was identified and discussed predominantly by the usability managers. In the good stories, IS project team members were involved, through observation of usability activities, or sharing the usability journey with usability practitioners, or being skilled up as usability practitioners by mentoring to be groomed as usability champions for project. Both usability managers and practitioners discussed this.

The concept “Skillset and experience of usability practitioner” describes the skills and experience required to achieve good usability activity outcomes. The usability managers, with their role as allocating usability resource, saw this as a crucial consideration when resourcing usability for a project. Being able to provide usability practitioners with appropriate skills and experience to provide usability value to a project given the project constraints. This concept was part of an internal relationship in the usability practice theme, which related to the concept about working in usability teams. The usability manager’s focus on these two concepts is clearly important, skills, experience and working in teams are key determinants used to help allocate usability resources to projects.
In summary, the usability managers see the importance of usability practitioners having a good skillset and experience base when engaged to perform usability in a project. Where needed, usability mentoring is a great way to improve usability practitioner skills. Usability managers are also more aware of problems with involvement, especially the need to get involvement from the IS project team members, to bring the technological issues (constraints) into consideration. The examination of the other concepts found little different between number of managers and practitioners that discussed them.

5.2 Usability consultant vs. organisational based practitioners

The comparison of usability consultants (eight practitioners) and organisational-based practitioners (seven practitioners), presents an interesting set of differences that may impact the usability outcome. There are six usability practitioners that had been in both roles, which for purposes of highlighting the concepts that have a significant difference (more than 30% of practitioners) have been ignored in this initial analysis, see Table 10.

Table 10: Usability consultants and organisational usability practitioners, percentage of interviewees that discussed a concept

<table>
<thead>
<tr>
<th>Concepts</th>
<th>Consultant</th>
<th>Organisational</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usability activities compliance within a project lifecycle</td>
<td>75%</td>
<td>42.9%</td>
</tr>
<tr>
<td>Constraints dictate usability activity selection &amp; performance</td>
<td>100%</td>
<td>57%</td>
</tr>
<tr>
<td>Technological constraints</td>
<td>50%</td>
<td>14.3%</td>
</tr>
<tr>
<td>Allocating resources to usability activities</td>
<td>100%</td>
<td>57.1%</td>
</tr>
<tr>
<td>Nurture usability understanding</td>
<td>62.5%</td>
<td>100%</td>
</tr>
<tr>
<td>Usability education of project stakeholders</td>
<td>37.5%</td>
<td>85.7%</td>
</tr>
<tr>
<td>Maintain flexibility with usability practice</td>
<td>75%</td>
<td>42.9%</td>
</tr>
<tr>
<td>Validation of Usability practice</td>
<td>50%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Organisational-based usability practitioners did not discuss working within the organisation process as being problematic, because they are working within the same organisation structure and have a clear understanding of what is possible. The selection and performance of usability activities, and being flexible with performance of usability was not a highly discussed concept. The technological constraints are less of an issue, because working within the organisation they can have conversations and discussion to gain an understanding of what is possible with the appropriate IS project team stakeholders. The time and budget for a project can be discussed at the inception of a project when involved from the start where within an organisation is more likely. The nurturing of usability understanding and performing usability education can be done, when involved in the organisation because the usability practitioner is available from day-to-day to have conversations with the various project stakeholders. Working within the organisations provides an opportunity to take the usability mindset beyond the project to the organisation’s culture, to improve the usability maturity. Validation of usability findings by external usability consultants and limitations encountered by usability consultants were not discussed.

The usability consultants find themselves engaged into the project lifecycle at the specific points where their expertise is needed, which assumes a high level of usability maturity in the organisation and the project stakeholders. Project constraints have a huge bearing on what can be selected and performed as usability activities for project. Technological constraints have a larger impact due to the time and access needed to foster relationships with IS project team members. The time given and budget allocated also provide limitations on what can be done because often they are not engaged at the start of a project to have an impact on the project plan. The usability education of stakeholders is limited by their short-term engagements. The generation of usability documents is the main deliverable for their engagements, they are not judged on the overall usability outcome for a project. Due to the project constraints they find it difficult to be flexible with the performance of usability activities so they can maximise the usability findings generated. Often usability consultants will be asked to validate usability findings generated by internal organisation usability practitioners. They are more likely to encounter limitations that are out of their realm of control, in relation to the access to stakeholders (involvement), organisations usability maturity and organisational constraints (like legal issues or politics).
This discussion shows that these concepts can vary significantly in relation to the performance of usability activities by a usability consultant or an organisationally based practitioner. The main differences include the following topics:

- Level of access to project stakeholders
- Time when usability is initiated in a project
- Involvement in project plan at start of project
- Opportunity to change the usability mindset for project or organisation (beyond usability activities and beyond project)
- Traction with mitigating project constraints
- Selection and performance of usability activities

There are other differences between these two types of usability practitioners. For example, 100% of the usability consultants found the time and cost constraint concept along with the constraints dictating the selection and performance of usability as important concepts for consideration when engaged in a project to perform usability, where just over 50% of organisationally based usability practitioner said this. On the other hand, 100% of organisation-based usability practitioners discussed the opportunities to help nurture usability understanding to project stakeholders, where just 60% of usability consultants discussed this as important. The type of engagement a usability practitioner has with the project, as a consultant or an organisational-based practitioner, does present various constraints and relationship limitations in the performance of usability activities. The examination of the other concepts found little different between number of organisation-based and consultants that discussed them.

This section would suggest, based on the discussions, that organisation-based usability practitioners have a better opportunity to have a beneficial impact the project’s usability outcome. Usability consultants are reliant on the usability maturity of the organisation, without it they’re impact on the project’s usability outcome can be significantly stifled by the various concepts discussed in this section.

The usability practitioners (mixed) that had been both organisation-based and consultant practitioners discussed most of the concepts discussed by both organisation-based and usability consultants. There was no value in looking at differences between mixed and organisation-based or mixed and usability consultants. It does not provide any significant differences.

5.3 Success and failure concepts

This section will examine the success and failure orientated concepts in relation to the usability practitioner roles. Table 11 shows the six top concepts which were discussed during a good story provided by usability practitioners interviewed.

Table 12 provides the top six concepts that had an impact on the usability income during the bad story discussed. This section will compare these against the roles of the practitioner.

Table 11: Success factors drawn from key concepts emergent from good story discussion

<table>
<thead>
<tr>
<th>Success Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Involvement by all project stakeholders enhances the collaborative approach</td>
</tr>
<tr>
<td>Project stakeholder relationships must be fostered</td>
</tr>
<tr>
<td>Making usability real to create a shared vision for project stakeholders</td>
</tr>
<tr>
<td>Usability goals promote a usability mindset</td>
</tr>
<tr>
<td>Crucial involvement by IS project team members</td>
</tr>
<tr>
<td>Nurture usability understanding</td>
</tr>
</tbody>
</table>
Table 12: Failure factors drawn from key concepts emergent from bad story discussion

<table>
<thead>
<tr>
<th>Failure Factors</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Involvement by all project stakeholders enhances the collaborative approach</td>
<td></td>
</tr>
<tr>
<td>Organisational constraints external to project</td>
<td></td>
</tr>
<tr>
<td>Usability goals promote a usability mindset</td>
<td></td>
</tr>
<tr>
<td>Technological constraints</td>
<td></td>
</tr>
<tr>
<td>Create and follow the usability requirements</td>
<td></td>
</tr>
<tr>
<td>Project stakeholder relationships must be fostered</td>
<td></td>
</tr>
</tbody>
</table>

When examining the top concepts for organisational-based usability practitioners in comparison to the usability consultants, there are some interesting differences. Table 13 shows the four concepts that were common to both types of usability practitioners. These concepts are the major concepts that also appeared in the success and failure concepts (tables above, i.e. Table 11 and Table 12), except “Organisational constraints external to project” which only appeared in detrimental key concept list. Both organisational-based and consultants agree on the importance of fostering good relationships with project stakeholders, to enable good collaboration and involvement in project activities. This enables usability goals to be promoted and a usability mindset to be created. Collaboration also enables the elicitation and understanding of organisational constraints external to the project.

Table 13: Success and failure common key concepts for organisational-based vs usability consultants

<table>
<thead>
<tr>
<th>Concept</th>
<th>Organi-</th>
<th>Consultant</th>
<th>Success</th>
<th>Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usability goals promotes a usability mindset</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Involvement by all project stakeholders enhances the collaborative approach</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Organisational constraints external to project</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project stakeholder relationships must be fostered</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

The interesting concepts are those that are different between organisational-based usability practitioners and usability consultants (see Table 14). These differences seem to suggest that usability consultants look to make usability issues real to project stakeholders. In order to gain credibility with project stakeholders they look to eliciting and measure usability goals and provide more quantitative measures with their deliverables. Their skillset has been applied to multi-domains and experience across a broader range of domains and stakeholders that enable a more flexible approach to performing usability in a project lifecycle that can maximise usability findings potential.

Table 14: Differences in top concepts for organisational-base vs usability consultants

<table>
<thead>
<tr>
<th>Usability Consultants</th>
<th>Organisational-based usability practitioner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Making usability real to create a shared vision for project stakeholders</td>
<td>Usability team practices</td>
</tr>
<tr>
<td>Measuring usability goals</td>
<td>Nurture usability understanding</td>
</tr>
<tr>
<td>Skillset and experience of usability practitioner</td>
<td>Usability maturity requires transformation of the organisational culture</td>
</tr>
</tbody>
</table>

Organisational-based usability practitioners look to nurture usability understanding of project stakeholders. They look to create a usability mindset by improving the usability maturity of project stakeholder and the organisation. They also look to work in usability teams, of at least two people, to improve usability findings, and to allow for enough resources to perform usability activities and maximise their outcomes. The usability team approach allows for improved mentoring and education of project stakeholders to aide in the transformation of organisational usability culture and maturity.

The reasons for the different concepts would be based on the following: the length of an engagement, when engaged in project lifecycle, time given and monies allocated to usability. Usability consultants would be engaged for a specific set of activities, more often than not, at a particular point in the project lifecycle, which highlights the need for making usability issues real to project stakeholder and eliciting quantitative usability measures for deliverables. Organisational-based practitioners can potentially be involved from start of the project (till the end). This allows them from within the organisation to have the conversations that can nurture
usability understanding and develop a usability mindset for the project. The six usability practitioners interviewed that had been both an organisationally based practitioners and usability consultant also discussed the same four concepts in common with success and failure concept lists (shown in Table 13). In addition, they all described the importance of trying to transform the organisations usability culture and maturity that was discussed by organisationally based practitioners. They also discussed the important of involving IS project team members in usability activities like it was mentioned in the success concept list (Table 11).

Table 15: Key concepts discussed by interviewees that were both organisational-based and consultants (mixed)

<table>
<thead>
<tr>
<th>Mixed usability consultant key concepts</th>
<th>Mixed</th>
<th>Organisational</th>
<th>Consultant</th>
<th>Success</th>
<th>Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usability goals promotes a usability mindset</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Project stakeholder relationships must be fostered</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Organisational constraints external to project</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Usability maturity requires transformation of the organisational culture</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crucial involvement by IT project team members</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>Involvement by all project stakeholders enhances the collaborative approach</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

These mixed usability practitioners, corroborated core concepts that are of importance to the success and failure list of key concepts lists (i.e. Table 11 and Table 12). These also provided the key elements of the organisational-based versus consultant key concept list. This in essence reinforces the importance of involvement with usability by all project stakeholders, especially IS project-team members. It promotes the importance of developing and fostering project stakeholder relationships for a project to enabled the promotion of usability goals and an overall usability mindset for a project, where conflicting goals have been concorded in consultation with project stakeholders. The mixed usability practitioner’s list of concepts was associated more closely with the organisational-based practitioners and the success outcome list of concepts.

6. Conclusion

This analysis presents the impact on usability outcomes through the lens of a usability practitioner’s role within a project, i.e. organisational based or consultant engagement, usability manager or usability practitioner. This highlights the potential difference of practice in these roles, but also highlights what concepts become more prominent and/or important. This ultimately can be used, based on the type of engagement with a project a usability practitioner has, as a list of concepts that can guide practice and lead to an improved usability outcome. The various tables presented (in Section 5) provide this guide to help understand the impact on the usability outcome based on the perspective/role played by usability practitioners in an IS project. In summary, I propose the adherence to the following table, based on role performed in the IS project.

Table 16: Summary of Concepts as they relate to the usability practitioner roles

<table>
<thead>
<tr>
<th>Key Concept for usability practitioners (All usability practitioners)</th>
<th>Organisational-based usability practitioner</th>
<th>Mixed Usability Practitioner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Involvement by all project stakeholders enhances the collaborative approach</td>
<td>Project stakeholder relationships must be fostered</td>
<td>Organisational constraints external to project</td>
</tr>
<tr>
<td>Usability goals promotes a usability mindset</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usability Consultants</td>
<td>Organisational-based usability practitioner</td>
<td>Mixed Usability Practitioner</td>
</tr>
<tr>
<td>Making usability real to create a shared vision for project stakeholders</td>
<td>Usability team practices</td>
<td>Crucial involvement by IT project team members***</td>
</tr>
<tr>
<td>Measuring usability goals</td>
<td>Nurture usability understanding</td>
<td></td>
</tr>
<tr>
<td>Skillset and experience of usability Practitioner***</td>
<td>Usability maturity requires transformation of the organisational culture</td>
<td></td>
</tr>
<tr>
<td>***Usability Manager</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
References


Wilson, C. E. (2007). “Please listen to me!: or, how can usability practitioners be more persuasive?” interactions 14(2): 44-45 & 55.
The Role and Requisite Competencies of the Public Sector CIO: a Two-sided Perspective

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Abstract: A considerable body of research exists on the role, and desired capabilities and competencies of the CIO. However, most of these studies have been executed in large, private sector organizations. It seems that the challenges faced by public sector CIOs are often very different to those in the private sector, and this might place different requirements on them in terms of knowledge and competence, as well as the roles they fulfil. To date, there has been little exploration into such requirements in public entities. To address this gap, exploratory research was conducted into the role and competency expectations of CIOs in the public sector, and into the impact of the public sector context. A dyadic approach, involving both CIOs and their business colleagues, was adopted in order to gain more meaningful insights. Semi-structured interviews were conducted with both the CIO and the head of their main internal “business” partner of 17 local government organizations. The findings indicate that the CIOs and their business partners differ significantly in their views of required competencies. The business partners require a business knowledge and focus similar to theirs, and most manifest scant regard for the technical expertise necessary or the technical requirements of the organization. IT is there to support them. The government environment often places more onerous constraints on CIOs than in the private sector, especially so in terms of reporting level; the ability to influence strategy; decision making flexibility; and resourcing. The findings from this research extend the application of the RBV and also provide greater understanding of the competencies and roles of the CIO. It also provides insights for recruiters of public service IT professionals and CIOs, human resources managers, as well as for providers of training programmes.

Keywords: CIO, competency, knowledge, role, public sector, dyadic approach

1. Introduction

The role of the CIO has been the focus of research for a number of years. Basselier at al. (2004) were among those who explored the requisite capabilities and competencies of the CIO. They identified both the types of knowledge and experience that was desired. However, their research, like many others on the role and competencies of the CIO, was conducted in large private sector organizations.

The public sector in most countries is a sizeable employer, providing a large number of diverse business activities and a wide range of services to their community. Many factors such a legislation, politics, and resourcing, place very different demands on public sector CIOs to those in the private sector. There might thus be differences in terms of the roles they fulfil and the requisite knowledge and competence. To date, there has been little exploration into such requirements. To address this gap, exploratory research was conducted into the role and competency expectations of CIOs in the New Zealand government context, and into the impact of that context. A dyadic approach, involving both CIOs and their business colleagues, was adopted in order to gain more meaningful insights. The following sections report on the underpinning literature, the data collection, the findings, discussion and conclusions of the research.

2. Literature review

The competencies required for the CIO to realise their position as a strategic partner with the business has been of particular interest to researchers (Basselier & Benbasat, 2004; Broadbent & Kitzis, 2005; Lane & Koronos, 2007; Wu et al., 2008). In general this research has been based on the CIO position in large private sector (and often US-based) firms. Limited research has been undertaken in small organizations where the CIO often has to continue to manage the operational aspects of the technology as well as providing strategic advice to their business partners (Duhan, 2007). There has also been limited research that is specifically focused on the role of CIOs in the government sector.

The role of the CIO has undergone considerable change – from data processing manager in the 1970’s (Lane & Koronos, 2007) to senior executive responsible for aligning ICT with business goals (Broadbent & Kitzis, 2005). To a large extent, the role of the CIO is a reflection of the role that IS is expected to fulfil. IT/IS functions can be
divided into two key areas: those concerned with maintaining a stable and robust service (i.e. “keeping the lights on”) and those concerned with delivering business changes (i.e. “adding value”) (Gottschalk, 2000; 2007)

The CIO role thus moves between technologist, strategist and leader – very much like a chameleon (Remenyi et al., 2005), or as Chung and Mooney (2009) saw it, from functional head, to strategic partner, to business visionary, and then a possible split between innovation leader and IT leader.

The resource-based view (RBV) of an organization provides a basis for identifying and describing competencies required to support organizational roles (Bharadwaj, 2000; Garavan & McGuire, 2001). The RBV maintains that organizations achieve and sustain competitive advantage through the acquisition and deployment of resources (Peppard & Ward, 2004). Capabilities refer to a firm’s ability to assemble, integrate and deploy resources, usually in combination (Bharadwaj, 2000) thereby transforming inputs into outputs of greater worth. Capabilities subsume competencies (Bharadwaj, 2000).

Using the RBV, Feeny and Willcocks (1998) identified a set of nine core IS capabilities to support the organization’s ability to successfully exploit IT: leadership, relationship building, contract facilitation, informed buying, making technology work, architecture planning, business systems thinking, vendor development, and contract monitoring. Leadership and informed buying are regarded as “lynch-pin” capabilities, (Feeny et al., 2006). Each of these capabilities requires business, technical and interpersonal skills to a greater or lesser extent. Broadbent and Kitzi’s (2005) identified five critical roles with matching competencies through which CIO leadership is achieved: providing an IS vision; IT governance; integration of the IT and business strategies; IS/IT staff management; and vendor management, while Gottschalk (2000) identified nine leadership roles of CIOs: three managerial and six consultancy roles. However, he did not define the relevant competencies. Peppard and Ward (2004) identified three macro competencies (business knowledge, skills and experience, technical knowledge, skills and experience, and behaviour and attitude) which comprise an overall IS capability for the organization. Basselier and Benbasat (2004) identified the CIO’s organization-specific competence and interpersonal management as contributing to business competence, and Preston et al (2008) defined four IT profiles which they matched to IT contribution to the organization, as did Weill and Woermer (2013), although they identified slightly different profiles.

In summary, models such as Feeny and Willcocks’ (1998) IS Capabilities and Peppard and Ward (2004) show the link between the organizational IS capability and the individual skills and knowledge of the CIO, while others, such as Basselier and Benbasat (2004) and Wu et al. (2008) focus on defining the components that comprise business and technology competency. This has allowed a set of components for each broad competency area to be identified (see Table 1).

Only a few researchers, such as Lawry et al. (2007) and Curran (2006) have explored the role of the CIO in the public sector, where indications are that although the CIO is expected to play a significant strategic role, the range of technology management is far broader than in the private sector and the shift will be more towards government processes, people and business efficiencies. However, much is still unknown and Lawry et al. (2007) have pointed out that the public sector has lagged behind the private sector in identifying the need for someone to take on the role of a CIO, and indeed of their requisite competencies. Given the changing role of the CIO (Smith & McKeen, 2010), greater emphasis has been laid on the innovation aspect of their responsibilities (Chung & Mooney, 2009), and this has been identified as being particularly necessary in the public sector (Irani & Ellman, 2008).

In addition, drawing on the alignment literature (Chan & Reich, 2007), there might be differing perceptions between the CIOs and their business partners of the requirements of the CIO. Given that the “business” is the customer of the CIO (IT/IS) it is important that the differences in perceptions are reconciled in order for the CIO to have greatest effect. In order to address that gap, this research’s objectives, within the public sector context, were to:

- Identify the key roles performed by CIOs and the individual knowledge, skills and competences required to support them
- Ascertain the extent to which CIOs and their business partners’ perceptions of these roles and competences differ
- Determine how the public sector context impacts on these roles
Table 1: Business and technical competency expected of CIOs: indications from the literature

<table>
<thead>
<tr>
<th>Business competence</th>
<th>Management and leadership competency</th>
<th>Behavioural skills and attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business domain knowledge</td>
<td>Strategic perspective (Emiliani, 2003)</td>
<td>Interpersonal communication (Basselier &amp; Benbasat, 2004)</td>
</tr>
<tr>
<td>Basselier &amp; Benbasat, 2004</td>
<td>(Broadbent &amp; Kitzis, 2005)</td>
<td></td>
</tr>
<tr>
<td>External environment</td>
<td>Leadership (Kotter, 1990)</td>
<td>Relationship building (Broadbent &amp; Kitzis, 2005)</td>
</tr>
<tr>
<td>(Broadbent &amp; Kitzis, 2005, p. 38)</td>
<td>(Broadbent &amp; Kitzis, 2005)</td>
<td></td>
</tr>
<tr>
<td>Organizational units</td>
<td>Human resource management (Lane &amp; Koronos, 2007)</td>
<td>People skills (Kotter, 1990)</td>
</tr>
<tr>
<td>Basselier &amp; Benbasat, 2004</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizational responsibility</td>
<td>Budgetary &amp; financial management (Lane &amp; Koronos, 2007)</td>
<td>Problem solving and creative thinking (Broadbent &amp; Kitzis, 2005)</td>
</tr>
<tr>
<td>Basselier &amp; Benbasat, 2004</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT/Business integration</td>
<td>Business planning (Broadbent &amp; Kitzis, 2005)</td>
<td>Team work (Broadbent &amp; Kitzis, 2005)</td>
</tr>
<tr>
<td>(Broadbent &amp; Kitzis, 2005)</td>
<td>(Broadbent &amp; Kitzis, 2005)</td>
<td></td>
</tr>
<tr>
<td>High-level business knowledge</td>
<td>Change Management (Broadbent &amp; Kitzis, 2005)</td>
<td>Openness/adaptability (Broadbent &amp; Kitzis, 2005)</td>
</tr>
<tr>
<td>(Broadbent &amp; Kitzis, 2005)</td>
<td>(Wu et al., 2008)</td>
<td></td>
</tr>
<tr>
<td>Knowledge networking</td>
<td>Results focus (Broadbent &amp; Kitzis, 2005)</td>
<td></td>
</tr>
<tr>
<td>Basselier &amp; Benbasat, 2004</td>
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</table>

<table>
<thead>
<tr>
<th>Technical competence</th>
<th>IT industry knowledge</th>
<th>IT management expertise</th>
<th>IT technical expertise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broad industry concepts</td>
<td>IS strategic planning (Broadbent &amp; Kitzis, 2005)</td>
<td>IS Risk and Security management (Lane &amp; Koronos, 2007)</td>
<td></td>
</tr>
<tr>
<td>Basselier &amp; Benbasat, 2004</td>
<td>IS processes and procedures (Lane &amp; Koronos, 2007)</td>
<td>IS project management (Lane &amp; Koronos, 2007)</td>
<td></td>
</tr>
<tr>
<td>Technologies</td>
<td>(Broadbent &amp; Kitzis, 2005)</td>
<td>(Lane &amp; Koronos, 2007)</td>
<td></td>
</tr>
<tr>
<td>(Basselier et al., 2001)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT solutions</td>
<td>IS Governance and regulatory compliance (Lane &amp; Koronos, 2007)</td>
<td>IS asset management (Basselier &amp; Benbasat, 2004)</td>
<td></td>
</tr>
<tr>
<td>Architectures</td>
<td>Vendor and Supplier Management (Feeny &amp; Willcocks, 1998)</td>
<td>Application development and support (Basselier &amp; Benbasat, 2004)</td>
<td></td>
</tr>
<tr>
<td>(Broadbent &amp; Kitzis, 2005)</td>
<td>(Lane &amp; Koronos, 2007)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access to IT knowledge</td>
<td>IT contract development and negotiation (Peppard &amp; Ward, 2004)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basselier &amp; Benbasat, 2004</td>
<td>IS Service delivery management</td>
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3. Data collection and analysis

Because the research was exploratory, a qualitative research method was chosen (Klein & Myers, 1999). The sample consisted of 17 New Zealand public sector organizations. Local governments, of which there are 73, were selected because they represent the largest body of public sector organizations in New Zealand. They vary in size and potential participant organizations were selected based on their size, so as to ensure a good range of in the sample. The participating organizations were also chosen based on convenience, especially geographic proximity to the capital where the researchers were based. Each CIO was initially invited to participate and if agreeable, then to nominate a “business partner” with whose area of responsibility it had
significant dealings. Only three CIOs declined to take part – mainly for temporary organizational pressure reasons.

Semi-structured interviews were conducted with both the CIO and the head of their main internal “business” partner. The interviews were recorded and transcribed. The responses were then analysed, coded and categorized according to themes and sub-themes (Cresswell, 2003; Douglas, 2003). Apart from recording the organizational demographic data, the initial categorization followed the general structure of the interviews which was according to CIO experience and knowledge (competence); organizational knowledge; and IT-business integration. The findings are reported in the following sections.

4. Findings

As part of its responsibilities under the Local Government Act (2002), each local government produces a long-term council community plan (LTCCP) that sets out activities planned for the next 10 years. Many councils do not have a separate organization-level strategy and the LTCCP forms the basis for their annual plans and budgets.

The respondents represented a range of different sized local governments, from small (<250) to large (>1250). The number of IT/IS staff varied more or less proportionately from <10 to nearly 90. The local governments cover a wide area of responsibilities – up to 50 maximum. The range of functions undertaken by the IT/IS units include business change functions (project management; business analysis; business consultancy) and operational functions (infrastructure support; telephony; applications support; GIS; web; records management). These functions are distributed in a number of different ways, and in some organizations the IT/IS function was split under two managers.

The environment is highly regulated, with activities being defined by central government through legislation and regulations. Budgets are limited and consequently, so are resources. The local councils’ customers are also their shareholders and expenditure, indeed all council activity, is open to public scrutiny. The local governments are thus very risk averse, despite the presence of political agendas. However, the environment is not competitive in the same way as the private sector.

The areas in which the interviewees felt it was important for local government CIOs to have knowledge, skills and experience, fell into three categories: IT competence, business competence; and organizational knowledge. They also identified a number of areas where CIOs can provide added value to the organization, and how they can best deliver on their services and advice.

4.1 IT competence

In terms of IT competence, all interviewees thought that IT experience was essential but while the CIOs thought that hands-on experience was most useful, the business partners thought it was definitely not a requisite. This division was particularly evident in large organizations, whereas in the smaller and medium-sized councils, often the CIO had to turn his/her hand to resolving more hands-on issues. Reasons offered in support of the need for technical experience generally included:

- The ability to engage with technical staff and vendors
- Ability to see through vendor hype
- Understanding the technical issues and stresses of the support staff
- Understanding how the technology “hangs together”.

However, while recognizing the importance of IT experience, one CIO of a large council cautioned:

“It can be detrimental if they have a technology background such that they want to get involved in “hands on” activities, for example trying to fix server problems”

To complement the IT experience, the requisite technical knowledge and skills mentioned are depicted in the table below.
Both groups of interviewees stressed the importance of a broad range of IT industry knowledge. This includes both technology and wider information management knowledge, and reflects the variety of activities the IS function is expected to perform. It also reflects the need to be able to embrace more recent developments in the industry.

While the requisite IT industry knowledge and skills refer more to leadership roles the CIOS are expected to perform, the IT management skills refer more to the delivery aspect of the role. The CIOS emphasized the ability of CIOS to have skills in both strategic planning and in operations management so as to understand the whole range of the function’s activities, but the business partners’ main focus was on consultancy and the provision of advice and guidance.

Technical skills, and the variety of them, were understandably much more frequently mentioned by the CIOS than their business partners. In particular, the CIOS emphasized project management experience and knowledge, but also noted the importance of business analysis skills. Also knowledge of Web/internet was noted as important as it was considered a key enabler of the business.

“Web and internet experience (and a knowledge of the key concepts) as business is increasingly done over the web” – CIO medium council.

4.2 Business competence

In terms of business competence, while most CIOS felt that local government experience was useful, the business partners were of the opinion that it was not important. In particular, the CIOS felt it helped in understanding both the diversity of the environment and the constraints. Some of interviewees felt that experience in central government was useful as it provided a background in terms of the decision making structures and gave the CIO some exposure to working in a political environment.

Particular issues CIos need to become aware of within local government that were mentioned included:

- How external factors (e.g. the economic downturn) affect the operating environment
- Diversity and demands of the environment
- The business drivers for council as a whole and the different areas
- Funding structures and their allocation - there is a complexity in how councils earn their revenue
- The language and culture of the council

Some interviewees felt that private sector experience could add value, as exposure to a commercial environment could bring a fresh approach. However, both groups thought that it was important to learn about the organizational culture and environment.

The requisite business knowledge and skills noted are presented in the table below.

<table>
<thead>
<tr>
<th>IT industry Knowledge area</th>
<th>IT Management Skills</th>
<th>Technical Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broad range of industry knowledge</td>
<td>Change Management</td>
<td>Web/Internet</td>
</tr>
<tr>
<td>Currency/future direction</td>
<td>Consultancy (advice/guidance)</td>
<td>Network architectures &amp; connectivity</td>
</tr>
<tr>
<td>Strategic focus</td>
<td>Service delivery (focus)</td>
<td>Project Management (experience/knowledge)</td>
</tr>
<tr>
<td>Understanding of architecture</td>
<td>Operations management</td>
<td>Records Management (principles)</td>
</tr>
<tr>
<td></td>
<td>Strategic Planning (IT)</td>
<td>Business analysis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Applications &amp; support</td>
</tr>
</tbody>
</table>
Table 3: Requisite business knowledge and skills

<table>
<thead>
<tr>
<th>Broad business knowledge</th>
<th>General Management Skills</th>
<th>Leadership Skills</th>
<th>Interpersonal Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business perspective or acumen</td>
<td>Managerial skills &amp; experience</td>
<td>Leadership skills</td>
<td>People skills (Emotional Intelligence)</td>
</tr>
<tr>
<td>Customer focus</td>
<td>Staff/people management</td>
<td>Business case in relation to IT (cost-benefit)</td>
<td>General communication skills</td>
</tr>
<tr>
<td>Corporate view &amp; understanding of priorities</td>
<td>Effective Delegation</td>
<td>Ability to negotiate (between contending bus. Interests)</td>
<td>Ability to communicate in a non-technical language</td>
</tr>
<tr>
<td>Financial Management &amp; Budgetary skills</td>
<td>Strategic perspective - big picture focus</td>
<td>Ability to communicate with technical staff/vendors</td>
<td></td>
</tr>
<tr>
<td>Decision making skills</td>
<td>Future vision</td>
<td>Relationship building skills</td>
<td></td>
</tr>
<tr>
<td>Vendor Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strategic &amp; business planning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resource Management</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Regarding broad business knowledge, both the CIOs and particularly their business partners felt that it was important for the CIO to possess a business perspective or acumen.

“They also need to have good commercial experience, especially in the situation where they are delivering services to a commercially-oriented enterprise. This allows them to understand the business’s commercial constraints & needs” – Business partner

The business partners also felt it was important for CIOs to have a corporate view and understanding of business priorities, although this did not receive any mention by the CIOs themselves.

As far as general management skills were concerned, both groups of interviewees stressed the importance of the CIO possessing managerial skills and expertise, and especially financial management and budgetary skills. They also stressed the importance of staff/people management, and the CIOs emphasized the necessity of strategic and business planning skills.

Of the necessary leadership skills, once again the CIOs and their business partners had similar views: that it was important for CIOs to have a future vision.

“Leadership is an essential skill and it’s important to have a vision to inspire their staff & get their buy-in (i.e. their emotional & intellectual engagement)” - Business partner

“The ability to see the big picture and have a vision that draws together the different needs and objectives. In doing so they need to be able to prioritise & be diplomatic, because they are constantly dealing with competing demands both politically & from the business” - Business partner

The business partners also emphasized the ability of CIOs to negotiate between contending business interests.

In terms of people skills, the business partners focused on interpersonal skills and general communication skills.

“Communication on a personal level is critical; the CIO requires both good verbal & written communication. Ability to talk with customers and find out what their problems are plus the ability to just sit & chat. Emotional Intelligence is important, balanced with the technical knowledge” – Business partner

The CIOs, on the other hand, had a more specific focus, and emphasized the ability of CIOs to communicate in non-technical language, and the ability to communicate with technical staff and vendors.

Some interviewees mentioned the personal attributes that would facilitate interpersonal skills. These included patience, tenacity, being results driven, having the ability to prioritize, and especially, having a practical approach, and being politically savvy.

4.3 Organizational knowledge

Despite not being involved in the strategic planning, the CIOs, and to a slightly lesser extent the business partners, felt it was extremely important for them to have a good understanding of the organizational goals and objectives. Although the business partners did not think it was necessary for the CIOs to be involved in setting those goals, they and the CIOs felt that the CIOs could provide meaningful input in the form of advice.
on technological innovations and solutions, and on how technology could enable the organizational strategies that would achieve the goals.

“The CIO is a strategic advisor on how innovations and efficiencies can be achieved. They need to be aware of the goals being sought by the community (and directors) as they are being planned. Also to be aware of (and provide input into) funding requirements where technology supports business process change and innovation. Explaining the benefits, offering the opportunity (to use technology) & explaining the “how & why”. This helps to justify the commitment of resources during the planning activity.” – CIO large council

Both groups of interviewees felt that it was important for CIOs to understand the legal framework, but more at a higher level of understanding.

“This is very important as this role can influence how things are done & so they need an understanding to ensure that things (technology solutions) don’t impact this. This may not need to be a detailed understanding – but enough of an overview to assist with this.” - CIO small council

It was, however, important for the CIOs to know where to get the information when needed, and this was usually from business managers and experts or a legal advisor.

Regardless of size their council, the CIOs had to provide ICT services and support applications across the breadth of the business activities. Both groups of interviewees felt it was very important for CIOs to have a good understanding of the business goals and drivers of the different business units.

“This [understanding the goals and objectives] is very important as it affects their resourcing. It allows them to ensure that things are prioritised – they need to know what’s critical for the business.” – Business partner small council

In addition, the CIOs emphasized the importance of using the business language of the relevant unit in their communication with them.

“Using the business language is important as it helps communicate and builds rapport. It reflects knowledge of the business concerns & I encourage it with all my staff. Equally important is avoiding the use of IT jargon.” – CIO medium council.

Although the CIOs felt that their involvement in the business unit planning was not sufficient, the business partners felt that it was sufficient for CIOs to be informed of potential IT projects from the business plans. Others felt that the CIO needed to be involved before the business plans were finalized.

4.4 Roles of the CIO

The role of the CIO was also explored, particularly with regard to the integration activities whereby the CIO could contribute most significantly to the organization. The interviewees noted seven distinct, integration roles for the CIO. These fell into two categories: the strategic value-adding aspects of the CIO’s task; and the more operational IT management and delivery.

4.4.1 Value add

Three areas of value-added roles were identified: communication of innovative uses of technology; communication of the impact of IT legislation and standards; and the CIO having a vision for IT.

Both interviewee groups felt it was important for the CIO to promote the innovative uses of technology, as well as new developments which might assist the organization; and that the best way to do this was for the CIO to communicate with the relevant business unit manager, in a variety of ways, and for the CIO to attend seminars with the business managers.

“The business manager’s focus is on the day to day running of their business, CIO can offer ways in which technology can enhance business. Technology is a complex area and not necessarily aligned to what the
business requires, CIO can reduce risk (of poor technology decisions) by providing advice within the business context” – CIO large council

In terms of relevant IT legislation and standards, the business managers were more emphatic that this be discussed with the relevant business managers, rather than in more general forums.

“Yes this is very important. Central government may not always communicate these well, so the IT Manager has a role in communicating the impact to the managers. It would be good for the IT Manager to drive (facilitate) cross council understanding.” – Business partner small council

Both CIOs and their business partners thought it was particularly important for the CIO to have a clear vision for IS and to communicate that vision, which needs to fit in with the business vision.

“It’s absolutely important that the IT Manager has a vision. This is because of the importance of technology to delivering the business & the rapid change in the technical environment. The IT vision needs to be part of the Council vision. The IT Manager needs to lead from the front as they know where technology is going.” – Business partner medium council

4.4.2 IT management and delivery

With regard to the management of the IT organization and the delivery of their services, four aspects emerged: prioritization of IT projects and expenditure; managing and reporting IT projects; communication with key stakeholders; and management of and communication with vendors. In terms of prioritization, particularly the CIOs and their business partners of the larger organizations felt it was important to have an IS governance group in place to make the key decisions. The CIOs also felt that they should prioritize infrastructure projects, and that this should be done via formal procedures. CIOs also felt particularly strongly that formal steering groups should be used for major projects and that key stakeholders should be involved in these.

In terms of communicating IS/IT matters, the CIOs felt that this was best done through formal reports to senior management but also by informal meetings with their business peers. The business partners agreed on the latter channel.

Both interviewee groups felt that informal discussions with vendors which sometimes included the business partners was the best way to go. Business partners also mentioned that combined meetings with the vendors facilitated by the CIO were very useful in ensuring that their business concerns were understood. They then expected the CIO to follow up with the vendor.

“This is a joint effort, I expect them to support the business around the urgency for an issue & communicate this to their technology partners.” – Business partner small council

A number of the CIOs - in particular in smaller councils - indicated that the key vendors themselves sometimes advised them on potential business changes and the resources to determine the impact of these.

“This is a bit the other way around, the vendors have their own BAs who understand the Acts etc & how it works within their systems. These vendors are usually specialists in local government & understand the business requirements really well including changes required from new legislation.” – CIO small council.

Generally, the smaller councils preferred more informal integration activities whereas medium-sized and larger councils preferred more formal processes and reporting mechanisms.

5. Discussion

There has been considerable research into the competencies required by CIOs, and to a large extent, those noted in the interviews reflect the literature. While this research does not claim to have identified an exhaustive list of competencies required by the CIO in the government sector, what is particularly important is
the respective focus of the CIOs and their business partners, the extent to which the competencies relate to the different categories of roles identified, and the impact of the public sector context.

Regarding technical competencies, on the whole, high-level broad industry skills were the most often mentioned as important for the CIO role. It was also important that this knowledge was current and business-focused. The CIOs themselves raised both IT management skills and technical skills more often than their business partners. The business partners more commonly mentioned those skills that would have a direct impact on them, for example, consultancy/advice, project management, business analysis and application support.

In terms of business competencies, those specific competencies identified support the Basselier and Benbasat (2004) model of business competence which comprises business and commercial knowledge, management and leadership as well as personal attributes. While local government experience was considered more important by the CIOs, a broad business knowledge or perspective was considered extremely important by both CIOs and their partners. A strategic and visionary perspective, and communication and people skills were valued, although the CIOs focussed more on the specific IT details than their business partners. They were very conscious, too, of the need to communicate in language that the business partners could understand.

The interviewees agreed on the importance of a CIO having a broad high-level organizational knowledge, in particular with regard to the organizational goals and objectives, organizational culture and environment, legal framework, and business unit goals and drivers. In that way they could advise on innovative uses of technology to support and enhance these areas’ performance. This reflects the views expressed by Jones (2012) and Chun and Mooney (2009). They suggested that this is gained through discussion with business managers favouring informal discussion over more formal arrangements.

A key theme that emerged is the importance of the CIO’s role as an advisor to the business, both during organizational strategic planning and at the business planning level. The roles of the CIO were divided into two areas:

- A set of strategic roles performed by the CIO to identify where IT can add value to the council
- A set of operationally focused roles the CIO performs to ensure IT delivers the benefits within the budget constraints.

Regarding the value-add aspect of the IT-business relationship, there was a clear indication that the business looked to the CIO for advice and guidance on new technologies and IT-related legislation. Informal two-way communication was preferred. The majority of the interviewees felt that it was important for the CIO to have a vision for IT and that this be well communicated and aligned with the business vision.

Within the IT management and delivery area, informal structures were favoured when dealing with business peers, while more formal arrangements suited to communications with senior management. Large councils tended to have governance groups and formal processes around IT investment decisions, while smaller used existing reporting structures.

Combining competence with roles, the relative emphasis on the strategic versus the operational is depicted below.
The two categories of roles require different sets of competencies:

- Broad industry knowledge, leadership skills and high-level organizational knowledge were identified as more important for the strategic value-add roles.
- IT management skills, technical expertise, general management skills and business unit knowledge were identified as more important for the operational value-for-money roles. General management skills and technical skills were regarded as especially necessary.
- Interpersonal skills and personal attributes were seen as being particularly important for both roles although each role might require slightly different attributes. In particular, both technical and non-technical communication were valued in both categories of roles.

As with the CIO's competencies, the findings largely reflect the competencies relevant for the various roles as identified in models such as those of Feeny and Wilcocks (1998), Broadbent and Kitzis (2005) and Lane and Koronas (2007). However, the local government context places certain demands and constraints on the role of the CIO. Some of the key points relating to local government are:

- Local government CIOs are not usually included in top council management, and consequently are not involved in setting strategic direction which is based on the LTCCP. Rather, they are required to have a strategic perspective and are involved at a later stage advising how technology can enable the business outcomes. This type of arrangement can be constraining.
- Vendor relationships are usually operational in nature rather than strategic as models like Feeny and Wilcocks’ (1998) IS capabilities would suggest. CIOs are more focused on managing vendor issues than seeking new opportunities with vendors.
- There are two key (lynch-pin) roles that are considered the most important by all the participants: to promote the IS plan; and deliver the IS plan.
- The management of a particularly wide range of stakeholders, or client groups, places very large demands on the CIOs, not only on the need for excellent communication skills, political skills, and the ability to prioritise between often conflicting demands, but also requisite knowledge of the frameworks within which the groups operate. Additionally, when resources are stretched, the CIO is often expected to adopt a “hands on” role, and demonstrate excellent technical skills.
- Local government CIOs communicate formally with senior management and with peers in larger organizations, but informally with peers in other organizations.
6. Conclusion

The research aimed to explore the role and competency expectations of CIOs in the public sector context, and to determine the impact of that context. A dyadic approach, involving both CIOs in New Zealand local government and their business colleagues, was adopted in order to gain more meaningful insights.

Three categories of competence were explored: IT competence, business competence, and organizational competence. Two categories of roles were identified: strategic, value-add roles, and operational IT management and delivery roles. The respective competencies were matched against the roles. In general, the competencies and roles identified reflect those noted in the literature. However, the CIOs and their business partners differed significantly in their views of required knowledge, skills and competencies. The business partners required a business knowledge and focus similar to theirs, and most manifested scant regard or concern for the technical expertise necessary or the technical requirements of the organization. Their perspective was that IT is there to support, advise and guide them. CIOs, on the other hand, were aware of the necessity of possessing not only the broad business and organizational knowledge, but also the more detailed and wide IT knowledge required to cover all the many client groups and activities of the local government.

The findings from this research extend the application of the RBV and provide greater understanding of the competencies and roles of the CIO. In particular, it indicates the value of considering different significant stakeholders' perspectives on the requisite competencies of the CIO and on the roles he/she is expected to play. By considering different perspectives, the potential for disappointment can be minimized.

The local government context places decided constraints on the CIO and consequently on the range of competencies and roles required of the position. In addition, it requires additional knowledge and skills from the CIO.

This research also provides insights for practitioners and, in particular, recruiters of public service IT professionals and CIOs; human resources managers; and providers of training programmes. However, more research is needed with a broader sample to identify the core competencies required in the public sector more precisely, and to determine whether the gaps in perceptions of requisite competencies reflect actual differences or rather different focuses of the CIOs and their business partners.

References


Use, Perception and Attitude of University Students Towards Facebook and Twitter

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Abstract: As social computing systems persist over time, many elements such as user experience, perceptions, attitudes and interactions may change. Facebook and Twitter are two social computing systems that have become increasingly popular among university students. This research replicated previous studies by Lampe, Ellison and Steinfield (2008), and Johnston, Tanner, Lalla and Kawalski (2013) to assess how Facebook and Twitter use, perception and attitude have changed among university students. Because online social networks, social networking sites and micro-blogging sites are relatively new as areas of academic research, there is limited research into the impacts of these social networking and micro-blogging sites. A sample of 486 students from the University of Cape Town (UCT), South Africa completed a survey. The results were then compared to research data from previous studies by Lampe et al. (2008) and Johnston et al. (2013). The results showed that the percentage of students using Facebook increased to 95%, Facebook daily usage and the number of Facebook friends doubled from previous surveys. This results also found that the South African students are more dependent on using Facebook, in comparison to using Twitter; that their perception of Facebook privacy has led to a decrease in personal information shared on Facebook as well as a change in audience perception. The data also shows that UCT students perceive friends and total strangers to be their main audiences on Twitter; the attitude of UCT students towards Facebook remained positive, on the other hand, a less positive attitude was experienced from the students using Twitter; and Facebook is a more popular method for communication between students. The results clearly highlight the changes in usage, attitude and perception of Facebook over time, and provide a starting point for assessing how usage and attitude to Twitter may change. The results also suggest that should therefore make use of social networking software such as Facebook and Twitter both in their personal lives, and in classrooms.

Keywords: Attitude, change, Facebook, perception, students, Twitter, use

1. Introduction

Over the years, there has been an increase in user participation in social computing systems such as online communities, media sharing sites and Social network sites (SNSs). This research replicated aspects of studies into Social network sites (SNSs) previously conducted at Michigan State University (MSU) by Lampe, Ellison and Steinfield (2008), and of South African (SA) university students by Johnston, Tanner, Lalla and Kawalski (2013), adding an additional element of micro-blogging (Twitter). The aim was to establish the usage, user perception of and attitude to Facebook and Twitter among students at the University of Cape Town (UCT) in 2011, and compare the Facebook data to the Lampe et al. (2008) and Johnston et al. (2013) studies. The Twitter data was analysed but could not be compared, as no similar data was found on Twitter. A positivist philosophy was adopted, a survey instrument adapted with permission from Johnston et al. (2013) was used, and all respondents remained anonymous. Limitations included the fact that 85% of the student respondents were first-year students in Information Systems. Hence respondents were likely to be more computer literate, and have greater interest and access to computers and the internet in comparison to other students.

The paper is divided into six sections. Section two is a Literature Review of Facebook and Twitter, which looked at the changes in use, perception and attitude of Facebook and Twitter as well as how Facebook and Twitter are used as a communication channel. The research questions were derived from the themes identified in the literature. Section three explains the methodology used to answer the research questions, as well as the design and process of the research. Findings and analysis of the data researched was detailed in section four, followed by discussion of implications in section five. The final section draws conclusions of the research.

2. Literature review

The literature was sourced using Google Scholar, EBSCO host Science Direct, and JSTOR. The Facebook and Twitter phenomena are fairly new which limited the number of available and relevant journal and conference papers.

Two main research papers were used for Facebook, the first by Lampe et al. (2008) was conducted between 2006-2008, and the second by Johnston et al. (2013) was conducted in 2008. Lampe et al. (2008) focused on the change in use and perception of Facebook among students at Michigan State University (MSU). Johnston
et al. (2013) focused on the use of Facebook amongst students at seven South African (SA) universities, and the impact of Facebook friends on social capital. For Twitter, the primary papers were by Java, Song, Finin, and Tseng (2007), and Zhao and Rosson (2009) who focused on how and what micro-blogging was used for.

Social Network Sites (SNS) are an internet-based media platform that has grown in popularity in recent years (Roblyer, McDaniel, Webb, Herman, & Witty, 2010), and been embraced by university students (Johnston, 2013). Lampe et al. (2008, p721) defined SNSs such as Facebook, to have three main characteristics which allowed users to “(1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system”. SNSs create an online community that relies on user participation and contribution (Waters, Burnett, Lamm & Lucas, 2009). Typical SNSs provide users with profile space, and allow users to upload content (such as photographs, statuses and interests) about themselves. SNSs also provide a platform where users can connect and communicate with one another (Joinson, 2008). Furthermore, an SNS acts like an online bulletin board allowing users to view other people’s posts and content (Pempek, Yermolayeva & Calvert, 2009). The core of SNSs is its users and the connections between them, therefore SNSs are primarily organised around people (Boyd & Ellison, 2007; Joinson, 2008). The students of today “have redefined communication not only by their acceptance of and hunger for new devices, but because of their sometimes overwhelming reliance on technology for being in touch with others and interpreting their world” (Waldron, 2011, 2-3).

Micro-blogging is a variant of blogging where short messages are posted instantly, and are within the prescribed character range (Fischer & Reuber, 2010; Java et al., 2007; Thomases, 2010). Micro-blogging is used by both consumers and businesses to share news, post status updates and carry on conversations (Reinhardt, Ebner, Beham & Costa, 2009). Messages can be restricted to a certain number of individuals, sent exclusively to a specific contact, or made available to the Worldwide Web (Reinhardt et al., 2009). Mico-blogging requires less time and thought investment from the user for content generation; compared to regular blogging where users update their blog every few days, the nature of micro-blogging allows them to update several times within a day (Java et al., 2007; Zhao & Rosson, 2009). “Twitter is an Internet social-network and micro-blogging platform with both mass and interpersonal communication features for sharing 140-character messages, called Tweets, with other people, called followers” (Chen, 2011, p. 755). Student use of social media such as Facebook and Twitter is integrally related to how students view and engage with the world (Junco, Elavsky & Heiberger, 2012), and is changing communication patterns (McArthur & Bostedo-Conway, 2012).

2.1 Facebook

Facebook is an SNS used primarily to connect, interact and stay in touch with contacts that the user knows personally, such as friends, family and colleagues (Ellison, Steinfield, and Lampe, 2007). Facebook is one of the most popular SNSs (Lampe et al., 2008), and has been widely adopted by students (Johnston, 2013; Roblyer et al., 2010). A typical Facebook user spends 10-20 minutes a day on the site, and around two-thirds logged in more than once a day according to (Ellison et al., 2007) A 2010 survey of 2368 students at a University in the USA, found that students spent a mean of 101.09 min per day on Facebook, and checked the site a mean of 5.75 per day (Junco, 2012).

Hew (2011) stated that there are four elements within a Facebook profile, namely: control elements, referents elements, preference elements, and contact elements. Control elements include a users gender and time they have been a member, referent elements are fields such as home town and high schools, where common points of reference among users can be established. Preference elements are fields that express the personal interests of the user and short biographies (Hew, 2011). Contact elements are fields such as mobile contact numbers and e-mail addresses (Hew, 2011). Furthermore, users can set their privacy settings to include or exclude certain users from viewing parts of their profile (Pempek et al., 2009). Joinson (2008) found various heterogeneous uses of Facebook such as keeping contact awareness, photo sharing, group organisations, and application participation. Several studies have shown that the use of Facebook is associated with social capital gains (Ellison et al., 2007; Johnston et al., 2013; Ryan & Xenos, 2011).

Studies conducted by Lampe et al. (2008) on MSU students, and Johnston et al. (2013) on SA students showed responses to the question “I use Facebook to...” were similar. The main uses of Facebook were—“keeping in touch with old friends” and to “check out someone I met socially”. Manago, Taylor and Greenfield (2012)
Kevin Johnston, Mei-Miao Chen and Magnus Hauman

found that on average 21% of university student Facebook friends were close connections, 18% were connections from the past (maintained contacts), 27% were acquaintances, 24% were teammates, classmates etc, 4% were strangers, 2% were online connections, and 4% were classified as other. Thus, only 39% of Facebook friends were close or maintained contacts.

There are seven motives why users use Facebook. Firstly, to maintain existing relationships, to stay in touch and maintain relations with people (Hew, 2011; Roblyer et al., 2010). Secondly, to meet new people, find out information about people previously met, and meet others online with the intention of meeting them offline later (Hew, 2011; Joinson, 2008). Thirdly, using Facebook is perceived as “cool” and “fun”, as people enjoy following trends and don’t like to feel left out (Hew, 2011). Fourthly, to raise public awareness of oneself, where users can gain popularity through having Facebook friends (Hew 2011; Pempek et al., 2009). Fifthly, the ability to express or present oneself, by updating their profiles and statuses (Hew, 2011; Smith & Kidder, 2010). The sixth motive – for learning purposes – lets users communicate with one another, ask and share questions and information (Hew, 2011; Roblyer et al., 2010). The seventh motive – enabling of student activism – lets students provide general information about activities, and express their viewpoints (Hew, 2011).

The perception users have of their audience plays an important role in the usage of Facebook, as if the user perceives no audience for his or her profile, he or she is less likely to make use of Facebook (Lampe et al., 2008). The type of perceived audience also determines the type of information and content users are likely to share on their profiles (Pempek et al., 2009). Studies conducted by Lampe et al. (2008) on MSU students, and Johnston et al. (2013) on SA students showed that as the offline relations become weaker, the less students consider them as perceived audiences. Manago, Taylor and Greenfield (2012) found that females are communicate more than males on Facebook.

The overall student attitude towards communicating on Facebook is positive (Hew, 2011). Lampe et al. (2008) observed a significant increase in positive attitudes towards Facebook between 2006 and 2008, despite a small increase in some negative effects.

2.2 Twitter

Twitter is a micro-blogging platform that allows users to share their thoughts, information and links in real time, and to communicate directly, privately or publicly with other Twitter users (Thomases, 2010). Users can tweet about any topic within the 140-character limit (Fischer & Reuber, 2010; Junco, Elavsky & Heiberger, 2012; Thomases, 2010). A follower is someone who has opted to receive tweets from a specific person, whereas following is whom the person has opted to follow and receive tweets from (Java et al., 2007; Thomases, 2010). Pennacchiotti and Popescu (2011, p.281) stated that the success of Twitter has lead Twitter to “become an integral part of the daily lives of millions of users”.

Users update their daily life activities with friends, families and co-workers; share information, news, and opinions with interested observers; and seek knowledge and expertise in public tweets (Browning & Sanderson, 2012; Java et al., 2007; Pennacchiotti & Popescu, 2011). Honeycutt and Herring (2009) stated that Twitter has the potential to be used for idea sharing and coordination of activities, similar to instant messaging in a more dynamic way. McArthur and Bostedo-Conway (2012, p291) suggest that “one-to-many (or many-to-many) communication channel may offer instructors an opportunity to efficiently contact and create learning opportunities for many students at once”. The main types of user intentions on Twitter are: daily conversations, sharing information and website URLs, and reporting news (Honeycutt & Herring, 2009; Java et al., 2007). Twitter is also used for keeping in touch with friends and colleagues, sharing interesting information within one’s network, seeking help and opinions, and releasing emotional stress (Ehrlich & Shami, 2010; Zhao & Rosson, 2009). A Twitter user can create a public profile which entails full name, location, a web page, a short biography and the tweets of the user (Kwak, Lee, Park & Moon, 2010; Pennacchiotti & Popescu, 2011). The people who follow the user and those that the user follows are also listed (Pennacchiotti & Popescu, 2011). Ehrlich and Shami (2010) indicated that users are less likely to post confidential information on Twitter.
2.3 Johnston (2013), and McArthur and Bostedo-Conway (2012) encourage academics to use technologies such as Facebook, Twitter and mobile phones to communicate and educate students.

The South African context

One cannot conduct a study on South Africa without understanding the social context of the country. Apartheid in SA played a major role in creating gaps and inequalities between the different races (Johnston et al., 2013). Apartheid actively humiliated and oppressed races that were considered ‘non-white’, limiting the ‘non-whites’ in their education and the ability to accumulate and use assets, only 9% of South Africans are white (Johnston et al., 2013). Although South Africa was not the only country to propose and implement racial segregation, it has been “a distinctive feature through which communities and neighbourhoods in South African cities have been understood” (Oldfield, 2004, p.190). The racial segregation within South Africa had a formative impact on urban economic, social and political form (Oldfield, 2004). The racial segregation made South Africa a country with a high GINI coefficient, and one of the most unequal societies in the world (Armstrong, Lekezwa, & Siebrit, 2008).

3. Methodology

The study was done on the 2011 cohort of UCT students in the Faculty of Commerce, and aimed to understand the use, attitudes and perceptions of Facebook and Twitter. The philosophy was positivist. The questionnaires relied on the subject’s subjective observations of themselves. Hence, there was bias in the data; however it is assumed that the biases average out, and compensate for individual differences. The data analysis was quantitative to correspond with the studies done by Lampe et al. (2008) and Johnston et al. (2013). As in the two previous studies, five-point Likert scales were used extensively in the questionnaire with 1 = strongly disagree or very unlikely, and 5 = strongly agree or very likely. Data could therefore be compared and analysed. The sample comprised all 1231 UCT Commerce students registered for a first year Information Systems course in 2011. An online survey was made available to students and obtained 488 responses. The raw data was cleaned and formatted, two responses were not fit to be used, reducing the sample to n=486.

4. Data analysis

The results of the research (referred to as ‘2011 UCT’ as the data was collected in 2011) were compared with results from previous studies done by Michigan State University (referred to as ‘2008 MSU’) (Lampe et al., 2008) and Johnston et al. (2013) (referred to as ‘2008 SA’ as it was completed in 2008). The Facebook intensity scale which attempted to obtain a measure of Facebook usage and duration of use was adopted from the 2008 SA study (Johnston et al., 2013).

In the 2008 SA study, 67% of students were members of Facebook (Johnston et al., 2013), whereas 95% of the UCT students surveyed in 2011 were members of Facebook. Table 1 compares the statistics of Facebook (FB) intensity for the 2008 MSU students (Lampe et al., 2008), the 2008 SA students (Johnston et al., 2013), and the 2011 UCT students.

Table 1: Summary statistics for Facebook intensity

<table>
<thead>
<tr>
<th>Individual items and scales</th>
<th>2008 MSU</th>
<th>2008 SA</th>
<th>2011 UCT</th>
</tr>
</thead>
<tbody>
<tr>
<td>About how many Facebook friends do you have?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0=&lt;10, 1=11-50, 2=51-100, 3=101-150, 4=151-200, 5=201-250, 6=251-300, 7=301-400, 8=401-500, 9=&gt;501</td>
<td>7.33</td>
<td>3.17</td>
<td>6.78</td>
</tr>
<tr>
<td>In the past week, on average, approximately how many minutes per day have you spent on Facebook</td>
<td>3.37</td>
<td>1.69</td>
<td>1.44</td>
</tr>
<tr>
<td>0=&lt;10, 1=10-30, 2=31-60, 3=1-2 hours, 4=2-3 hours, 5=&gt;3 hours</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facebook is part of my everyday activity</td>
<td>3.85</td>
<td>1.12</td>
<td>3.03</td>
</tr>
<tr>
<td>I am proud to tell people I am on Facebook</td>
<td>3.34</td>
<td>0.85</td>
<td>3.53</td>
</tr>
<tr>
<td>Facebook has become part of my daily routine</td>
<td>3.66</td>
<td>1.19</td>
<td>3.07</td>
</tr>
<tr>
<td>I feel out of touch when I haven’t logged onto FB for a while</td>
<td>2.74</td>
<td>1.37</td>
<td>3.14</td>
</tr>
<tr>
<td>I feel I am part of the Facebook community</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would be sorry if Facebook shut down</td>
<td>3.72</td>
<td>1.34</td>
<td>3.58</td>
</tr>
<tr>
<td>My Facebook has caused me problems</td>
<td>2.20</td>
<td>1.12</td>
<td></td>
</tr>
</tbody>
</table>
The 2008 MSU students had an average of 333 friends (mean of 7.33), whereas the 2008 SA students had an average of 134 friends (mean 3.17). In the 2011 study of UCT students, students had an average of 251–300 friends (mean of 6.78). All groups of students in Table 1 leaned towards agreeing that Facebook was part of their daily routine and everyday activity. Similarly, all groups are leaning towards agreeing that they would be sorry if Facebook had to shut down, thus students have an overall positive attitude towards Facebook. When students were asked about problems caused by Facebook, the means were below 2.50 indicating that the majority disagreed with the statement.

Figure 1 shows that 72% of the 2011 UCT students indicated that they used Facebook to view the profiles of other students in one of their classes; 55% used Facebook to contact another student with questions relating to class work; 40% used Facebook to arrange study groups and meetings; and 25% were given Facebook-related class assignments. Facebook was used by students to assist in their education by this group of students, and thus could be used as a communication channel to assist academics.

**Table 2: Facebook use for prior contacts and meeting new people**

<table>
<thead>
<tr>
<th>Individual items and scales</th>
<th>2008 MSU</th>
<th>2008 SA</th>
<th>2011 UCT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off to Online: Use Facebook to connect with offline contacts</td>
<td>3.79</td>
<td>0.90</td>
<td>3.56</td>
</tr>
<tr>
<td>I have used FB to check out someone I met socially</td>
<td>3.94</td>
<td>0.89</td>
<td>3.57</td>
</tr>
<tr>
<td>I use FB to learn more about other people living near me</td>
<td>2.95</td>
<td>1.15</td>
<td>2.64</td>
</tr>
<tr>
<td>I use FB to keep in touch with my old friends</td>
<td>4.50</td>
<td>0.67</td>
<td>4.47</td>
</tr>
<tr>
<td>On to Offline: I use Facebook to meet new people</td>
<td>1.88</td>
<td>1.04</td>
<td>2.55</td>
</tr>
<tr>
<td>I use FB people to find people to date</td>
<td>1.62</td>
<td>0.95</td>
<td>1.50</td>
</tr>
<tr>
<td>I use FB to find people to add to my 'friends' list</td>
<td>2.14</td>
<td>1.12</td>
<td>2.25</td>
</tr>
<tr>
<td>I use FB to meet new people</td>
<td>3.51</td>
<td>1.10</td>
<td>3.72</td>
</tr>
<tr>
<td>I use FB to find out about specials and promotions</td>
<td>2.26</td>
<td>1.26</td>
<td></td>
</tr>
</tbody>
</table>
Figure 2 shows which elements students included in their Facebook profiles. The most commonly selected elements in 2008 were contact details (78%) and a photo of the student (66%); whereas 88% of the 2011 students included educational details, and 83% a photo. Although 80% of 2011 students included their home town, only 14% included an address. There has been a decrease from 78% to 65% in sharing contact details such as email and mobile numbers.

![Figure 2: Profile elements included for Facebook](image)

The 2008 MSU, 2008 UCT and 2011 studies revealed similar results with regards to perceived profile view (Figure 3), with friends perceived as the main audience. ‘High school friends’ are still being perceived as the main profile audience (2008 MSU had 94%, 2008 UCT had 88% and 2011 UCT had 97%). The biggest variation was the perceived profile audience of ‘someone I met at a party or social’, 2008 MSU study had 72%, the 2008 UCT study had 40%, and the 2011 UCT study had 64%. When asked about perceived professional audiences viewing the profile, only 7% of the 2011 UCT students perceived that companies would view their Facebook sites.

Table 3 provides a comparison of Facebook members across the studies. The number of Facebook members within South Africa increased from 67% to 95% in 2011. In both the 2008 SA study and the 2011 UCT study, over 26% of the Facebook respondents were white, whereas only 9% of the country’s population is white. This is a reflection of the inequality in the country.

Of the students surveyed, 34% (163 respondents) were members of Twitter. Table 4 shows that most spent less than 10 minutes per day on Twitter, and claimed to have between 11–50 followers, while following 11–50 Twitter users. Respondents did not consider Twitter a part of their daily activity (mean of 2.38), or daily routine (mean of 2.46) as they did with Facebook.

![Figure 3: Perceived profile viewers for Facebook](image)
Table 3: Comparison of Facebook members

<table>
<thead>
<tr>
<th></th>
<th>2008 MSU</th>
<th>2008 SA</th>
<th>2011 UCT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of respondents</td>
<td>n = 286</td>
<td>n = 572</td>
<td>n = 486</td>
</tr>
<tr>
<td>Facebook members</td>
<td>94%</td>
<td>67%</td>
<td>95%</td>
</tr>
<tr>
<td>Facebook use (minutes per day)</td>
<td>10-30 minutes</td>
<td>10-30 minutes</td>
<td>31-60 minutes</td>
</tr>
<tr>
<td>Facebook friends</td>
<td>151-200</td>
<td>101-150</td>
<td>251-300</td>
</tr>
<tr>
<td>Ethnicity of FB members (White/Black)</td>
<td>82%/18%</td>
<td>28%/72%</td>
<td>27%/73%</td>
</tr>
</tbody>
</table>

Table 4: Statistics for Twitter intensity (n=163)

<table>
<thead>
<tr>
<th>Individual items and scales</th>
<th>2011 UCT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>Std. Dev</td>
</tr>
<tr>
<td>About how many Twitter followers do you have?</td>
<td></td>
</tr>
<tr>
<td>0=&lt;10, 1=11-50, 2=51-100, 3=101-150, 4=151-200, 5=201-250, 6=251-300, 7=301-400, 8=401-500, 9=&gt;501</td>
<td>1.08</td>
</tr>
<tr>
<td>1.59</td>
<td></td>
</tr>
<tr>
<td>About how many people are you following on Twitter?</td>
<td></td>
</tr>
<tr>
<td>same scale as above</td>
<td>1.62</td>
</tr>
<tr>
<td>1.77</td>
<td></td>
</tr>
<tr>
<td>In the past week, on average, approximately how many minutes per day have you spent on Twitter</td>
<td></td>
</tr>
<tr>
<td>0=&lt;10, 1=10-30, 2=31-60, 3=1-2 hours, 4=2-3 hours, 5=&gt;3 hours</td>
<td>0.81</td>
</tr>
<tr>
<td>1.22</td>
<td></td>
</tr>
<tr>
<td>Twitter is part of my everyday activity</td>
<td>2.38</td>
</tr>
<tr>
<td>1.41</td>
<td></td>
</tr>
<tr>
<td>I am proud to tell people I am on Twitter</td>
<td>3.33</td>
</tr>
<tr>
<td>1.14</td>
<td></td>
</tr>
<tr>
<td>Twitter has become part of my daily routine</td>
<td>2.46</td>
</tr>
<tr>
<td>1.36</td>
<td></td>
</tr>
<tr>
<td>I feel out of touch when I haven’t logged onto Twitter for a while</td>
<td>2.06</td>
</tr>
<tr>
<td>1.21</td>
<td></td>
</tr>
<tr>
<td>I feel I am part of the Twitter community</td>
<td>2.56</td>
</tr>
<tr>
<td>1.24</td>
<td></td>
</tr>
<tr>
<td>I would be sorry if Twitter shut down</td>
<td>2.59</td>
</tr>
<tr>
<td>1.31</td>
<td></td>
</tr>
<tr>
<td>My Twitter has caused me problems</td>
<td>1.80</td>
</tr>
<tr>
<td>1.02</td>
<td></td>
</tr>
</tbody>
</table>

Figure 4 shows that 7% of Twitter respondents had used Twitter to arrange study groups and meetings, while 4% had contacted other students relating to class work. However, 18% of 2011 UCT students indicated that they had used Twitter to view the profile of a fellow student, and 9% had used Twitter to view the profile of a professor, lecturer or tutor.

Twitter was mainly used by UCT students to find out worldwide news or facts (mean of 3.43), secondly to find out local news and events (mean of 3.16), thirdly to find out about specials and promotions (2.38), and only fourthly to keep in touch with old friends (mean of 2.35) as seen in Table 5. Twitter was used to find out about issues, rather than to socialise.

Sixty-five percent of the students using Twitter indicated that they had included their real name in their profile, and 60% also included a pen name; 42% included a profile picture of themselves and 44% included location within their profile. Students are more likely to share personal confidential details on Facebook than on Twitter, as stated by Ehrlich and Shami (2010).
**Figure 4:** Usage of Twitter within education context

**Table 5:** Twitter use for prior contacts and meeting new people

<table>
<thead>
<tr>
<th>Individual items and scales</th>
<th>2011 UCT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>Off to Online: Use Twitter to connect with offline contacts</td>
<td>2.19</td>
</tr>
<tr>
<td>I have used Twitter to check out someone I met socially</td>
<td>2.13</td>
</tr>
<tr>
<td>I use Twitter to learn more about other people living near me</td>
<td>2.09</td>
</tr>
<tr>
<td>I use Twitter to keep in touch with my old friends</td>
<td>2.35</td>
</tr>
<tr>
<td>On to Offline: I use Twitter to meet new people</td>
<td>2.40</td>
</tr>
<tr>
<td>I use Twitter to find people to date</td>
<td>1.48</td>
</tr>
<tr>
<td>I use Twitter to find people to add to my ‘friends’ list</td>
<td>1.96</td>
</tr>
<tr>
<td>I use Twitter to meet new people</td>
<td>1.96</td>
</tr>
<tr>
<td>I use Twitter to find out things that’s happening around me</td>
<td>3.16</td>
</tr>
<tr>
<td>I use Twitter to find out worldwide news or facts</td>
<td>3.43</td>
</tr>
<tr>
<td>I use Twitter to find out about specials and promotions</td>
<td>2.38</td>
</tr>
</tbody>
</table>

**Figure 5:** Profile elements included for Twitter vs. Facebook

Sixty-one percent allowed anyone to view their Twitter profile, 15% did not indicate their privacy setting, and only 24% restricted views to approved audiences. Similarly to Facebook, high school friends were perceived as the main audience (75%), whereas only 14% perceived someone they have met socially to be their audience. Figure 6 shows who respondents perceived as viewers of their Twitter and Facebook profiles, and as expected the percentages of Twitter viewers were lower than the percentages of Facebook users.

**Figure 6:** Perceived profile viewers for Twitter vs. Facebook
Kevin Johnston, Mei-Miao Chen and Magnus Hauman

Out of the total number of Twitter members in the current study, 25% indicated that they were white. The ethnicity among students who were members of Twitter and Facebook was unsurprisingly similar.

5. Discussion

Of the students surveyed (N=486), 95% were Facebook users and 33% were Twitter users. The 2008 MSU study indicated that 6% of the students surveyed were not registered Facebook members, whereas 33% of 2008 UCT students surveyed were not registered on Facebook. In the current study only 5% of respondents were not registered on Facebook. With regard to Twitter, 67% of 2011 UCT respondents were not Twitter members, while 95% of these respondents were members of Facebook. The current study indicated that the time spent using Facebook per day (24%) fell within the 30 to 60-minute category, higher than the MSU and 2008 UCT study, but almost half of the 101.09 min per day reported by Junco’s (2012) 2010 study. Irrespective of which figures one uses, students are spending a sizeable portion of their days on Facebook. Similarly, the number of Facebook friends increased, 2008 MSU students had 150 – 200 friends, the 2008 UCT students had 101 – 150 friends, whereas the 2011 UCT students had between 400 – 500 friends. This may be because the 2011 students have been using Facebook for a longer period. With regards to Twitter, the average time spent was under 10 minutes (28%), and most members are following and are being followed by 11 – 50 fellow Tweeters. The main goal UCT students used Twitter for was to ‘find out about things happening around them and in the world’ rather than to socialise.

The study has shown an increase in registered Facebook members when compared to previous studies (Johnston et al., 2013), indicating that Facebook is becoming more popular amongst South African tertiary students. South African students have been slow to adopt Twitter. The research established that there has been an increase in popularity of Facebook within the South African tertiary student community. The main use of Facebook remained consistent with the literature, Facebook was mainly used for “keeping in touch with old friends” and to “check out someone I met socially” (Ellison et al., 2007; Hew, 2011; Johnston et al., 2013; Lampe et al., 2008; Pempek et al., 2009; Roblyer et al., 2010).

Hew (2011) and Pempek et al. (2009) both stated that although ‘learning purposes’ was listed as a motive for students making use of Facebook, Facebook was not widely used for learning purposes. However, our study proved the opposite, with 55% of the students surveyed using Facebook to contact other students for questions relating to class work, and 47% making use of Facebook to discuss class work. The literature indicated that Twitter is mainly used for daily conversations, sharing information and website URLs and reporting news (Honeycutt & Herring, 2009; Zhao & Rosson, 2009). Our study revealed that students at UCT mainly used Twitter to find out world-wide facts and events happening around them. Ehrlich and Shami (2010) and Zhao and Rosson (2009) stated that users made use of Twitter to keep in touch with friends and colleagues. However, our findings proved the opposite; students at UCT in 2011 did not make extensive use of Twitter to keep in touch with friends.

The literature revealed that the perception users have of their audience plays a role in determining the type of information and contents which users are more likely to share on their profiles (Pempek et al., 2009). The current study established that 2011 UCT students are less likely to share confidential information such as their contact details in comparison to 2008 students (Johnston et al., 2013). Lampe et al. (2008) and Johnston et al. (2013) both identified that student Facebook users were more likely to consider their peers as their main audience. Furthermore, Lampe et al. (2008) found that as Facebook became more popular, student Facebook users perceived more family members as their profile audience. The current study found similar results with regard to perceived Facebook audience.

The students’ attitudes towards Facebook and Twitter at UCT in 2011 was positive. The literature (Lampe et al., 2008) stated that Facebook had slowly become an important part of the lives of the students and would be missed if it had to close down. The statement was supported by the current study. Lampe et al. (2008) indicated that Facebook had become a popular method for communicating between college-age users; this was supported by the current study. The main use of Facebook was for communication with friends and to keep in touch with old friends (Pempek et al., 2009).

Although literature stated that Twitter is the most popular micro-blogging tool among other existing equivalents (Zhao & Rosson, 2009), and that Twitter has seen a dramatic growth in the number of registered
users, our findings showed a low percentage of respondents (34%) were Twitter users. The main purpose of Twitter users at 2011 UCT was to be kept updated with world-wide facts and happenings around them.

6. Conclusion

The research replicated aspects of studies performed at MSU in 2008, and in South Africa in 2008. The study aimed to assess the change in Facebook usage, perception and attitude among UCT students and whether or how it is used as a communication channel, drawing comparisons to the 2008 MSU and 2008 SA study. The study included Twitter as there appeared to be a gap in the academic literature.

The research questions were to establish the usage of Facebook and Twitter at UCT, and the user perception and attitude towards Facebook and Twitter at UCT. The main use of Facebook remained consistent with the literature, “keeping in touch with old friends” and to “check out someone I met socially”, while Twitter was mainly used for finding news and information. Facebook was also used for learning purposes; with 55% of respondents using Facebook to contact other students with academically related issues, and 47% using Facebook to discuss class work.

The student’s perception and attitude towards Facebook was extremely positive, and the vast majority are members, and would be sad should Facebook close down. UCT students in 2011 are less likely to share confidential information such as their contact details in comparison to students in prior years.

This study was conducted only on registered UCT students and is not an accurate sample of the entire South African populace. The research questions provide new avenues for future research regarding Facebook and Twitter, or more generally, online social networking within South Africa. Future research could attempt to replicate the Twitter study to see the growth of Twitter within the South African tertiary institution context. Future studies could also address the use of mobile technology within social networking in the South African context.

It is clear that university students are strong users of technology, spend time daily using technology, and have positive perceptions and attitudes towards technology. The one area of their lives which often avoids technology is academic programs. McArthur and Bostedo-Conway, (2012, p286) “encourages teachers to join the digital age and begin to experiment with any new tool that is available to students”. Failure to do so, could alienate students to academics and education (Johnston, 2013). Academics should therefore make use of social networking software such as Facebook and Twitter both in their personal lives, and in classrooms. Academics could use social media to communicate (listen and answer) with students in an more immediate and personal capacity.

References


Sectorial Adoption Analysis of Cloud Computing by Examining the Dissatisfier Landscape

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Abstract: Cloud computing in many ways can be viewed as both a technology offering and a business alternative. But its adoption today is driven more by economic rationale than by technology justifications. Cloud – as seen from the customer side – is more of compelling business economics than of complicated new-age technology. Though in delivery terms, cloud offering is a merger of state-of-the-art concepts like virtualization, server consolidation, interoperability and dynamic CPU provisioning, its risk-benefit analysis is purely driven by business imperatives. As a technology, Cloud Computing topped the Gartner’s Hype Cycle only as late as 2009. The hype has since then settled down and ‘computing in the ethereal cloud’ is slowly emerging as a cost-effective alternative to traditional computing. Irrespective of user, cloud offers a platform that converts fixed cost to variable costs. Again, irrespective of customer segments, cloud converts today’s upfront capital expenditure (CAPEX) to tomorrow’s deferred operational expenditure (OPEX). This paper focuses on the customer side perceptions of cloud adoption with a purely India-centric perspective.

In definitional terms, cloud computing is an on-demand, self-service, location independent, elastic, pay-for-use only, zero CAPEX, zero ownership, utility driven business model. Since cloud is a fairly new offering, there is bound to be a lot of inertia in its acceptance. This is because cloud offerings - from the product development lifecycle (PDLC) point of view - are at a nascent stage and hence perceived risks outweigh perceived gains. This paper focusses on the cloud adoption risks across four sectors – SME, BFS, Education and Hospitals. The four key risk categories identified in the context of cloud adoption are vendor related risk, security related risk, no-gain risk and efficiency related risk. The paper does a relative mapping of these four risks for each of the four mentioned industry clusters. Since cloud technology is only in the process of getting established and mainstream adoption is still a few years away, many of the cloud adoption fears are nebulous and will be removed once critical volumes start building up. Till such a maturation happens, cloud vendors will have to assiduously work out ways and means of assuaging the fears that inhibit adoption – real or perceptional. This paper is posited to be a pointer in that direction.

Cloud Computing being an evolving technology, current global literature is focused more on technology and less on business. There are enough studies conducted and published today on technology aspects like virtualization, multi-tenancy, proprietary structures, usage of open-source products, interoperability, data size management and the likes. Eventually the acid test for any technology is its market acceptance. As far as market adoption goes, cloud is on the verge of crossing the vital chasm between the early adopters and the
early majority. Early adopters have a psychographic profile of being venturesome and they are known to have fewer inhibitions in accepting a completely new technology offering. The current offerings, be it in applications, computing or storage is being lapped up by this target market. But early adopters constitute only a small single digit minority in any addressable market. The vital volumes are brought in by a large chunk of buyers who are called the early majority buyers. The early majority comprises of the pragmatists in the market and they cover the bulk of the real market. They tend to accept new technology only after measures against failure are reasonably in place. Need for referrals is a strong driver for a buy in this segment. Technology adoption by the pragmatic early majority is a crucial milestone for any nascent technology since adoption at this level will bring in the critical mass. This paper offers a multi-sector, emerging market, customer side view of cloud adoption, a technology that the authors believe is just one step away from the ‘early majority’ buyers.

Any new technology comes in with a set of risks – real, latent or perceived. Literature survey supported by previous work done by some of the authors and reported elsewhere indicates that there are four clear risk vectors for cloud adoption. They are vendor related risk, data security related risk, lack of significant cost reduction risk and system efficiency risk. The authors posit vendor related risk as the first dimension of perceived risk. Fear of lock-in with an incompatible vendor, lack of guarantee of business continuity and service availability, reputation fate sharing with a vendor and unclear licensing issues come under this risk profile. The next posited risk covers data security, data privacy, data confidentiality and loss of governance & control of IT delivery. The third risk posits that the gains that cloud purports to offer in terms of reduced capital and operative costs might not be sufficient enough to move from existing systems to cloud platforms. The last risk sums up the effects of latency, downtime, data bottlenecks and any other efficiency impediments.

As is the case with any systemic multi-risk environments, risks do not operate in silos. They tend to act together. Most of the time, multiple risks have a tendency to reinforce each other in such a manner that the cumulative risk effect will be much more than the sum total of individual risk effects. In the cloud risk scenario, an incompatible vendor can heighten the perception of loss of data security. The cumulating of vendor discomfort and lack of data security can reduce the sense of cost reduction advantages. Data bottlenecks and system downtime – two indicators of efficiency – can be eventually tracked in one form or the other to the vendors. Thus there is scope for multiple risks to operate together and enhance the cumulative impact. This ‘conjoining’ aspect of risk has been dealt with in this paper and will be explained in detail in the methodology section. The paper compares the relative weightage of the above-mentioned four risks across four customer segments – SME sector, banking sector, education sector and hospital sector. Each segment chosen is posited to have a different risk perception towards technology adoption.

Extensive literature is available today on each of the four vectors of posited risk. In addition, some work has already been done in looking at the risk-gain profile of different industry sectors that are poised to move onto cloud platforms. Before an inter-sector risk profiling is undertaken, a ringside literature survey is provided.

2. Literature survey

Extensive literature is available today on each of the four posited cloud computing risks - vendor related risk, data security related risk, lack of significant cost reduction risk and system efficiency risk. Similarly independent cloud adoption studies have been undertaken on each of the four sectors that this paper studies - SME sector, banking sector, education sector and hospital sector.

Michael. Ambrust et al (2010) refer to Cloud Computing as a symbiosis of applications delivered as services over internet coupled with the hardware/systems software in the datacenters that provide those services. A paper which has received wide citation, this Berkeley work delineates the roles of the pure cloud provider and the intermediary SaaS model packager. Brian Gammage et al (2009) talk about the strategic possibility of the ‘power of IT’ shifting towards external providers and users. The paper, which is essentially a Gartner report, tries to clearly define core vs. non-core strategies in the context of IT asset ownership and utilization. Both the Ambrust paper and the Gammage paper are umbrella works on Cloud Computing and offer a good starting point for zeroing in on specific risks vis-à-vis specific sectors.

Jeanne Capachin (2012) researches and reports on the slow yet steady cloud computing adoption by the banking sector. The paper covers contract management and regulations management in the context of key financial data moving to the public cloud. It has got a predominant US banking sector perspective. Paul L Bannerman (2010) has done an exhaustive comparative survey of all cloud research papers published between
2009 and 2010 and has come out with a comparative analysis of what are the various adoption risks – real and perceptual. The paper discusses various barriers to cloud adoption by reviewing opinions of industry commentators. Sarfraz Nawaz Brohi et al (2011) compare the challenges as well as the benefits in what they call the new Paradigm – Cloud Computing.

Chinyao Low et al (2011) investigates the factors that affect cloud adoption by firms belonging to the high-tech industry. Malden A Vouk (2008) maps the journey of cloud from technology to implementation. Easwar et al (2013) looks at the drivers and inhibitors of cloud adoption with a specific SME sector perspective. The data in this work is Indian SME data. Tara S Behrend et al (2011) examines cloud computing initiatives in the education sector. The paper is in the US context and examines the factors that lead to adoption of this technology from the perspective of both colleges and student community. Vladimir Vujin (2011) looks at the education industry and cloud computing, but more from a research support point of view. The paper talks about a reliable and scalable cloud environment that can foster scientific research and educational progress.

Alec Nacamuli (2010) in what is essentially an editorial piece stresses on the importance of cloud in banking in the days to come. The paper cites that regulation, data recovery, customer trust and innovation would be some of the key thrust areas which come in the cup of cloud computing and banking. Jeanne Capachin (2010) in another well researched article on banking focusses primarily on security issues that would be on top of mind for bankers when they think of 3rd party data storage. Chris Chatman (2010) focusses on another sector which has a clear cloud adoption focus – health care sector. The paper focuses on the dual concerns of data security as well as speed of implementation for the healthcare sector. Edward J Giniat (2011) offers more insights on cloud vs. healthcare.

To sum up, there is a body of literature available today which individually talks about cloud adoption in the context of SME, BFS, Education and Hospitals. But there isn’t enough literature available that does a comparative sectorial adoption analysis of Cloud Computing. This paper fills in that research void and proceeds to do a comparative risk profiling of cloud adoption across all these 4 sectors.

3. Problem formulation and research methodology

Cloud – as a technology – has already transformed itself from a mere hype to an implementable reality in the last few years. Enlightened technology maturation and acceptance by pragmatic ‘early majority’ users are the next logical steps towards an all-embracing acceptance of this ‘pay-as-you-use’ business model. Technology vendors are keenly working on solutions like ease of deployment, interoperability, server consolidation, economics of deployment and level of customization possible in their efforts to demystify the ethereal cloud. All these activities are actually happening today on the product front. The authors of this work feel that there should be a lot of simultaneous research thrust in positioning the cloud offering to potential enterprise level buyers. There has to be aggregate studies to analyze the resistance points to cloud adoption. The research approach undertaken in this paper is a step in that direction. The methodology adopted is quantitative and conjoint linear regression is used for data analysis. The survey was done on an online format with sufficient respondents chosen from each of the segments - SME sector, banking sector, education sector and hospital sector. The study presumes that the risk variables chosen are reasonably comprehensive in understanding adoption risks in cloud today.

As previously mentioned, there is a clear inertia at the client end in going for a full-fledged acceptance of cloud computing. This inertia is partly driven by the fact that many client industries have already invested heavily in technology and are reluctant to even partially abandon their on-premise traditional IT infrastructure. For a technology intensive company, the IT infrastructure investment would be a significant portion of their assets in the balance sheet. Any move to adopt a ‘pay and use’ type 3rd party platform would have ramifications on sunken assets and depreciation of these assets. In addition to capital investment, organizations currently running their IT in the traditional non-cloud mode have invested deeply in people and processes to run the well-oiled in-house IT infrastructure. Any significant cloud adoption will have to take into account a major people and process transformation. The operational cost elements and its reduction is explained in the next paragraph.
For organizations that are currently running their IT in the traditional non-cloud mode, their operating costs do not ‘naturally’ fall in step with higher and higher cloud adoption. The operating cost reduction is something that has to be strategically made to happen. Some of the cost elements of traditional in-house IT operating costs which will continue even after cloud adoption are maintenance costs, training costs, IT staff salary costs, utilities cost, supervisory staff salary costs, hiring costs, band width costs and a host of other associated costs. A systematic ‘people, process and policy’ transformation is required after cloud adoption to control these cost elements and thereby gain the full benefits of cloud computing. An industry / firm which is already into a deep financial lock-in in terms of existing sunken IT assets would have an adoption inertia towards cloud.

Another reason for the slack in adoption is that despite the buildup on cloud over the last few years, the ‘real’ gains from the cloud offering look hazy to the buyer. To compound the scenario, the risks of full-fledged cloud adoption are yet to be fully quantified. With main stream adoption for cloud predicted to happen in the next 2 to 5 years, this is the time for the cloud vendor industry to introspect on how their new offering will be perceived by the customer. The problem formulation of this paper is a step in the direction of sectorial risk profiling and assessment of cloud adoption. The paper posits that different sectors will have different relative risk perceptions and a correct assessment of the same will go a long way in tailoring custom-made cloud solutions for each sector. Incidentally, the previous subsection on literature survey quotes at least one paper which has done a significant cloud adoption study in each of the 4 sectors that this paper is working on.

As mentioned in the abstract, the four broad risk drivers for this study are vendor related risk, security related risk, no-gain risk and efficiency related risk. They have been arrived at by collating from literature the risk studies that have been previously done. Subsequently, discussions with industry experts are used to condense the risk mapping along the aforementioned four vectors. Once the four key vectors have been identified, they are paired in all possible combinations of twos, thus yielding $4C_2$ combinations; i.e. 6 combinations of risk. The six combinations are vendor + security, vendor + no gains, vendor + efficiency, security + no gains, security + efficiency and finally no gains + efficiency. The respondents are asked to distribute their relative risk perception weightages across the six pairs in such a way that the aggregate weightage comes to 100. In this trade-off scenario, the respondents are forced to streamline their relative perception of risks. The reason for the ‘pairing’ of the risk elements is given in the next paragraph.

In reality, risks do not come in ones, they occur together. Hence, seeking risk weightages at a one-on-one level would have ‘disjointed’ the risks in the respondent’s mind. In this context, the authors had the option of conjoining the risk elements either two at a time or three at a time. The ‘two at a time’ pairing option has been chosen because it would have become difficult for respondents to perceive the combined effect of 3 simultaneous risks. But, the process of pairing them has enabled the respondent to think in ‘conjoint’ terms before going for relative risk weightage assignment.

The $4C_2$ possible combinations can be represented in binomial terms as 1100, 1010, 1001, 0110, 0101 and 0011. The 1s and 0s are basically dummy variables which indicate the simple presence / absence of the risk(s) under study. A simple conjoint regression is done between the respondent’s percentage risk perceptions and the binomial combinations. The part worth of each risk is derived from the regression output. In all, 5 regressions are run - 4 individual regressions for each sectors and a common regression for all respondents to get the mean risk across all sectors. The aggregated risk profiling across all sectors is not of any specific application and is done only to enable a deviance analysis of each sector’s risk from the aggregate mean risk. All the 5 regressions yield an $R^2$ value of greater than 0.5 with education sector giving the highest value of 0.815 and SME giving lowest value of 0.574. The aggregate ‘all-responses’ $R^2$ value is 0.639. Along with regression studies, a correlation study was also undertaken by studying the correlation of relative risks across the four sectors. The correlation throws up similar and dissimilar industry pairs.

Care has been taken to ensure that there are at least 30 respondents from each sector. The study was eventually done on 150 respondents spread over SME (55), Hospitals (35), Education (30) and BFS (30). The entire sample consists of ex-ante users and hence the picture that emerges is purely one of risk perception and no way reflects a post-buy usage driven feedback. The questionnaire itself ensures that at the point of submission, the total risk weightage is exactly 100 across the six combinations of risk. Else, submission is not permitted. This ensures data consistency.
4. Analysis and interpretation

The paper basically aims at finding out a hierarchical associativeness of the four inhibitor variables on the potential cloud adopter of the four aforementioned sectors. At a one-on-one level, each of the risks is a significant deterrent. But when the market is asked to tradeoff between the risks, then distinct patterns turn up on what are the key inhibitors for a buy decision on a sectorial perspective. The paper looks at identifying the ex-ante preferences of the potential customers on the decision variables involved in cloud adoption. The part worth or utility functions that are determined for each risk gives the relative hierarchical importance that a given sector perceives for that particular risk as a tradeoff amongst various probable risks. The part worth associativeness that the study has indicated on a sector by sector basis will be a useful starting point in positioning the nebulous and intangible cloud offering to the proposed markets under study.

The relative perception spread of the four risks, as given by the respective part worth utility functions, is plotted for all the four sectors in Figure 1. Inferences on this behavior based on the results obtained are given on a sector by sector basis.

![Figure 1](https://www.ejise.com)

5. SME sector & cloud

The SME sector’s risk perception spread indicates that vendor related fears dominate the mindscape of the SME market. Since Cloud – as an offering - is new and there are multiple layers of cloud vendors (ibid Michael. Ambrust et al), there is an ambiguity on who is one’s actual vendor. At one layer we have the cloud utility vendor who provides computing and storage at the hardware level. At another layer, we have the cloud application vendor who packages / bundles applications like CRM and ERP along with pure play hardware. What the user gets is an amalgam of these two, vended out to him by the intermediary SaaS (Software as a Service) provider. Thus there is a perceived ambiguity of escalation point for the user when he needs trouble shooting. It is this dilemma which has given vendor related risk the highest risk ranking. If addition, cloud computing gives a plethora of offerings which can be purchased and used independently as well as conjointly. These are together clubbed as XaaS offerings and include – yet not restricted to – SaaS (Software as a Service), SaaS again (this time Storage as a Service), AaaS (Application as a Service), PaaS (Platform as a Service), NaaS (Network as a Service) and IaaS (Infrastructure as a Service). Each of them could have an independent sourcing vendor and an independent aggregating vendor. The unit by which the usage of each offering is priced is also different. All this can cumulate to heighten the vendor risk perception of the SME sector. In the absence of an expert IT think tank in most SME setups, the decisions are taken by the ‘management / promoters’ who might not completely understand the entire nuances of this multi-vendor platform.

The SME respondents themselves are proactive / reactive problem solvers in their domain. Hence, they instinctively understand the value of trouble shooting. The respondents currently perceive an inability to identify a feedback path by which they can solve their cloud adoption problems. This opinion, which was
obtained from random chats with SME respondents after they have filled up the questionnaire, can be posited as one of the reasons for the sector giving highest weightage for vendor risk.

The second risk is more easily explained. Data security, data privacy and its associated losses would weigh across all adoption classes and literature quotes the same as the key deterrent for wide spread cloud adoption. Since both vendor risk and security risk can be perceived even before adoption, they garner the top two perceived risk spots. The risk on ‘Efficiency’ will be felt only post adoption and hence it gets relegated to the 3rd spot. The inability to sense efficiency-related risk before adoption is not generic across sectors. This will be explained in the context of the next two sectors. Coming to the last perceived risk, the SME respondent market is apparently completely sold on the monetary gain aspect of Cloud Computing. Hence their risk perception of a ‘No Gain’ is just 13%. De-escalation of vendor ambiguity, authentication of data security and finally focus on delivery efficiency – this will be the pecking order that the SME client expects in approaching his risk mitigation in the context of Cloud.

6. BFS sector & cloud

The security risk is obviously the most overwhelming risk for the data sensitive banking sector. Of all the 16 part worth functions that have been arrived at (spread across 4 sectors x 4 risks), there is only one part worth function which has got a value in excess of 50%. This is for Security Risk in the context of BFS sector. Fears of data loss, privacy invasion, confidentiality loss, account hacking and the likes which can critically hamper banking operations add up to ensure that security risk gets a relative weightage of a whopping 61%. Banking – like any other sector in the verge of cloud adoption – definitely stands to gain from the classic cloud benefits of elasticity of usage, granularity of scaling and flexibility in pricing. Yet, this study indicates that the downside due to security fears override logical upside advantages.

The measurement and quantification of the non-cash, yet monetizable unknown risk component associated with cloud adoption has been analyzed by some of the authors of this paper in a different work (ibid Easwar et all 2012). On a sector by sector basis, one can segment and then do a weightage assignment for the possible risk factors that critically affect cloud adoption. Then, each of these weighted risks can be assigned a probability of the risk occurrence. This duality of relative weightage and probability will help in quantifying the effect of the individual risk. An aggregation of such risks elements – as applicable to a given sector – will yield a realistic value for the unknown risk component associated with cloud adoption. BFS looks like the most potential segment to start doing this risk analysis and mapping and some of the authors of this paper are working on the same in parallel. This paper only tries to look at the macro equation between BFS segment and data security. The connection is obvious according to the response data and the overwhelming 61% part worth for security risk.

Coming to the 2nd ranked risk, efficiency considerations and ‘cost’ of inefficiency are far more visible in banking sector than in a generic SME sector. BFS industry, which universally follows the norm of daily accounts closing and a day to day transaction reconciliation format, recognizes ex-ante the value of efficiency. In a different context, all online financial markets like stock markets, commodity markets, FOREX markets and call money markets require minimal down time and ‘zero’ latency as hygiene factors. Latency in cloud can be introduced by cloud elements and internet elements. In a global online financial market, where snap shot execution of trade decisions are critical, lack of efficiency will be a significant deterrent. It is for these reasons that BFS gives efficiency related risk the second highest weightage.

BFS is a very organized sector and its vendor calls are taken at national level. Given the scale of operations, there will be tight Service Level Agreements (SLAs) to ensure smooth operations. There will be in-house or hired IT expert panels to advice on the right choice of offerings and vendors. Hence the sector doesn’t perceive any significant vendor related fears. The 4th fear of ‘no gain’ wasn’t even statistically significant for this sector. This was the only sector for which a ‘statistically insignificant’ risk was obtained. The conjoint regression was re-run after dropping the ‘no gain’ risk to get the relative mapping of the remaining three risks.

7. Hospital / health sector & cloud

Health Sector and BFS sector show a remarkable similarity in their perception towards all 4 risks. Since both the sectors are part of the organized sector and remain well informed, their vendor related risk perceptions are low. Hospitals are as wary about data confidentiality as banks. Leakage of patient information can make
this sector morally and legally tenable. Today most hospitals have moved to a paperless health record format. Loss, temporary loss, swap or leakage of patient’s medical data can be calumnious to the industry. Thus, like banks, data security takes the top slot for Health sector also. Data security, in this context, encompasses the privacy element as well as the confidentiality element of data – two vectors which are highly critical for the data-sensitive healthcare industry.

The important of availability of right data at right time to right medical person cannot be overstated in the context of health. The possibility of a network / system failure in between a mission critical situation such as a time sensitive surgery might be highly detrimental to the actual outcome of the surgery itself. The very credibility of the medical fraternity is hinged on availability of dynamically updated patient data. Hence, efficiency risk comes a close # 2 to data security for health sector. Here again, as in BFS, there is a clear ex-ante judgement of efficiency losses. It is worth noting that amongst the 4 sectors, the health / hospital sector records the highest risk perception of efficiency for the reasons cited above. The no gain risk is the least perceived, a rank that it consistently maintains across all 4 sectors.

8. Education sector & cloud

The education sector’s high pitching of vendor risk could be driven by the fact that in this sector, students are also cloud users [unlike say in a hospital sector where the patients are not exposed to the cloud environment]. In a university, the student population would run into thousands and hence the load variability on cloud usage would be high. This creates problems with provisioning. Under provisioning of cloud services would result in service outages when the load peaks up. In education sector, there would be daily as well as seasonal peaking of load. In the Indian context, post-dinner hours would be heavy usage hours if the system is configured in such a way that academic material has to be downloaded from the cloud platform. Examination, placement and admissions time would create seasonal spikes in usage. To take care of such load variability, if the university goes for over-provisioning, it would lead to capacity under-utilization during non-peak hours. That would not be prudent from the costing perspective. Today, there are advanced technologies like ‘Cloud Bursting’ available where application deployment is essentially on a private cloud or private data center, but has got the capability of ‘bursting’ into a public cloud when the demand for computing capacity spikes up. Yet, such innovations are only emerging. Respondents of this paper are still wary of provisioning.

This scenario actually translates to a ‘vendor fear’ for the ex-ante market. We have respondents talking to us about vendor unpredictability in the context of what essentially is a provisioning driven system outage. This fear – like many other cloud adoption related fears – is purely perceptional. Yet, it exists in the potential customer’s mind space as the study suggests.

After vendor risk, security and efficiency risks are almost even for education sector. As earlier mentioned, no sector has got a significant ‘no gains’ fear. This can be attributed to the fact that the cloud vendor industry has really ‘sold’ the CAPEX and OPEX gains of cloud computing to the aspiring adopter markets.

As mentioned earlier, 5 independent regressions were done – the first four for the 4 independent sectors and the 5th across all 150 respondents. The relative risk perception of each sector vis-à-vis the mean risk of the total sample population is plotted in Figure 2.
It can be observed that the BFS sector and the Hospital sector tend to move together for all the risk vectors. These are two sectors that have a clear ex-ante perception of efficiency – as delivered by the IT framework – on their day to day operations. Latency effects again would have a higher bearing in a financial transaction or a medical case handling compared to the SME sector or education sector. Similarly the legal implications of a data breach would affect all industries, yet the effect would be far more pronounced in financial data as well as medical data. All this explain the correlation in risk perception between BFS and healthcare.

Similarly the SME sector and Education sector show some similarity in risk mapping behavior. In both cases, vendor risk is a higher priority compared to data security. It is worth noting that except for the pairs mentioned above, the risk perception correlations are not high for any other pair of industry sectors. This inter-pair correlation is mapped in the matrix given in Figure 3.

![Correlation Matrix of Inter-Sector Risk Mapping](image)

**Figure 3** Correlation matrix of inter-sector risk mapping

### 9. Conclusion

By way of a conclusion, the authors feel that this study will crucially help cloud service vendors to segment their positioning strategy after they understand the key inhibitors of cloud adoption for different markets. Cloud marketing being predominantly B2B, brochures, mailers, ads in sector specific magazines and other promotional campaigns can be tweaked at the last delivery mile to reduce fears and increase acceptance of this nascent technology.

Though the authors have fragmented the total risk along 4 vectors only, in reality, each of these risk vectors consist of fairly uncorrelated and independent sub vectors. Fear of service continuity, fear of reputation fate sharing and risk of mismatch between vendor architecture and client business needs are all part of the broad
umbrella of vendor risk. Same is the case with privacy, confidentiality and lack of control in the context of data security. A detailed relative analysis of these sub-risks is missing in this study. That can be construed as one of the limitations of this study at this point.

Cloud as an alternative is here to stay and the business gains of cloud adoption in terms of better Net Present Value is measurable. Cloud changes the paradigm from ownership of technology to utilization of technology. The authors of this paper feel that customer-centered research will facilitate good product as well as positioning strategies in such a way that cloud adoption fears are played down and gains are ushered in.

10. Future directions of research

The papers that are quoted from literature offer perspectives of cloud adoption risk only on a sector by sector basis. This paper attempts to capture a reasonably good framework of inter-sector relative risk comparison. But as mentioned in the previous section, this work has not explored the sub-risks that reside within each risk category. A segmented and weighted study of each sub-category of risk will enable the monetization of all risk possibilities. Such a monetary association of risk will go a long way in delineating the actual Net Present Value gains of Cloud Computing (ibid Easwar Krishna Iyer et al 2012). Some of the authors of this paper are currently working on such a study.

The second thrust in research would be a country specific research approach. The risk perspectives offered in this paper are highly India centric. The relative risk perception scenario could play out differently in another country. Again, some of the authors of this work are currently working on cloud adoption risk measurement in some neighboring emerging economies.

References

The Conditions of Complex Innovation Adoption Occurrence — A Critical Realist Perspective

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Abstract: The adoption of innovation is a multifaceted and dynamic phenomenon. It occurs as a result of the interplay between structural influences and agents’ activities. Although existing studies on innovation have recognised the importance of theories that link the structure, the macro level, and agency, the micro level, in explaining changes over time, few theoretical accounts support the integrations of multiple levels of analysis. The purpose of this paper is to develop an explanatory framework based on a realist social theory and underpinned by a critical realist perspective, with the intention of describing and explaining IS/IT adoption occurrences. The potential of the framework is empirically illustrated with a case study that examines the adoption of one Enterprise Systems Implementation Methodology by implementers in an implementation context. Our qualitative study provides explanatory insights and a rich description of a particular type of complex innovation. Four theoretically and empirically grounded modes of adopting an implementation methodology are identified: fragmented, aggregated, integrated and infrastructural. Using the framework allow us to achieve four things. First, the framework will support the researchers in identifying particular configurations and the pattern of events caused by them. Second, it will take into account the embeddedness of innovations that have occurred within broader structural configurations. Third, it will allow the researchers to distinguish the different stances agents might adopt toward particular innovations and structural configurations. Fourth, the researchers will be able to identify variations that have occurred in the adoption of innovations. This study offers a foundation for future work that may contribute to a more coherent view on complex innovations and insights into their potential adoption; as such, the findings presented here can provide guidance for practitioners who seek to adopt complex IS/IT innovations.

Keywords: IS/IT adoption occurrence, enterprise systems implementation methodology, realist social theory, critical realism, morphogenetic approach, modes of reflexivity

1. Introduction

IS/IT adoption represents a mature research stream within the IS field. Despite an extensive body of research, progress has occurred mainly at either an individual- or an organizational level, with less work devoted to linking the two levels (Sarker and Valacich 2010). Moreover, there has been gradual movement toward homogeneity of a type that might weaken innovation adoption research, a field that is dominated by the positivist paradigm (Fichman 2004), and to a lesser extent of the interpretive paradigm (Williams, Dwivedi, Lal and Schwarz 2009). Several authors have suggested a need for alternative paradigms and theories that might lead to a deeper understanding and alternative explanation of the IS/IT adoption (Williams et al. 2009). In line with these recommendations, we suggest an alternative approach that will provide valuable insights and explanatory purchase in the face of IS/IT adoption phenomena. The objective of this paper is to describe and explain potential IS/IT adoption occurrences of an Enterprise Systems Implementation Methodology (ESIM), which we regard as a type of complex innovation technology, by applying a Realist Social Theory (RST) that is underpinned by a Critical Realist (CR) perspective. The paper continues with a presentation of current trends in IS/IT adoption research, followed by a brief description of the CR perspective and RST, which is applied as a way to conceptualize IS/IT adoption. A framework is then developed and applied in order to explain the adoption of AcceleratedSAP, an example of an ESIM, in an ES-implementation context. The paper concludes with a discussion of the implications of the findings and some promising avenues for future research.

2. IS/IT innovation adoption

There is a rich diversity in the research streams and theories available within the body of IS/IT adoption literature. Several studies point to the Technology Acceptance Model (TAM) as having a dominant position in IS/IT adoption research. For instance, based on a review of 211 IS/IT adoption studies published in IS journals and conferences between 2000 and 2006, Liu, Min and Ji (2008) found TAM to be the most influential among the theories employed, having been applied in 40% of the aforesaid studies. TAM is followed by the Diffusion...
of Innovation Theory (DoI) and Theory of Planned Behaviour (TPB). DoI was applied in 12% of the studies reviewed and TPB in 10%. Williams et al. (2009) also found TAM to have a dominant position (29%), followed by DoI (16.3%) and TPB (5.6%) in their review of 345 studies on innovation adoption, acceptance and diffusion research, published in IS journals between 1985 and 2007. Williams et al. (2009) observe a gradual moving towards homogeneity that might weaken innovation adoption, acceptance and diffusion research, dominated by a positivist perspective, empirical and quantitative research, and survey method. Besides different underlying perspectives, i.e. positivist and interpretivist, the dominant theories focus on determinants or behaviours at the individual or organizational level of IS/IT adoption (Basole, Seuss, and Rouse 2013). While DoI focuses on the organizational adoption of IS/IT, TAM, TPB and Unified Theory of Acceptance and Use of Technology (UTAUT) address the individual adoption of IS/IT (Oliveira and Martins 2011). Moreover, focusing on the impact of technical and contextual variables on technology adoption, positivism takes a deterministic view that IS/IT adoption and its outcomes can be objectively described and predicted. Empirical findings show unpredictable effects, however, which often cannot be explained from a deterministic viewpoint (Venkatesh, Thong and XU 2012). Unlike those scholars, interpretivists attempted to understand IS/IT adoption as it is experienced by actors through their meanings and frames of reference. Due to their reliance on empirical epistemology, the resultant descriptions and explanations of IS/IT adoption have been confined to observable regularities that provide a one-dimensional view of the IS/IT adoption phenomenon at organizational- or individual level. Within the positivist perspective, the variance models have accorded contextual factors a deterministic influence on the regular occurrence of IS/IT adoption; within the interpretivist perspective, the process models have accorded importance to social actors, who differ from one another by virtue of their knowledge and skills.

Notwithstanding the extensive research to date, the progress of technology adoption research has mainly been at either the individual or organizational level, with little focus on how to link the two levels (Venkatesh, Davis and Morris 2007; Sykes, Venkatesh and Gosain 2009; Sarker and Valacich 2010). In addition to such one-dimensional views, these models fall short in explaining changes in the occurrence of IS/IT adoption. Moreover, the positivist and interpretivist perspective lead to theory-practice inconsistencies (Smith 2006), and introduce a problematic notion of causality, as they are based on Humean assumptions of regular cause-effect relationships within positivism, and interpretations of meanings and idiographic phenomena within interpretivism (Sayer 2000). Critical realism (CR) therefore has been suggested as a potential means of overcoming these inconsistencies (Smith 2006), guiding analysis of factors involved in technology adoption and use (Dobson, Jackson, Gengatharen 2011) and enriching IS research (Carlsson 2012). Underpinned by a CR perspective, Archer’s Realist Social Theory (RST) (1995; 2007) seems to be a promising alternative for providing causal explanations of complex, dynamic and multilevel phenomena (Wong 2005) and a CR-based development of IS theories (Carlsson 2012).

3. Theoretical framework

The insights garnered from a review of the extant literature have yielded a preliminary understanding of the potential issues that might be overcome by adopting a CR perspective. This section provides a brief introduction to CR and to RST.

3.1 Critical realism perspective

The central tenets of CR, as developed by Bhaskar (1989) and expanded upon by several authors (Archer, Bhaskar, Collier, Lawson and Norrie 1998; Sayer 1992), are: stratification, causal explanation, differentiation and emergence. The notion of stratification draws attention to the ontology of CR, which regards reality as being stratified into three separable but interrelated domains: the real, the actual and the empirical (Figure 1). The stratified ontology directs the critical realist toward an explanatory focus on the domain of the real, where unobservable mechanisms generate observable phenomena in the actual and empirical domains.

Causal explanation concerns the identification of causal mechanisms that reside in the domain of the real and generate events in the domain of the actual. Although events in the domain of the actual might be unobservable, they are nevertheless experienced. Experiences of the events that populate the domain of the empirical are observable but represent only the starting point of inquiries intended to result in causal explanations. The form of causal explanation advanced by CR is different, on one hand, from the Humean notion of causality based on law-seeking cause-and-effect relationships expressed by observable and regular
conjunctions of events (Smith 2006). This form of causality does not consider humans with their reasons, choices and activities, which are significant ingredients for social phenomena. On the other hand, it is also different from the notion of causality based only on interpretation of meanings and idiographic phenomena (Sayer 2000). Hence, rather than focusing on observable regularities or interpretation of meanings, CR directs attention towards identification of structural and causal mechanisms residing in the real domain of reality. In the context of this study, causal explanation involves the identification of causal mechanisms, which contribute to the occurrence of ESIMs adoption and under what conditions they are adopted in an ES implementation context.

Figure 1: The three overlapping domains of reality in CR ontology (Mingers 2004)

The notion of differentiation emphasises an analytical and temporal distinction between structure and agency since the former is dependent on the activity of the latter - i.e., structure pre-dates agency. Owing to their distinctive properties, structure and agency are considered capable of independent variation and temporally distinguishable as being out of phase, because the two operate over different tracts of time (Archer 1995). Stratification and differentiation are related to emergence, which “derives from interaction and its consequences which occur in time” (Archer 1995:14). Operative in open systems, emergence is embedded in interaction when structure and agency shape and re-shape one another over time (Archer 2010).

3.2 Realist social theory

The tenets of CR underpin RST, which is based on the notions of analytical dualism, as a theorizing tool and a foundation for social analysis and explanation of social change (Archer 2010); morphogenesis, as an explanatory framework for social change; and, reflexivity, which provides explanatory purchase for agents’ distinctive stances toward their social circumstances. In order to theorize the interplay between structure and agency, Archer (1995) has suggested the notion of analytical dualism, that emphasise the fact that structure and agency are interdependent but analytically separable and temporally sequenced. In addition to an analytical separation, Archer (1995) also has suggested a separation between structure and culture. Both provide insights into the social context that depends on, but cannot be reduced to, agency - i.e., to individuals and their activity. Structure and culture on the one hand, and agency on the other, therefore are not only two separate strata but are also understood to be temporally differentiated. Furthermore, structure and culture are held to have existed prior and to have exerted a causal influence upon agency - i.e., to have enabled or constrained human activity. Agency, which mediates the influence of structure and culture on individuals, has the power to reproduce or transform structure and culture, but it is the individual who possesses the relevant powers that enable agency - e.g., reflexivity, self-consciousness and intentionality (Archer 1995).

In this study, analytical dualism informs the interpretation of IS/IT adoption as a concrete phenomenon regarded as a manifestation of the interplay between a social context (structure, culture and groups of agents) and human activity (agents’ stances and interactions). The means by which Archer (1995) suggests the operationalization of analytical dualism are represented by a morphogenetic cycle that consists of the structural/cultural conditioning of groups; interaction; and, a structural/cultural and group elaboration phase (Figure 2).
In the first phase, at Time 1 (T1), the cycle begins with and is informed by the structural-cultural properties available from previous interactions to have occurred in the social context. According to Archer (1995), these are emergent properties and represent relationships which entail: a) material resources such as wealth, power or expertise with regard to structure; and, b) ideational sources such as doctrines, theories or beliefs, with reference to culture. The distribution of material resources and the composition of ideational sources pre-groups agents into collectives with under-privileged positions as primary agents and organised groups with privileged positions as corporate agents. Primary agents are mobilised to advance the interests of corporate agents, who have emergent powers that they exercise in promoting and articulating their vested interests in maintaining or improving their positions. Relationships of compatibility or incompatibility, and necessary or contingent create different situational logics. The four situational logics that provide directional guidance and motivate agents to maintain or alter the status quo are:

1) correction generated by relationships of necessary incompatibilities,
2) protection generated by relationships of necessary complementarities,
3) elimination generated by relationship of contingent incompatibilities, and
4) opportunism generated by relationships of contingent compatibilities (Archer 1995).

Each situational logic provides directional guidance for different forms of strategic action and shapes the situations that differently positioned ES implementers confront when they interact at the second phase of the morphogenetic cycle. While the first phase directs the attention towards structural and cultural properties delineated by distributions of material and ideational resources and situational logics encountered by agents with different vested interests, the second phase focuses on interaction.

In the second phase, T2-T3, the focus is on agency and concerns the interaction and emergent properties of peoples possessing reflexive power. They act by virtue of their subjectively defined concerns with regard to three orders of reality: a) well-being concerns with regard to natural order; b) performative achievements with regard to practical order; and c) self-worth with regard to social order. Representing what they most care about, the concerns are organically prioritized and are realized through projects that are adjusted to reflect the objective circumstances created by previous cycles. The interplay between people’s configurations of concerns i.e., what they most care about and their context generates four distinctive modes of reflexivity and related stances:

1) an evasive stance in the case of communicative reflexivity due to ultimate concerns in inter-personal relationships,
2) a strategic stance in the case of autonomous reflexivity due to ultimate concerns in performative achievements,
3) a subversive stance in the case of meta-reflexivity due to ultimate concerns in value rationality, and
4) a passive stance in the case of fractured reflexivity due to a lack of ultimate concerns and hence disconcerted (Archer 2007).

When dominant, fractured reflexivity produces a passive agent, i.e. one to whom things happen, whereas the dominance of the first three modes of reflexivity indicates an active agent with a distinctive stance towards structural and cultural constraints and enablements. Owing to their bargaining power and negotiating
strength, which are delineated by material and ideational distributions of resources and their relations with other agents, their interaction, which takes place between T2 and T3, ensues in structural elaboration/reproduction at T4.

In the third phase, T4, interaction ensues in the form of structural-cultural and group elaboration i.e., reproduction (morphostatis) or transformation (morphogenesis). As a result of exchange and power transactions, agents undergo: a) re-grouping, as of initial ideational sources - i.e., propositions, theories, doctrines; and b) re-constitution of material resources - i.e., wealth, power and expertise are re-distributed during morphogenesis. Due to differentiated resources, the transactions between agents are realized in terms of power, while evenly distributed resources involve exchange transactions. The results represent the start and structural conditioning of the next morphogenetic cycle, at T1.

3.3 A realist conceptualization of IS/IT adoption

Informed by RST, IS/IT adoption occurrence is regarded as a manifestation of the interplay between situational logics and stances of interacting agents over time. Figure 3 illustrates a realist conceptualization of it.

Working within this framework adaptation in structure, which is a precursor of technology adoption (Khanagha, Volberda, Sidhu and Oshri 2013), is enabled by particular situational logics, and interaction through power or exchange transactions is undertaken by agents who take particular stances towards their context in order to achieve their concerns. Adaptation and interaction, which are internally related to each other, together generates particular IS/IT adoption occurrences. The morphogenetic cycle provides us the means to examine and provide potential explanations of IS/IT adoption occurrences and their variations over time.

4. ESIM adoption – the case of ASAP

The retrospective case reported in this study concerns ASAP, an ESIM adopted by the SAP vendor. The study adopts a qualitative approach, which subsumes a combination of qualitative data collection techniques, documents and semi-structured interviews. A retrospective analysis is conducted in order to explain the adoption of an ESIM from early 1980s until 2004 through four morphogenetic cycles. Each cycle depicts a particular adoption occurrence as the interplay between the situational logic and the implementer’s stance. The shape of the distribution of material resources, such as wealth, power or expertise and ideational resources, such as doctrines, theories or beliefs, which are related necessarily or contingently in compatible or incompatible relationships serve as indicators for particular situational logics. The configuration of material and ideational resources express structural relationships between the roles and activities on the institution of the SAP implementation context and ideational relationships between ASAP, the implementation process and the SAP product. The lack of or predominance of concerns for productivity, quality of products or relationships characterising different modes of reflexivity, serve as indicators for particular stances. The adaptation enabled by different situational logics is examined with regard to content and purpose of ASAP and the interaction.
facilitated by different stances undertaken by implementers is assessed based on the relationships of power or exchange between implementers and other agents.

The examination of ESIM adoption occurrences follows the conditionings, interplay and outcomes phases of the morphogenetic cycle. Four different adoption occurrences: fragmented, aggregated, integrated and infrastructural, have been identified and are described below.

4.1 Fragmented adoption — early 1980s–1988

The first morphogenetic cycle delineates the occurrence of a fragmented adoption taking place between early 1980s and 1988.

**Conditionings:** Available on the market as early as the 1970s, “off-the-shelf” or generic application packages, which could be customised to better meet the buyer’s needs began to attract increased interest among customers in the period beginning in the early 1980s. One of the few suppliers of generic software applications and contributors to the growth of the software industry was SAP AG. By the early 1980s the company develops and provides a configurable and mainframe-based business application with integrated modules, known as R/2. The underling ideas of providing a configurable product are to reduce potential problems related to the development cycle of the application package and to facilitate a rapid implementation. These ideas was rather different from the prevailing view on IS development and the use of technology to support and automate an organization’s existing processes. As a global company, SAP is organised with centralised management and decentralised operations through its subsidiaries around the globe. As one of SAP’s subsidiaries, SAP America benefits from operational autonomy and focuses on providing complementary services exclusively to their service partners.

**Interplay:**

**Situational logic:** By the early 1980s, there had been an explosion of corrective repairs initiated via the reinterpretation of IS development methodologies and system development processes in an attempt to resolve the inconsistencies between them. The majority of developers were engaged in corrective efforts directed toward system development content and system development processes. The few organizations that followed the path of Enterprise Systems (ES), such as modular software providers, integrated general guidelines and provided training congruent with the principles and assumptions that underpinned their ES solutions. Shaped by the principle of rapid implementation of and configurable application packages, SAP’s implementation methodology takes shape as a complementary part to the implementation process of the R/2 product. The corrective ideational repairs fostered by SAP challenged the dominant IS doctrine on the IS market and in IS education, and coincided with a protective effort to preserve their integrated operations and role as both developer and implementer of the R/2 product. The **selective adaptation** occurring in the SAP implementation context is achieved through a limited extension of the content of implementation methodology by adding cognitive support the technical transformation support. Hence, the content consists of principles of a buy-in approach and configuration of R/2 provided by SAP.

**Implementers’ stance:** Although continuously increasing, the number of ES vendors, who like SAP, were both developers and implementers of ES solutions remained limited compared with the number of IS developers, which dominated by the early 1980s. Due to fractured reflexivity, delineated by undetermined concerns and disconcerted experiences, SAP implementers, as both developers and implementers were passive in their orientation towards SAP implementation context. However, they did attract the interest of an increasing number of customers, who increase the legitimacy of SAP syncretic endeavours and improve its market position. They attempted to advance the alternative principles of a buy-in approach, but also sought to reuse their expertise in IS development, augmenting their distress in implementation and precluding the formation and pursuit of purposive ES implementation activities. The difficulties encountered in articulating and prioritising their ultimate concerns in relation to R/2 implementation confined implementers as a dependent and subordinated collectivity in reactive and **power-induced interaction** controlled by the R/2 developers.

**Outcomes:** The effects of selective adaptation realised through a limited extension of the content of the implementation methodology and a reactive power-induced interaction controlled by R/2 developers, contributes to a **fragmented adoption** of implementation methodology by passive implementers in a situation
of corrective protection. Passive implementers serve the interests of the R/2 developers who promote a buy-in package approach, as an alternative to in-house development in a centralised organisation of interlocking roles and interchangeable personnel with concentrated distribution of resources, most of them oriented towards the development of the R/2 product. This structure of necessary and complementary roles is accompanied by a culture with necessary but contradictory ideas advanced by the syncretic ideas of a buy-in package approach, which gain legitimacy from customers. The position of SAP, as a generic application package provider, is consolidated in the market. However, as differentiated access to material and ideational resources intensifies between developers and implementers due to exploration and integration of operations, an undermined ability to make resilient differences in implementation and a pronounced dependence of developers on subordinated implementers and the need to satisfy customers’ interests, emerged as an unintended side-effect in the SAP implementation context.

4.2 Aggregated adoption — 1989–1992

The second morphogenetic cycle delineates the occurrence of an aggregated adoption of implementation methodology taking place in the SAP implementation context between 1989 and 1993.

Conditionings: SAP grows rapidly and by early 1990s the company introduces a new generic application package called R/3, which is based on a novel system applications architecture. The generic application package incorporates functionalities of its predecessor R/2 but it is based on a client-server architecture, which provides the benefits of portability, inter-operability and scalability. In order to benefit from the business processes embedded in the application package, the customer is required to re-engineer its business processes in accordance with R/3 product. SAP America concentrates its efforts on the one hand, in marketing and selling SAP application packages and the other hand, developing strategic partnering relationships and providing support services exclusively to their partners. In their turn, the partners provide consulting, implementation support and support services for SAP implementation to customers. The relationship between SAP and its partners is beneficial for both. SAP focuses more on generic application package development and installation and less on implementation services, which in the case of SAP America are exclusively managed by its independent partners on integration, project management and customer services. Both SAP and its partners retain their operational autonomy and differentiate themselves by specialising in complementary areas of expertise. In addition to knowledge of SAP products, the partners contribute to implementation projects with skills accumulated from previous projects and expertise through their own methodologies. However, these methodologies are specialised in particular part of implementation and differ with regard to content, congruence and efficiency in SAP implementation projects. Despite this variety of complementary but contingently related operations and expertise, and although SAP’s generic application package continues to increase in popularity, its implementation is far from being without challenges. Both vendor and its partners encounter operational obstructions and practical problems in implementation projects.

Interplay: Situational logic: Exploding demand for SAP solutions and for implementation resources, which were limited in terms of the available expertise available, encouraged an increasing number of consulting companies and SAP vendor to join together. Due to their differentiated distribution of resources but complementary areas of expertise, defensive alliances were initiated that shared a common interest in legitimizing SAP ideas for a buy-in package approach through defensive protection. There was mutual recognition of benefits between the ES vendor and its implementation partners, but both actors also retained sectional interests in their own operations and in being able to offer diversified services. Part of their protective efforts entailed the reuse of the available but limited SAP implementation methodology content and the reproduction of their own expertise by adding project management and BPR services. The selective adaptation occurring in the SAP implementation context is realised through a horizontal expansion of the implementation methodology content with added control and analysis support provided by independent partners.

Implementers’ stance: Differentiated partners were able to mobilise and exchange material resources, particularly human assets and expertise. Due to communicative reflexivity, delineated by an ultimate concern for the maintaining of concordant inter-relationships, SAP and its partners were evasive in their orientation toward the SAP implementation context. They conceived their operations within available but differentiated resources. Their exchange induced interaction, realised through cooperation was based on shared interests and an active but circumventing response intended to avoid potential constraints due to a lack of, or incongruent expertise in different SAP implementation areas. They also simultaneously renounced potential
opportunities such as those that would have allowed them to augment their positions and resources and taking a proactive role in differentiating their implementation expertise. Contentment with their position insulated against external stimuli and sustained the reproduction and efficiency of their own operations and expertise.

**Outcomes:** The effects of a selective adaptation realised through a horizontal extension of the content of the implementation methodology with potential risks for inconsistencies and an exchange-induced interaction of cooperative partners contributed to an *aggregated adoption* of implementation methodology by evasive partners in a situation of defensive protection. As the content relied on the rapid aggregation of complementary but limited parts provided by independent partners, the content of implementation methodology presented an increased risk of inconsistencies. Evasive partners with shared interests in their interrelationship are promoting a systematisation of a buy-in package approach, in a sectional organisation of independent roles and differentiated distribution or resources, most of them oriented towards project management and configuration of SAP’s product. This structure of necessary and complementary roles and relations is accompanied by a culture with necessary and complementary ideas, legitimised by an increasing number of partners and customers. The position of SAP as provider and its partners with sectional interests in implementation is consolidated in the market. However, a selective assimilation of novelty and a reduced variety among implementation partners emerged as unintended side-effects in SAP implementation context.

4.3 Integrated adoption — 1993–1995

The third morphogenetic cycle delineates the occurrence of an integrated adoption of implementation methodology taking place in an SAP context between 1993 and 1995.

**Conditionings:** After the release of the R/3 product in 1992, SAP America’s product registered an impressive increase in sale, even though the actual implementation of the product remained a challenge. The expertise necessary to implement the R/3 application was shallow. In addition, partners used their own implementation methodologies, which often were better suited to system development than to the task of implementing R/3. SAP America’s lack of commitment in the implementation process and the complexity of the R/3 are issues of discontentment and concern for customers who are not only unprepared for the idea of business process reengineering but also increasingly dissatisfied with the partners’ performance, support and knowledge about R/3. Hence, SAP America is induced in a frustrating situation. Ignoring its customers’ concerns could be costly and risky in the long run, not least in view of the increasing competition from other ES vendors such as Oracle. Although both SAP America and its partners are wealthy, they are dependent on each other and their expertise is complementary but incongruent with their interests. In order to tackle this challenge, supported by SAP America’s service division, a team of consultants with past experience having participated in joint SAP implementations were assigned to develop an implementation methodology.

**Interplay:** *Situation logic*: ES implementation partners joined together on their own terms and were operationally autonomous. Guided by their own sectional interests, they pursued the opportunity to differentiate their operations and services. Alternative ES implementation strategies, as well as specialized ideas about the role of SAP application packages in organizations and SAP implementation processes began to gain support from different groups of implementers and customers. While an ES implementation based on a vanilla strategy entailed the configuration of R/3 product, the alternative, “chocolate” strategy involved considerable customisation of the R/3 product. Mobilised by SAP America, a team of implementation partners extended the underlying ideas of a buy-in package approach and the implementation process, and exposed a complementary implementation methodology with congruent content. Alternative but complementary operations and services remained salient in practice and were exposed through conferences. The *comprehensive adaptation* taking place in the SAP implementation context was achieved through a vertical extension of the implementation methodology content with added cooperation and representation support provided by an implementation team.

**Implementers’ stance:** Committed to accumulating and integrating differentiated resources in a systematic fashion, implementation partners joined together and organised their efforts. Due to meta-reflexivity delineated by organic concerns in exposing best practices, implementation partners were subversive in their orientation toward the state of SAP implementation context and concentrated on providing a specialised set of
ideas and resources that were compatible with an SAP implementation role. Their exchange-induced interaction, achieved through collaboration, was based on a commitment to integrate resources in an attempt to improve quality and raise value rationality in the SAP implementation. Their commitment to the integration and protection of quality in an SAP implementation context came at a price but long-term achievements were valued more.

Outcomes: The effects of a comprehensive adaptation achieved through the vertical extension of the content of the implementation methodology and an exchange-induced interaction of collaborative partners, contributed to an integrated adoption of implementation methodology by subversive implementers in a situation of protective opportunism. A subversive team of collaborative partners with shared interests in value rationality and quality was stimulating a systematisation of an implementation methodology in a cohesive organisation or interrelated roles and similar distribution of resources. This structure of contingent but complementary roles and resources was accompanied by a culture with necessary and complementary ideas sponsored by SAP and legitimised by an increasing number of customers. A display of the alternative values that might animate the interests of passive and diversified partners has emerged as an unintended side-effect.

4.4 Infrastructural adoption — 1996–2004

The fourth morphogenetic cycle delineates the occurrence of an infrastructural adoption of the implementation methodology occurring in an SAP implementation context between 1996 and the early 2000s.

Conditionings: By 1996, the outcome of the initiative taken by SAP America and the work of the implementation team was represented by an implementation methodology that had been added to SAP’s product development portfolio and extended their complementary services. The implementation methodology was introduced to SAP’s partners and customers as AcceleratedSAP (ASAP), and was recommended as a de facto standard for all SAP implementations, managed not only by SAP’s consultants but also its partners. The implementation methodology was included in SAP’s professional services - i.e., training and certifications, and demonstrated at conferences arranged by the SAP vendor. In addition, it was actively promoted through TeamSAP, which was an initiative that entailed a combination of the vendor’s resources, including personnel and technology and its service partners in all SAP implementation. Moreover, a new role was added to all SAP implementation projects, namely, a SAP coach, whose level of involvement in the implementation project could range from that of project manager to quality assurance advisor. In 1999, ASAP was enhanced via the implementation of related support tools such as the SAP Solution Manager platform, which was integrated into all SAP installations free of charge and was thereafter owned by the customer. Moreover, the Solution Manager platform could be used during evaluation and implementation as well as in the normal operation of a SAP solution; the platform came to comprise part of SAP’s NetWeaver platform. Some of SAP’s implementation partners continued to cooperate with SAP in implementing R/3 solutions, but initiated the development and deployment of their own methodologies by extending and/or integrating elements of ASAP. Others deployed ASAP and collaborated with the vendor to enhance it. Positive results in terms of efficiency and effectiveness were indicated by SAP and its service partners after the introduction of ASAP. Moreover, SAP took a more active role in supporting customers’ implementation projects and required the involvement of an SAP representative in all projects. The initiative was met with mixed feelings, in some cases being well received and in others being regarded as an added burden imposed on the already hectic schedules of consultants who first needed to acquaint themselves with ASAP. It was also perceived as another training or resource hiring cost, or as a way to increase partners’ dependence on SAP’s products.

Interplay: Situation logic: Implementation partners with their own interests and differentiated resources in an SAP implementation context were disadvantageous and affected customer satisfaction, the performance in the implementation process and the quality of the implemented SAP product. In order to show commitment to its service partners and customers, SAP takes an active position in promoting complementary resources. A comprehensive adaptation occurred in the SAP implementation context through a connective extension of the implementation methodology content with organisational, coordination and production support provided by a dedicated team. A platform of diversified and specialised but complementary resources were recommended and endorsed through certification programs in the implementation context.

Implementers’ stance: In concentrating on sustaining satisfactory implementation performance, implementation partners were active in capitalising on availabilities and circumventing constraints. Due to autonomous reflexivity, delineated by an ultimate concern on proficiency and feasible performance
achievements, SAP took a strategic stance towards its implementation context and connected specialised and diversified resources in a comprehensive platform of services and resources. Aware of the limitations and benefits of an SAP implementation, a dedicated team harnessed the compliance of various resources and circumvented certain constraints through an active and coordinated involvement in a power-induced interaction.

Outcomes: The effect of a comprehensive adaptation, entailing the connective extension of implementation methodology content and a power-induced interaction coordinated by SAP, contributed to an infrastructural adoption of implementation methodology by a strategic implementation team in a situation of offensive opportunism. A strategic implementation team with particular interests in task and productivity achievements was promoting a specialisation of distinctive roles and diversified distribution of resources. This structure of contingent and complementary roles and resources was accompanied by a culture with contingent and complementary ideas legitimised by implementation partners and an increasing number of customers. Intensification of sectional and divergent interests and reduction of interaction among implementation partners emerged as unintended side-effects.

5. Conclusion

This study has provided an alternative conceptualisation of the IS/IT adoption phenomenon, one informed by a RST underpinned by a CR perspective. Despite its complexity, RST facilitates an emergent and stratified account of a complex innovation, thereby providing a potential explanation for the occurrence of IS/IT adoption and its variations over time. Four things have been achieved in applying the suggested framework: First, it has supported the researchers in identifying particular innovation configurations. Second, it has taken into account the embeddedness of innovations within broader structural configurations. Third, it has allowed the researchers to distinguish the different stances of agents toward particular innovations and structural configurations. Fourth, we have been able to identify variations in how certain innovations have been adopted; such variations have been seen to have often occurred as a result of the interplay between structure and agency over time. Our qualitative study has provided explanatory insights and a rich description of a particular type of complex innovation and its adoption over time.

Four theoretically- and empirically-grounded implementation methodology adoption, with related conditions, have been identified:

- A fragmented adoption, where a selective adaptation achieved through limited extension to ESIM’s content and a power-induced interaction achieved through a control of passive implementers, takes place in a situation of corrective protection;
- An aggregated adoption, where a selective adaptation realised through horizontal extension to ESIM’s content and an exchange-induced interaction realised through cooperation of evasive partners, takes place in a situation of defensive protection;
- An integrated adoption, where a comprehensive adaptation involving a vertical extension to ESIM’s content and an exchange-induced interaction realised through collaboration of a subversive team, occurs in a situation of protective opportunism; and
- An infrastructural adoption, where a comprehensive adaptation consisting of a connective extension of ESIM’s content into a platform and a power-induced interaction attained by a strategic team through coordination, occurs in a situation of offensive opportunism.

The labelling and classification of implementation methodology adoption occurrences suggested in this study are corroborated by empirical evidence from literature and the study’s case. In spite of its usefulness, a morphogenetic approach is comprehensive, tending to enlarge the focus of an inquiry, making it difficult to incorporate and consider all aspects within a limited study, such as this one. Hence, the potential explanation provided in this study captures only components appropriated to describe and explain the adoption of ESIMs and its variations over time in an ES implementation context. However, the occurrence of ESIM adoption might be supported or counteracted by other mechanisms, which are originating and might be identified in other contexts, such as ES operation context, generic application package development context, or an ES educational context.

While there is much research still to be carried out on this subject, this study offers a foundation for future work that may contribute to a more coherent view of IS/IT adoption phenomena. One potential avenue is to
examine the adoption of implementation methodology introduced in the study after early 2000s. By this time, the use of ASAP seems to oscillate between an infrastructural and integrated adoption through incorporation of advancements, such as Application Lifecycle Management (ALM), IT Infrastructure Library (ITIL), agile and lean development, production and management. Moreover, the use of ASAP is extended to an ES operation context and seems to take the form of a fragmented adoption in this context. Another potential avenue is to apply the realist IS/IT adoption framework developed in the study in other settings in order to refine it and to provide better conceptualisations and explanations of complex phenomena. Moreover, another possibility could be to enhance the explanatory potential of the realist IS/IT adoption framework by formulating coherent design propositions that provide high-level guidance for practitioners who find themselves in similar situations.

References

Defining Social Technologies: evaluation of social collaboration tools and technologies

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Abstract: The popularity of social technologies continues to grow in the society. The term ‘social technology’ is often referred to digital social networks such as Facebook, Twitter, LinkedIn, etc. In order to this a redefinition of this concept based on the original definition is needed. Nowadays the concept of social technologies has several aspects which destabilize the dominant status of technology. It emphasizes social sciences and the humanities as society shapers, reconsiders the strength of social dimension in technological sciences. The aim of this paper is to provide insight into the concept of social technologies, to develop its meaning in information and knowledge society by evaluating social collaboration tools and technologies. Design/methodology/approach – The research results have contributed to the knowledge of the concept of social technologies. Based on the analysis of scientific literature and results of empirical research in the Focus group as well as Content analysis, theoretical framework for defining the concept of social technologies was developed. The paper presents effects’ relation analysis with particular social collaboration tools and technologies. Each tool and technology was evaluated by all positive/negative effects simultaneously by setting hierarchical impact of the effect on a tool or technology. Research limitations/implications – The research is limited in a few aspects. To understand the concept of social technologies more deeply and to develop technological perspectives in social sciences a broader theoretical and empirical research is necessary. In order to generalise the research findings, it is recommended that further research includes different dimensions from the perspective of other fields of science.

Keywords: social technologies, social engineering, social collaboration, social media, millennial generation

1. Introduction

In today’s world, when the time cost is substantial and competition is fierce, the importance of new technologies is increasing. Surveys conducted by analysts such as Forrester Research demonstrate that popularity of social technologies continues to grow in the society from politics to personal communication, from production of building materials to state management. The term ‘technology’ could no longer be understood in its narrow sense as manufacturing processes and equipment necessary for production. Technical definition of social space is a broader concept and can be modified to the next level of technology that can be defined as a social problem in search for and implementation of the decision theory approach (Derksen et al, 2012). The concept of social technologies became established in different fields of science in recent decades. It includes a new research area for interdisciplinary research practitioners as well as major practical application and the potential to make a real impact on social reality.

Social technologies – “the computer code and the services that enable online social interaction – are, essentially, the product of 40 years of technology evolution and the fulfilment of a long-held vision of what computers and digital technology could do” (Chui et all, 2012). In their research authors also state “that the Web’s growth in reach and capability, and as a medium for interaction, set the stage for the explosive growth of social technologies”. Social technologies unleash creative forces among users and enable new relationships and group dynamics. In the hyperactive world people can feel immediate benefits in connecting with the right peers, getting answers to questions and finding information. The Millennials, also known as the Millennial Generation (Generation Y), are people born between 1980 and 2000 (Alberghini, et al., 2010). They are now entering the workplace and have different habits and communication forms than the older generation. According McKinsky Global Survey “Americans spend approximately 11 hours a day communicating or consuming messages in various ways, including in-person, watching TV, reading, and using e-mail” (Chui et all, 2012). Just as email and instant messaging replaced the phone call, social technologies could have a similar effect in changing communication dynamics (De Gennaro, 2010). “Freed from the limitations of the physical world, people are able to use social technologies to connect across geographies and time zones and multiply their influence beyond the number of people they could otherwise reach” (Bughin et al, 2011).
Koo et al (2011) emphasized, that “even though the term ‘social communication technologies’ is most commonly used to refer to new social media such as Twitter and Facebook, a redefinition of this concept based on the original definition is needed”. Nowadays the concept of social technology has several aspects which destabilize the dominant image of technology. It emphasizes social sciences and the humanities as society shapers, reconsiders the strength of ‘soft technologies’, and restores focus to human actors. It means that social technology is increasingly salient as an object of study for social sciences: sociality is more and more something that people create technically (Derkzen et al, 2012). “The instrumental, techno-scientific approach to social life is not the exclusive province of social scientists any more, it demands all the more attention as an object of study” (Mayer, 2009).

Social collaboration tools and technologies which fall in to category of cloud technology were evaluated in this paper.. This category was emphasized as one of twelve disruptive technologies that will change life, business and the global economy (Manyika et al, 2013).

The purpose of this research paper is to provide insight to the concept of ‘social technologies’, and to develop the role of social technologies in information and knowledge society by analyzing new needs and application forms of social technologies. The theoretical framework for defining the concept of ‘social technologies’ was developed based on the analysis of the scientific literature and the results of empirical study in the Focus group and content analysis.

2. Theoretical insights to the concept of social technologies: evaluation of this concept and its possible definition

Technologies recently have become an inseparable part of human life in all dimensions. According D. MacKenzie and J. Wajcman (1999) “technologies feed, clothe, and provide shelter for us; they transport, entertain, and heal us; they provide the bases of wealth and of leisure; they also pollute and kill”. Despite of all physical demands, technologies also actively mediate in the communication of people, making it easier, more affordable and accessible. The concept of social technology was born in the light of development of communication and collaboration processes in society in dimensions of business, government and community, as well as in the process of interaction between them. In this chapter the brief overview of the evolution of the concept of social technology will be presented, having in mind its connection with communication and collaboration processes.

Nowadays society in everyday life deals with big number of different collaboration tools and technologies. In general meaning collaboration can be defined as the communication of two or more people, who are interacting in order to reach the common goal. Thus such definition does not reveal the essence of this social phenomenon. In scientific literature can be found the idea, that communication is not a trait possessed by an individual, but rather the consequence of a certain type of interaction; specifically, one that has interdependent functionality (Scott-Phillips et al, 2012). This means, that communication is a process, a certain activity, which is done every second in business, government and society. Also the collaboration must be understood as special process, interaction of interdependent subjects. Modern information technologies have brought into reality the necessity of adaptation to the fast speed of information sharing, creating and distributing among actors, located in different states or even continents. For fulfilment of such high requirements a large scale of various social tools and technologies are proposed to the market.

Collaboration tools and technologies comprise an increasingly important part of the information and communications technology infrastructure in organizations, related to key areas such as knowledge management, process improvement, teamwork, and supply chain management (Weiseth et al, 2006). Thus, in modern word collaboration tools and technologies are disengaged from the frames of organizational infrastructure and became easily accessible and affordable not only for business units, but also for governments and society. Such processes made the usage of the concepts of tool and technology very wide, but in some aspects not clear. According to Wikipedia, tool is any physical item that can be used to achieve a goal, especially if the item is not consumed in the process. The synonyms of the “tool”, may be such word as "instrument". The set of tools needed to achieve a goal is "equipment". Thus the technology can be defined as the knowledge of constructing, obtaining and using tools. (Wikipedia, 2013a). Technology in its technical meaning is a whole of production processes, tools, which are necessary to produce certain production, and involves general (the cultivation and adaptation of stocks) and additional (transportation, storage, control and
documentation) manufacture processes (Vaitkevičiūtė, 2000). If we transpose this technological definition in the context of social sciences, we would find out that collaboration technology is a whole of collaboration process, including all collaboration tools and in addition all knowledge of their interaction. This means that the concept of tool is narrower and should be understood as a part of technology, which can consist of number of different tools, which usage is concerted and meaningfully placed into consistent process or the interconnected set of it. Furthermore, the concept of collaboration tools and technologies must be supplemented with support of information technologies in order to reveal the importance and modern value of innovative collaboration. Here, the definition of e-collaboration should be shortly described. The term e-collaboration is increasingly being used in industry to denote collaboration activities supported by some form of information and communication technologies (Weiset et al, 2006). Electronic collaboration (e-collaboration) is collaboration using electronic technologies among different individuals to accomplish a common task. This is a broad definition that encompasses not only computer-mediated collaborative work, but also collaborative work supported by other types of technologies (Kock, 2005). In systematic approach it should be easily noticed, that the integrated concepts of e-collaboration tools and technologies can be changed into one of the most modern definition of social technology, which was first mentioned at the University of Chicago by A. W. Small and Ch. R. Henderson around the end of the 19th century (Wikipedia, 2013b). Henderson (1895) had used the term ‘social art’ for methods by which improvements to society are and may be introduced; “social scientists are the ones who make predictions and social art is what gives directions”. The term ‘social technology’ has dual meaning (Li and Bernoff, 2011): as a term from its introduction was related to ‘social engineering’ (Schotter, 1981; Sugden, 1989; North and Wallis, 1994; Nelson and Sampat, 2003; Nelson, 2002; Pelikan, 2003, Leichter, 2011), and since 21st century it gained another meaning as a ‘social software’ (Johannessen et al., 2001; Andersen, 2011; Duarte, 2011; Leibetseder, 2011; Bugin et al, 2011; Derksen et al, 2012).

In modern understanding of social technology, it could be applied for various purposes, such as decision making, knowledge sharing, etc. Social technologies can be defined as any technologies used for goals of social or with any social basis, including social hardware (traditional communication media), social software (computer mediated media), and social media (social networking tools) (Alberghini, et al., 2010). Chui et al (2012) defines social technologies “as digital technologies used by people to interact socially and together to create, enhance, and exchange content”. Social technologies distinguish themselves through the following three characteristics (Bugin et al, 2011):

- they “are enabled by information technology”;
- they “provide distributed rights to create, add, and/or modify content and communications”;
- they “enabled distributed access to consume content and communications”.

Social technologies include a wide range of various technological instruments that can be used by people, private or public sector organizations, or as an interaction tool between them. They include many of the technologies that are classified as “social media”, “Web 3.0”, and “collaboration tools” (see Figure 1).

All these types of social technologies can be described in terms of three dimensions (Johannessen et al., 2001):

- Richness: “the ability to convey verbal and nonverbal cues, and facilitate shared meaning in a timely manner”;
- Interactivity: “the extent to which rapid feedback is allowed”;
- Social presence: “the degree to which virtual team members feel close to one another”.

Different technologies may be better applicable for conveying data-information-knowledge, while others are better suited for convergence-related tasks such as making decisions. For example, “e-mail facilitates well the fine-tuning and re-examination of messages, but richer synchronous technologies (such as videoconferencing) are needed to resolve differing viewpoints among team members and to develop a consensus for decision making” (Montoya-Weiss et al, 2001).

The definition of social technology is characterized by multiplicity and the concept is not defined unambiguously. The term ‘social technology’ is defined as a set of potentially arbitrary effective social challenges refillable solution, ways to achieve the intended results, doing social impact of human, social
groups, different social structures' behaviour (Alberghini, et al., 2010; Bugin et al, 2011; Chui et al., 2012). Social technologies are much more than a consumer phenomenon: they connect many organizations internally and increasingly reach outside their borders (Bughin et al, 2013).

According to the Figure 1, all listed social collaboration tools and technologies from the discussion forums to the crowd – sourcing, may be conditionally separated into three big groups: e-business tools, e-government tools and e-community tools. Such separation is only conditional, because every tool, used in certain sphere, has a potentiality to be used in other one. For example: social networks, as a tool for communication, which may be defined as a set of socially relevant network members, connected with one or more relations (Carrington & Scott, 2011), nowadays is widely used in marketing and in involvement of society into decision making processes. Or the crowd-sources, well known also as a collective intelligence, in the course of evolution, from the tool of business units, used for marketing issues, is already transferred to the e-government platform as an instrument for more effective work and decisions. As it visually showed in the Figure 1 different listed tools are interacting between each other and cooperating depending on the goals, which are set by their users. All mentioned social technologies have some common characteristic: the better accessibility and affordability, granted by the usage of collaboration tools.

*Public administration

Source: Ammended schema first published at Skaržauskiene et al (2013)

Figure 1: Social collaboration tools and technologies

The concept of social technology generally is inseparable from the concept of information and communication technology. Thus this definition, despite of its popularity and wide application may be named as narrow approach of the general category of social technology. Some scientist suggest to disassociate from the informational technologies and reveal the meaning of social technology in wider scope, as all possible problems solving methods, when some negative social phenomena with a help of certain combination of tools and methods, is changed into more desirable in society (Urmonas, 2007; Buračas, 2007). Thus, even this wider attitude (in distance with the compulsory connection with technological progress as a main characteristic of social technology), gives us the same keywords, for defining social technologies: innovative, more effective and changing the common processes.
3. Empirical interdisciplinary approach to analysis of the perception of tools of social technologies

A Focus group method and content analysis were chosen for an empirical research. The research group established the workshop “Defining Social Technologies” during the International conference on Social Technologies at Mykolas Romeris University, Lithuania, in October, 2012 and later on discussions. During the workshop the selection procedure for Focus group representatives was made. The results received in the Focus group were supported with the results of virtual brainstorming using social technologies developed by MRU Faculty of Social Informatics. In the context of interdisciplinary understanding of Social technologies concept mix of Field (natural) and Nominal (also known as Delphi technique) types of Focus groups were used (expert choosing is reasoned in table 1 below). In total, 13 experts from 9 research fields and 10 countries participated in discussions via three sessions. All sessions were organized in the period of 8 month during the year of 2012. Focus group method was chosen for its following features according Kimel (2003): “(a) it provides rich depth of understanding of the phenomenon of interest; (b) it is valid used in isolation from other research methods (might be used to support quantitative research as well); (c) it is as useful and as strong as its link to the underlying research question and the rigor with which it is applied; (d) it provides concentrated amounts of rich data, in participants’ own words, on precisely the topic of interest; (e) it provides critical information in development of hypotheses or interpretation of quantitative data”. As Social technologies is a phenomenon missing clear definition the Focus group method was chosen as appropriate according to the goals and the object of the research.

According to Grudens-Schuck et al. (2004) composing Focus group with highly different characteristics (such as status, income, education, personal features, etc.) will decrease the quality of the data. Interdisciplinary research requires different characteristics. In order the data not to decrease in quality Focus group members were unfamiliar with each other and kept away from direct contact in sessions 1 and 3. Session 2 was conducted in natural environment with careful monitoring of the process. Anonymity among experts does not lower validity of collected data and is appropriate characteristic for this type of empirical research (Tidikis, 2003). Focus group method has some limitations (challenges) as according to Kimel (2003) they are as follows: (a) small number of participants; (b) limited generalizability, (c) group dynamics can be a challenge, (d) time consuming interpretation, (e) requires experienced analysts. Challenges of the method were overcome with experience of and thorough analysis executed by researchers.

Part of results gathered during this focus group were previously published in 4th international conference on Information systems management and evaluation, RMIT University Vietnam, Ho Chi Ming Sity, Vietnam 13-14 May 2013 (see reference Skaržauskienė et al 2013).

Table 1: Analysis of experts’ relevant characteristics

<table>
<thead>
<tr>
<th>Expert</th>
<th>Main research field</th>
<th>Research work in ST field experience (in years)</th>
<th>Research work experience (total in years)</th>
<th>Country of affiliated research institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expert 1</td>
<td>Communication</td>
<td>6</td>
<td>17</td>
<td>The Netherlands</td>
</tr>
<tr>
<td>Expert 2</td>
<td>Economics</td>
<td>3</td>
<td>14</td>
<td>Denmark</td>
</tr>
<tr>
<td>Expert 3</td>
<td>Economics</td>
<td>5</td>
<td>5</td>
<td>Spain</td>
</tr>
<tr>
<td>Expert 4</td>
<td>Education</td>
<td>2</td>
<td>9</td>
<td>Norway</td>
</tr>
<tr>
<td>Expert 5</td>
<td>IT</td>
<td>7</td>
<td>21</td>
<td>Portugal</td>
</tr>
<tr>
<td>Expert 6</td>
<td>IT</td>
<td>6</td>
<td>11</td>
<td>Finland</td>
</tr>
<tr>
<td>Expert 7</td>
<td>IT</td>
<td>6</td>
<td>8</td>
<td>Germany</td>
</tr>
<tr>
<td>Expert 8</td>
<td>Law</td>
<td>2</td>
<td>5</td>
<td>Lithuania</td>
</tr>
<tr>
<td>Expert 9</td>
<td>Management</td>
<td>3</td>
<td>13</td>
<td>Poland</td>
</tr>
<tr>
<td>Expert 10</td>
<td>Management</td>
<td>6</td>
<td>8</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>Expert 11</td>
<td>Mathematics</td>
<td>5</td>
<td>19</td>
<td>Lithuania</td>
</tr>
<tr>
<td>Expert 12</td>
<td>Politics</td>
<td>2</td>
<td>17</td>
<td>Finland</td>
</tr>
<tr>
<td>Expert 13</td>
<td>Sociology</td>
<td>2</td>
<td>8</td>
<td>Lithuania</td>
</tr>
</tbody>
</table>

1 Social Technologies
2 Information technologies
According to Skaržauskienė et al (2013) outcomes of the content analysis revealed that essence of Social technology is seen in 7 different sub-fields (grouped in to major fields) and is close in characterization to the content of concept descriptions found in scientific literature. Focus group data analyses showed that both conceptions of social technologies are still vivid though gradually compiling to one. As social technology with the aspect of social engineering is to be understood as (a) public policy creation means; (b) group behaviour pattern creation methods/means; (c) individual behaviour shaping means; in the social software field of social technology the subfield of social networking tools those two seemingly different aspects are starting to combine. Other sub-fields (collaboration tools, information aggregation tools, knowledge aggregation tools) in social software field are more of a separate sphere more oriented not to changing current structures or forming new ones, but more related to the collective of the community/society.

Social technologies is a possible solutions to a problem when any event a combination of tools and techniques (technology) support is replaced by the more socially desirable. It is practically any activity which is replaced by the object. As a counterbalance to this general concept of social technologies, in research lays another concept, simplifying pre-defined from the theoretical approach on the study of innovative technical device. At its most narrow sense social technologies can be understood as information and communication tools that have a range of economic, social, cultural or other public life processes available to each person: computers, smart phones, social networks, etc. Thus, the analysed object is called an instrument through which members of the public relevant information just become available. Both general and as most narrow concept of social technologies gives out the same keywords - social technology is what is innovative, efficient, and changes us past the usual social processes.

Additional notices, relevant to a deeper understanding of the concept of social technologies, were abstracted from the ideas presented in Focus group discussion.

Experts in line with the discussion of the content of social technology concept suggested possible negative or positive effects of this phenomenon. Positive effects were mostly related to social technology as a collaboration or information/knowledge aggregation tool, as in this case it was taken as tool helping to assure efficiency of the processes in collaboration, while negatives rose from social technology as social networking tool with the agenda of personal data privacy or face-to-face communication skills. No strong opinions were given on positive or negative effects of social technology as social engineering. Previous paper (Skaržauskienė et al 2013) presented extraction of positive and negative effects made by social technologies in general. In this paper effects’ relation analysis with particular social collaboration tools and technologies were analysed (accordingly in Figure 2 and Figure 3). Each tool and technology was evaluated by all positive effects simultaneously by setting hierarchical impact of the effect on a tool or technology. For example: Shared workspaces were discussed to be as much encouraging innovations as helping to generate collective intelligence and having twice or more times bigger impact on time management; so in the Figure 3 in the Shared work space column 20 percent is given to effects Innovation encouragement and Collective intelligence and 60 percent to Time management effect. The same evaluation was executed with negative effects.

Results of analysis of positive effects of social collaboration tools and technologies are diverse, though some tendencies emerged. Most innovations encouraging and collective intelligence aggregating tools and technologies analyzed belong to e-community group. Time management is mostly emerging in e-business and e-government groups. Most of tools and technologies are evaluated to encompass only two of three effects. E-democracy, business information systems, media and file sharing, social software seem to be weak in innovation encouragement; which may be explained by the essence of tools and technologies mentioned, as they are more related to management of exiting information rather than creation of new. Blogs/microblogs, social networks, gamification, social gaming seem to be weak in time management, and all of them are high in innovation encouragement. This suggests that time management and innovation encouragement even both are positive effects, but they might be difficult to optimize together. Online public administration services seem to be weak in collective intelligence. Again, it might be explained by the essence of this unit, as online services in public administration are being encouraged with the goal to save time for administrative actions, not managerial. Encouragement of innovations may occur by emerging necessity to save more time in routine tasks. If the dichotomy of policy making and implementation is denied, much wider area for innovations might be encouraged via online services in public administration which could include not only issuing of documents, but two way dialog between person and institution..
Figure 2: Positive effects of social collaboration tools and technologies

To sum up: Time management effect is mostly seen in Media and file sharing and Social software; Collective intelligence effect is equally often seen in Crowdsourcing, Blogs/microblogs, Wikis, Rating and reviews, E-democracy; Innovation encouragement effect is mostly seen in Gamefication and Social gaming.

Further in Figure 4 analysis of negative effects of social collaboration tools and technologies is presented.

Figure 3: Negative effects of social collaboration tools and technologies
Results of analysis of negative effects of social collaboration tools and technologies are less diverse as in positive effects analysis. Most negative effect on user generated content emerges in e-community group. Most negative effect on safety emerges in e-government and e-business groups. Most negative effect on satisfaction in interpersonal communication emerges in e-government group. Similar leverage by all three effects is found on Crowdsourcing, Wikis, and Social gaming; (with exclusion of Safety affect) on Online learning systems, Rating and reviews, and Discussion and forums. Online public administration services and Gamefication seems to be weakly affected by user generated content; it might be explained by the essence of those units as accordingly either there is not much user generated content, or that content is not of great official importance.

Social software, Social networks, Crowdsourcing, and Wikis are considered to be least affected by safety issues. Dissatisfaction in interpersonal communication is the least with Blogs/microblogs. Social art tools and technologies did not get to this diagram, as they are not seen as negative effect producers (except matters related to intellectual property protection in unusual environments).

To sum up: Negative effect on User generated content quality is mostly seen in Wikis and Online learning systems; Negative effect on Safety affect is mostly seen in Gamefication, Business information systems and Rating and reviews; Negative effect on Satisfaction in interpersonal communication is mostly seen in Online PA services and Shared workspaces.

4. Conclusions and discussion: The potential and risks of social technologies

Summarizing theoretical insights, results from the Focus group research and content analysis the following conclusion and questions for further research on the potential and risks of social technologies can be formulated:

Despite rapid application of social technologies, much more lies ahead. Today, more than 80 percent of the world’s online population is interacting via social networks on a regular basis, but 65 percent of the world population-4.6 billion people-still lacks internet access (McKinsey research, 2012). The real power of social technologies is only started to be understood. Social interaction via technologies is a powerful way to efficiently organizing knowledge. The same effect is valid to culture, economics, and political power. As has been seen in early use of social technologies, when these ways of interacting are applied to commercial and professional activities (e.g. developing and selling products, working together to solve a business problem), the resulting value creation is impressive (Chui at al, 2012).

The application of social technologies in organisational management has become crucial for success in network society. Nevertheless, over the next few years the emerging “social technologies” of Web 2.0 and Web 0.3 are likely to transform the management. Social technologies enable organisational interactions to take place online with the scale, speed, and economics of the Internet. Virtual networking teams have made management more efficient, because they are reducing the costs of communication, collaboration and coordination. McKinsey’s fifth annual survey on social tools and technologies shows that when integrated into the daily work of employees and adopted on a large scale throughout a new kind of business—the networked enterprise—they can improve operations, financial performance, and market share (Chui at al, 2012).

Social technologies are becoming the preferred method of communication of new generations and communication styles are evolving into a more collaborative approach (Alberghini, et al., 2010). According with Forrester analysts as De Gennaro and Fenwick (2010), there are key trends that will make the inclusion of social technology in society life a necessity. These trends are the physical distance between teams and the entrance of Millennials into the workforce (De Gennaro, 2010). These new employees bring very different needs, experiences, and expectations to the job and often meet a seasoned workforce that has very different work styles (Schooley, 2009). New technologies allow people to raise questions, share knowledge and ideas, and discover people skills regardless of hierarchy.

It can be concluded that the current function of social technology is for social purposes via digital means. At its most narrow sense social technologies can be understood as information and communication tools that have a range of economic, social, cultural or other public life processes available to each person: computers, smart phones, social networks, etc. Respondents reported benefits from the use of social technologies for various purposes: first of all reducing communication costs, increased speed to access knowledge, decreasing travel costs, and increased creativity. According empirical research results positive effects were mostly related to social technology as a collaboration or information/knowledge aggregation tool, as in this case it was taken as tool helping to assure efficiency of the processes in collaboration, while negatives rose from social technology.
as social networking tool with the agenda of personal data privacy or face-to-face communication skills. Chui et al. (2012) and other also researchers from McKinsey Global Institute, working in the field of social technologies identified several risk groups: “employee time spent “chatting” about not work-related topics on internal or external social networks or using social media to attack fellow employees or management”, different risks related to consumer privacy, information security and data security. These risks could limit the ways in which social technologies can be applied. Also “censorship and restrictions on Internet use stand in the way of value creation by companies that hope to enable consumer to interact with them and that wish to harvest deep insights from social data” (Chui et al, 2012).

Social networking capabilities are providing vital information in a way that is adaptive and user-driven. However, all these technologies have limitations that can easily lead to misinterpretation, as with the lack of non verbal communication, they are not capable of providing the same quality of communication as eye-to-eye interaction. “Because of delays in transmission and the lack of social and nonverbal cues, communication technologies can interfere with open communication, knowledge sharing, and the ability of teams to identify and resolve misunderstandings” (Cohen, Gibson, 2012). Old generations tend to be sceptical about social technologies. Therefore, it is important to implement something useful, to monitor the user engagement and to educate the community for using social technologies (Alberghini et al, 2010). Online collaboration, in its current state, is not a very good substitute for the sort of unscripted, face-to-face interactions that are critical to producing genuine breakthroughs. And complex coordination tasks, like those involved in the design of a new aircraft, still require a dense matrix of “strong ties” among critical contributors, rather than the “weak ties” that are typical of web-based communities (McKinsey Global Survey, 2012).

Social technologies enable more and more users to become a part of global conversation, creating their own content rather than just consuming it. However, the quality of user-generated content varies dramatically – from excellent works of journalism to spam and even abuse. Bauerlein (2008) critics have argued that the very disintermediating power of social technologies has reduced the overall quality of discourse. Carr (2010) have argued that the short-form content made me available through social technologies is making people less able to digest large and complex amounts of information. The opposing view is that even our existing means of content selection didn’t ever assure quality, that the diversity of opinions is healthy, and that if people can learn social media literacy, access to a broader set of opinions can actually promote critical thinking.

Discussion about social technologies potential ought to be a possibility to address the following question for future research, through fundamental conceptual reflections and empirically-oriented contributions: which social technologies are most important in current social environment? How can we study them? What is the future of social technologies and network society?

References
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The Five-dimensional Reflective Cycle Framework for Designing Financial Information Management Systems Courses

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Abstract: Financial Information Management Systems (FiMS) or Accounting Information Systems (AIS) is a cross-discipline subject, often taught by Computing and Accounting disciplines. In recent years, demand for this subject has grown. However, educators have lamented high failure rates among AIS students; professional bodies have reported that graduates lack sufficient meta-cognitive knowledge of information systems to perform their tasks. Students have reported that their knowledge of databases, enterprise resource planning and relevant technology topics is lacking. Quality teaching of FiMS or AIS requires instructors to actively update their knowledge of accounting systems and information technology as well as to reflect on their teaching techniques. Reflection and reflective practices are taught within the education discipline (Birenbaum and Amdur, 1999; Carlo, Hinkhouse and Isbell, 2010), information technology as well as to reflect on their teaching techniques. Reflection and reflective practices are taught within the education discipline, and have grown in popularity among many other disciplines. Yet little has been written about how accounting and IT professionals reflect on their practice and how they apply their reflections to their teaching. Through our case study at an Australian university, we discuss (1) the rationale for the importance of constructivist theory, cognitive load theory, reflective and action-research in teaching and learning, (2) Bloom’s Revised Taxonomy, (3) the application of Bloom and the reflective concept for the design and delivery of FiMS courses, (4) reflection on our strategies for applying these concepts (5) how reflective professionals can assist instructors in the design and delivery of FiMS courses and, (6) how the proposed five-dimensional reflective cycle framework can assist academics in the design of AIS courses. Our study supports the view that reflection, within the proposed framework, is an effective strategy; and that Bloom’s Revised Taxonomy and the PEER Model are tools which can assist instructors to teach FiMS and AIS courses in a way that enhances participants’ learning abilities. We present a five-dimensional reflective cycle framework that facilitates reflective practice among academic and professional instructors for designing, delivering and evaluating FiMS and AIS courses.

Keywords: constructivist theory, Bloom’s Revised Taxonomy, active learning, five-dimensional reflective cycle framework, evaluation, financial information management systems (FiMS), accounting information systems (AIS)

1. Introduction

FiMS or AIS is a cross-discipline subject, often taught by Computing and Accounting disciplines. The standard of the courses must meet the requirements of professional bodies. The American Institute of Certified Public Accountants and the International Accounting Education Standards Board have specified that new accountants should be sufficiently familiar with technology to assess risk and automated business processes (IFAC, 2007; Harrast, Strong and Bromley, 2010). FiMS or AIS is required as one of the core units for admission as an associate member of the Certified Practising Accountant (CPA) Australia and is included within the Commerce degree programs in many universities in Australia and the US (Lenard, Wessels and Khanlarian, 2010; Badua, Sharifi and Watkins, 2011; Essayyad and Ortiz, 2011; Zhou, Djatej, Chen and Senteney, 2011).

FiMS or AIS is a relatively new area in the Accounting discipline; in recent years, demand for it has grown (Ragan et al. 2006; Harrast et al. 2010; Lenard et al. 2010; Badua et al. 2011; Vatanasakdakul and Aoun, 2011; Zhou et al. 2011). However, it has been reported that the integration of technology into the curriculum has been slow (Roberts, Kelly, and Medlin 2007; Harrast et al. 2010). Students have reported a lack of database knowledge, Enterprise Resource Planning and relevant technology topics including business accounting systems, spreadsheets and encryption (Harrast et al. 2010; Kearns, 2010). Educators have lamented high failure rates among accounting information systems students (Yong and Aoun, 2008; Vatanasakdakul et al. 2011). Professional bodies, employers and academics have voiced concern that graduates lack sufficient meta-cognitive knowledge of information systems to perform their tasks or are ill-equipped to meet the challenges of working in modern organisations (Velayutham and Perera, 2008; Harrast et al. 2010; Rai, Vatanasakdakul et al. 2011; Tan and Seder, 2010; Badua et al. 2011).

Quality teaching of FiMS requires instructors to actively update their knowledge of accounting systems and information technology as well as to reflect on their teaching techniques. Reflection and reflective practices are taught within the education discipline (Birenbaum and Amdur, 1999; Carlo, Hinkhouse and Isbell, 2010),...
and have grown in popularity in other disciplines e.g. health education (Thorpe 2004; Plack and Greenberg 2005; Mann, Gordon and MacLeod 2009). Reflective studies have been introduced in engineering (Kelly, 2008), computing (Hazzan, 2002; Hazzan and Tomayko, 2003) and accounting disciplines (Samkin and Francis, 2008; Hancock et al. 2009, McGuigan and Kern, 2009, 2010). However, accounting students have found the concept of reflection difficult to comprehend and educators are warned about additional workload to staff (Samkin et al. 2008). Schön (1983), an influential thinker in developing the theory and practice of reflective professional learning, recognised the significant contribution of critical reflection in the development of professional knowledge. Schön provided examples of how other professions reflect, however he did not include accounting and IT professionals in his books. Little has been written about how accounting and IT professionals reflect on their practice and how they apply their reflections to the teaching of FIMS or AIS.

This paper explores the question: how can a five-dimensional reflective cycle framework assist educators in the design of FIMS or AIS courses? We discuss (1) the rationale for the importance of constructivist learning theory, cognitive load theory, reflective and action-research in teaching and learning, (2) Bloom’s Revised Taxonomy, (3) the applications of Bloom and the reflective concept to design and deliver FIMS courses, (4) reflection on our teaching strategies in applying these concepts, (5) the application of the proposed five-dimensional reflective cycle framework in designing AIS courses and, (6) conclusions about the possible benefit of the framework to computing and accounting academics in the design and delivery of FIMS or AIS courses.

2. Literature review

Constructivism’s perspectives on the role of the individual, on the importance of meaning-making, and on the active role of the learner have had great impact on instruction and curriculum design (Jones and Brader-Araje, 2002). Constructivist learning theory states that learning is an active process of creating meaning from experiences based on the learner’s current or past knowledge (Dalgarno, 1996; Denton, 2012). Learners interpret concepts and principles in terms of the ‘schemata’ that they have already developed (Biggs and Tang 2011, p.22). The interpretation of concepts adds to learners’ cognitive load. The cognitive load can be high when students are doing a task in a new domain as they have to learn new skills while performing the task. Cognitive Load Theory (CLT) states that human memory consists of sensory memory, working memory - where schemas are generated during learning - and long-term memory where knowledge is stored in the form of schemas (Sweller, Merrienboer and Paas 1998). The working memory is limited to holding about seven items (Miller, 1956). To overcome the limitations of working memory, schemas which help to systematically store and access information are created during the learning process (Sweller et al. 1998). A well designed instructional material would present the new information such that the schema generation is within the working memory of a learner (Sweller et al. 1998). Instructional strategies that encourage deeper thought and further consideration of course topics lead to robust discussions and heighten student interest and motivation levels. Deep learning occurs when students are able to connect with course topics, find value in them and see how to apply them to real-world situations (Delottel, Millam and Reinhardt, 2010). The performance of students in carrying out novel tasks will depend on their abilities and trainings in a similar domain, as well as their motivations (Maslow, 1987). To motivate students, it is important that students view AIS subject as being relevant to their needs (Kears, 2010). To enhance relevance, Shulman and Luechauer (1993) recommended that educators use real-world problems, provide examples of the importance of information to the students’ careers and encourage students to ask questions about the material. Roberts et al. (2007) called for accounting students to be actively involved in the learning environment in order to acquire the skills demanded by the profession.

Schön (1983) introduced the terms ‘reflection-in-action’ and ‘reflection-on-action’. He describes reflection-in-action as ‘thinking on our feet’, the thinking and reflecting that happens in the midst of activity and, reflection-on-action as the thinking and reflecting that occurs after an event. Killion and Todnem (1991) extended Schön’s concepts to include reflection-for-action which is to review what has been accomplished and identified constructive guidelines to follow to succeed in the given task in the future. The importance of reflection is noted in the literature and reflective capacity is regarded by many as an essential characteristic for professional competence (Mann et al. 2009). There are four key dimensions of reflection: describe, analyse, transform meaning and action (McGuigan et al. 2009). Biggs et al. (2011, p.45-46) introduced the term transformative reflection and defined it as a multi-stage process: reflect-plan-apply-evaluate.

Reflective practice requires action-research. Action-research is when teachers perform research on themselves, their students, classrooms, etc. for the purpose of improving teaching and learning (Carlo et al.
Through action-research, the teacher is self-monitoring the improvement of their decisions and actions. Action-research involves changing the teaching practice using whatever on-the-ground evidence that the teacher can obtain and use to inform the right action (Biggs et al. 2011, p.51). The one-minute paper is a technique whereby students write brief answers to questions such as: What do I most want to find out in this class? What was the main point left unanswered in today’s session? One-minute papers have been used in varied courses e.g. chemistry, art history, multicultural seminars, accounting, economics (Stowe, 2010). One-minute papers benefit students and instructors by providing feedback on what was clear and what may need further attention through the use of reflection (Johnson and Aragon, 2002).

3. Bloom’s revised taxonomy


The Knowledge Dimension is grouped into four categories as follows:

- **Factual knowledge** is knowledge of discrete elements of content, including knowledge of terminology or of specific details or elements;
- **Conceptual knowledge** is knowledge of more complex, organised forms such as classifications, categories, principles or generalisations, theories models and structures;
- **Procedural knowledge** is the knowledge of how to do something, including the use of skills and algorithms, techniques and methods. This category also includes knowledge of ‘when to do what’;
- **Meta-cognitive knowledge** is a meta understanding; that is, the learner knows what they know and don’t know and knows what to do to come to know. It is both self-knowledge and strategic knowledge (Anderson et al. 2001).

The Cognitive Process Dimension, which refers to learning processes, is grouped into six categories (Krathwohl, 2002):

- **Remember** is to retrieve relevant knowledge from long-term memory;
- **Understand** is to construct meaning from instructional messages: oral, written or graphic;
- **Apply** is to carry out or use a procedure in a given situation;
- **Analyse** is to break material into parts and determine how they relate to each other and to the overall structure or purpose;
- **Evaluate** is to make judgments based on criteria and standards;
- **Create** is to pull elements together into a new pattern or structure.

These categories differ in complexity, with Remember being the least complex and Create being the highest rung of the Cognitive Process (Krathwohl, 2002).

Table 1 lists examples of the verbs (actions) that can be used for each Cognitive Process to develop course materials and to assist in devising methods to teach at any level of the Knowledge Dimension. The verb that relates to a particular category of the Knowledge Dimension depends on the topics of the course. This list has been adapted from the diagram of the “task-oriented question construction wheel” from St Edward’s University, (2004), based on the Bloom’s original taxonomy.

Learners exhibit different capabilities in learning new tasks or transferring learnt abilities from one domain to a similar domain (Anvari, Tran and Kavakli, 2013; Lohman, 2006; Winner, 2000). In teaching methods that use a linear presentation of materials (e.g. textbooks, lectures) students gain knowledge at the most basic level and memorise scientific facts without understanding the underlying concepts (Cepni, Tas and Kose, 2006). By taking into account participants’ cognitive process dimension instructors can design course materials that match users’ cognitive processes (Anvari and Tran, 2013).
Table 1: Example of verbs used to describe each category of the cognitive process dimension

<table>
<thead>
<tr>
<th>KNOWLEDGE DIMENSION</th>
<th>COGNITIVE PROCESS DIMENSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>REMEMBER</td>
<td>UNDERSTAND</td>
</tr>
<tr>
<td>Memorise</td>
<td>Collect</td>
</tr>
<tr>
<td>Name</td>
<td>Discover</td>
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<tr>
<td>Recite</td>
<td></td>
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<tr>
<td>MATCH</td>
<td>APPLY</td>
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<tr>
<td>Confirm</td>
<td>Collect</td>
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<tr>
<td>Confirm</td>
<td></td>
</tr>
<tr>
<td>RESTATE</td>
<td></td>
</tr>
<tr>
<td>MATCH</td>
<td>ANALYSE</td>
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<tr>
<td>Change</td>
<td>Analyse</td>
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<tr>
<td>Compare</td>
<td>Constrast</td>
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<tr>
<td>Paraphrase</td>
<td>Distinguish</td>
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<tr>
<td>Express</td>
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<tr>
<td>State</td>
<td>CREATE</td>
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<td>Define</td>
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<tr>
<td>Describe</td>
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<td>Identify</td>
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<td>State</td>
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<td>Change</td>
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<tr>
<td>APPLY</td>
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<tr>
<td>Change</td>
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<tr>
<td>Draw</td>
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<tr>
<td>Modify</td>
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<td>Draw</td>
<td></td>
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<tr>
<td>Make</td>
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<tr>
<td>Draw</td>
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<tr>
<td>Report</td>
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<tr>
<td>Show</td>
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<tr>
<td>PROCEDECULAR KNOWLEDGE</td>
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<tr>
<td>Locate</td>
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<tr>
<td>Recognise</td>
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<td>Select</td>
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<td>Explain</td>
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<td>Extend</td>
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<tr>
<td>Relate</td>
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<tr>
<td>Distinguish</td>
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<tr>
<td>Illustrate</td>
<td></td>
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<tr>
<td>META-COGNITIVE KNOWLEDGE</td>
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<tr>
<td>Draw</td>
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<tr>
<td>Label</td>
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<td>Write</td>
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<td>Defend</td>
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<tr>
<td>Generalise</td>
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<td>Infer</td>
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<td>Predict</td>
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<td>Summarise</td>
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<td>Transform</td>
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<tr>
<td>Dramatisate</td>
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<td>Draw</td>
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<td>Model</td>
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<td>Paint</td>
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<td>Prepare</td>
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<tr>
<td>Produce</td>
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<tr>
<td>RESEARCH</td>
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<tr>
<td>Separate</td>
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<tr>
<td>Subdivide</td>
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<td>Survey</td>
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<tr>
<td>Take apart</td>
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<td>Criticise</td>
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<td>Critique</td>
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<td>Judge</td>
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<td>Recommend</td>
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<td>Weigh</td>
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<td>Create</td>
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<tr>
<td>Design</td>
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<tr>
<td>Invent</td>
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<td>Hypothesis</td>
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<tr>
<td>ORIGINATE</td>
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<td>Create</td>
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<tr>
<td>Develop</td>
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<tr>
<td>Formulate</td>
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<td>Role-Play</td>
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<tr>
<td>Plan</td>
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<td>Produce</td>
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<tr>
<td>What if?</td>
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</table>

4. The applications of Bloom and reflective concept in designing and delivering FIMS courses

At a research-intensive metropolitan Australian University, FIMS courses have been offered to professional staff since 2007. FIMS consisted of five three-hour face-to-face interactive learning workshops, spanning a nine-week period which covered General Ledger, Purchase Requisitions, Financial Information Management Reports and Accounts Receivable modules. Participants were administration and finance staff, department and faculty managers, post-graduate students and academics.

4.1 Reflective practices

To reflect-on-action (Schön, 1983) and reflect-for-action (Killion and Todnem, 1991), the author, Tran, kept a reflective journal in which she described her teaching and learning environments, analysed theories and techniques (such as constructivist and cognitive load theory), summarised action-research findings, noted her reflection and self-evaluated her teaching methods. Reflection was her teaching strategy and the reflective journal was a tool for her reflection.

To address the needs of a diverse group, participants provided expectation forms prior to the first hands-on workshop. To engage participants in the course materials, Tran reflected upon their expectations and prior knowledge and incorporated these into the training program. A few days prior to each training workshop, participants emailed Tran one-minute papers (Stowe, 2010), answering two questions: ‘what did you find useful in the last training workshop?’ and ‘what questions remain on your mind?’ The one-minute papers encouraged participants to raise queries and provided Tran with a means to follow up. From participants’ expectation forms and one-minute papers, topics that needed to be addressed were identified. Issues were reflected upon, action-research was conducted and remedial actions were carried out. For example, various methods of delivery were adapted to suit participants’ special needs (e.g. more theory or more practice; more financial reports or more procedures). Training documents were regularly updated to enhance participants’ learning abilities. If the questions raised in one-minute papers were private Tran answered them via email. Questions that were general in nature, were answered in the workshops. Tran demonstrated how to resolve them using real-world scenarios.
4.2 Teaching and learning resources and activities

Bloom’s Revised Taxonomy Knowledge Dimension was used to identify the Factual, Conceptual, Procedural and Meta-cognitive knowledge parts of FIMS curriculum. Table 2 shows the application of Bloom’s Revised Taxonomy Knowledge Dimension to identify teaching and learning processes. Table 2 contains samples of two Knowledge Dimension categories (Conceptual and Procedure) listed in order of the Cognitive Process Dimension from the lowest to the highest rung.

Table 2: Samples of the application of Bloom’s Revised Taxonomy Knowledge Dimension into the learning and teaching of FIMS

<table>
<thead>
<tr>
<th>TEACHING AIMS: KNOWLEDGE DIMENSION</th>
<th>LEARNING OUTCOMES</th>
<th>LEARNING PROCESSES</th>
<th>TEACHING PROCESSES &amp; LEARNING ACTIVITIES</th>
<th>COGNITIVE PROCESS DIMENSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conceptual Knowledge of FIMS reports.</td>
<td>Module 1: Identify the various types of reports that are used by managers and business analysts and run some simple reports.</td>
<td>Memorising key terms. Understanding concepts.</td>
<td>Explanation; Practice with feedback.</td>
<td>Remember</td>
</tr>
<tr>
<td>Conceptual Knowledge of the University’s Accounting Ledgers.</td>
<td>Module 1: Compare and contrast the various account components and selection codes of various ledger accounts.</td>
<td>Recognising, understanding rules and concepts; Interpreting ledgers’ account codes; Understanding how the account codes work within FIMS context.</td>
<td>Explanation; Reading; Practice with feedback.</td>
<td>Understand</td>
</tr>
<tr>
<td>Procedural Knowledge of Purchase Requisitions Processing.</td>
<td>Module 2: Generate Purchase Requisitions, reports and interpret the data.</td>
<td>Raising Purchase Requisitions; Understanding Purchase Requisitions Processes; Interpreting Purchase Requisition reports.</td>
<td>Case Studies; Exposure to Real-life worked-examples and processes; Modelling by instructors; Practices with feedback.</td>
<td>Apply and Analyse</td>
</tr>
<tr>
<td>Procedural Knowledge of Tax Invoices.</td>
<td>Module 3: Monitor the status of processing of Tax Invoices.</td>
<td>Understanding cause and effect in relation to certain functions; Distinguishing transactions in various scenarios.</td>
<td>Case Studies; Exposure to Real-life worked-examples and processes; Modelling by instructors; Scaffolded exercises; Practices with feedback.</td>
<td>Evaluate</td>
</tr>
<tr>
<td>Procedural Knowledge of AR Tax Invoices.</td>
<td>Module 4: Create an AR scheduled Tax Invoice and, interpret the features and components of a Recurring Documents Tab.</td>
<td>Recognising rules, analytical reasoning to be able to discriminate between different processes in various scenarios; Developing meta-cognitive, self diagnosed strategies.</td>
<td>Explanations; Case Studies; Exposure to Real-life worked-examples and processes; Modelling by instructors; Scaffolded exercises; Repeated practices with feedback.</td>
<td>Create</td>
</tr>
</tbody>
</table>

The cognitive load on the memory and the learn-ability of learners depend on the training materials (Sweller et al. 1998). The cognitive load on participants was considered, in particular the participants’ expectations and prior knowledge; worked-examples and scenarios were used as the modelling technique; training documents were illustrated with pictures and descriptions of real-world scenarios. All participants had access to the university financial system to practise. Participants actively learnt during the three-hour workshops then
independently practised worked-examples documented in the course materials within the training environment.

4.3 Evaluation and assessments

To develop questionnaires for evaluation, Tran used the Peer Review of Learning and Teaching model – also known as the PEER model (Macquarie University, 2012). This model consists of templates and check list forms with questions Why; What; Who; How; Reporting; and Follow up. Questionnaires suggested in the PEER model were adapted. Twenty-five questions were developed under five headings:

- Planning and organisation;
- Documentations and contents;
- Training strategies and resources;
- Presentation and management;
- Feedback and follow up of participants.

Tran employed self-assessment techniques. Participants’ feedback and surveys confirmed the benefits listed by Falchikov and Thompson (2008) in involving students in assessment.

**Empowering learners:** Participants actively engaged in learning during the three hour workshop. Active learning with technology had positive effects on student learning; real-world application of the materials heightened students’ interest and enhanced their learning abilities (Ragan et al. 2006).

**Encouraging attention:** Through one-minute papers we encouraged participants to raise queries and provided constructive and practical feedback. By involving participants, we were able to empower them, encourage dialogue and attract attention.

**Creating partnerships:** Through expectation forms and one-minute papers we encouraged participants to raise questions that would not otherwise have been raised in the class.

**Fostering proactive strategies in teachers and students:** Constructivism emphasises development of learner’s ability in solving real life problems (Huang, 2002). One-minute papers and surveys helped to identify topics to be addressed and strategies to deliver them.

**Reflection:** By asking participants to submit one-minute papers and to reply to the survey questions, we encouraged them to reflect-on-action.

**Enhancement of learning:** Prior knowledge significantly influence the ways individuals make meaning out of instruction (Jones and Brader-Araje, 2002). Novices (e.g. non financial staff) remember the facts but the experts (e.g. finance managers) evaluate existing methodologies and create new ones as the information presents meta-cognitive knowledge (Anvari and Tran, 2013). By recognising participants’ prior knowledge from their self-assessments, we were able to develop course materials that challenged them.

**Performance:** Participants were more engaged in class discussions when challenged to perform at the higher rung of cognitive processes. This is consistent with research results by Arum and Roksa (2011) that when high-order thinking is included in the coursework students perform better on tests measuring critical thinking.

**Personal development/autonomy:** Our case supports prior studies that a hands-on approach motivates students which subsequently increase their understanding of the business processes (Draijer and Schenk, 2004). Participants confidently use the university’s FIMS after attending FIMS courses. Those at managerial levels have sent new staff to the courses.
5. The reflection of our teaching strategies in applying these concepts

Tran and Anvari (2013) proposed the five-dimensional reflective cycle framework that can be used to facilitate reflective practice among academic and professional instructors for designing and delivering high quality FIMS and AIS courses. The reflective cycle consists of five dimensions: Describe, Analyse, Transform, Act, and Evaluate. For every process or issue identified by the instructor these five dimensions should be considered in a cycle as illustrated in figure 1.

Figure 1: The five-dimensional reflective cycle framework

- **Describe**: This dimension is to describe the process or the issue requiring reflection. The instructors use reflective journals or diaries to describe it. For example, when the instructors design course materials, they first describe who the learners are and what they want to learn; what contents the instructors need or wish to include; what survey or research questions the instructors need to formulate. Another example is that the instructors reflect on their teaching methods after each class then describe an event or an incident which they wish to reflect-on-action in their journals. A reflective journal enables a teacher to take regular notes of events and observations, record a tentative hypothesis and develop new understandings similar to a scientist keeping laboratory notes (UTS 2007).

- **Analyse**: This dimension is to analyse the process or the issue which the instructors have described in dimension one. The instructors analyse the methods which they plan to act or how they go about to obtain the necessary information and gain the required knowledge. Moon (cited in McGuigan et al. 2009) defines the analysis dimension as ‘a mental process with purpose and/or outcome in which manipulation of meaning is applied to relatively complicated or unstructured ideas in learning or to problems for which there is no obvious solution.’ For example, the instructors use the Bloom’s revised Taxonomy to analyse how to design course materials that encourage critical thinking from the learners or to analyse the intended learning outcomes in comparison with the participants’ learning outcomes to identify issues. Another example is that the instructors reflect on their actions or on the questions raised by learners in the one-minute papers to determine what they could have done better.

- **Transform**: This dimension often requires action-research or reflect-on-action to transform meaning of the above analysis. Action-research is about creating awareness and understanding, in order to improve a certain practice (Mahani and Molki, 2012). For example, the instructors conduct action-research to find possible solutions to an issue and, develop examples that they can use to illustrate the issue. Another example is that the instructors introduce innovative teaching methods to effectively transmit new techniques to inspire learners personally engage with learning materials or design training materials that keep the cognitive load on the working memory within the limits of a person.

- **Act**: This dimension is to act on issues that the instructors have decided in the transform dimension. For example, the instructor conducts a literature review and learns that for deep learning to occur students...
need to connect with course topics and apply them (Delotell et al. 2010). The instructor then decides to use real-world applications and hands-on approach to address issues raised in the one-minute papers and involves learners in making decisions on the learning activities that are applicable to them.

- **Evaluate**: This dimension is to evaluate whether the instructors’ actions in the act dimension indeed enhances learning and teaching experiences of the instructors and the participants and, to monitor their actions to gauge their success. Expert teachers evaluate their teaching methods to more effectively motivate students to solve their own problems (Biggs et al. 2011, pp 45-55). For example the instructors employ the PEER model to evaluate the effectiveness of their teaching strategies and methods. Another example is that the instructors practice reflection to self-evaluate and commit to continuous improvement that enhances teaching and learning experiences.

The above five-dimensional processes are repeated continually. Biggs et al. (2011, p.45) emphasises that expert teachers continually reflect on their teaching.

### 6. How the five-dimensional reflective cycle framework can assist educators in the design of AIS courses

The reflective cycle framework consists of five processes: Describe, Analyse, Transform, Act and Evaluate. Following is a practical example of how the five-dimensional reflective cycle framework can assist educators in the design of AIS courses.

#### 6.1 DESCRIBE the issue requiring reflection

At a research-intensive metropolitan Australian University, AIS is a 2nd year accounting subject taught over a 13 week semester. Topics covered are Information Systems fundamentals, database concepts, businesses processes, controls, ethics, systems development methodologies and documentation. Tutors had about half-an-hour to explain database concepts to students in a traditional face-to-face teaching and learning class. The time allocated was insufficient as explanation is not enough for students to comprehend a complex topic such as database. Vatanasakdakul el al. (2011) reported that majority of the students could not see the relevance of AIS subject for their future accounting careers and urged that students’ needs and perceptions be seriously considered in the design and review of AIS curricula.

#### 6.2 ANALYSE the issue

Many AIS students do not understand how accounting concepts are integrated within an accounting system nor do they perceive the importance of this understanding (Normand, 2011). Relational databases are the dominant technology for storing financial information; ‘an understanding of relational database technology unlocks a higher level of knowledge’ (Harrast et al. 2010). It is essential for accounting students to have an understanding of databases (Harrast et al. 2010; Zainol and Nelson, 2011; Zhou et al. 2011). However the results of the surveys of accounting students at three accredited Association to Advance Collegiate Schools of Business (AACSB) and Midwestern university business schools revealed that learning database technology is a moderate priority for accounting students; databases are highly complex and teaching database technology presents a major paradigm shift from other office suite applications such as spreadsheets (Harrast et al. 2010). Despite the call for databases to be included in accounting education, from literature review and the authors’ interaction with accounting and business students and graduates, only a small percentage of accounting and business students have a limited conceptual knowledge of databases.

Active learning with technology has the ability to bring outside resources into the classroom and has a positive impact on students (Ragan et al. 2006). An active learning approach takes maximum advantage of the benefits derived from socio-constructivist learning designs (Bower, Hedberg and Kuswara, 2010). Socio-constructivist theory states that interaction between learners and their peers is a necessary part of the learning process (Vygotsky, 1978). Harrast et al. (2010) reported that ‘students have a strong preference for practical applications of the concepts they are learning in accounting’. At Pepperdine University AIS students were required to complete a project covering data normalisation and Microsoft Access implementation; Vician et al. (2012) reported that during the implementation of the projects, students gained deeper understanding of the concepts they learnt in the lecture theatre.
6.3 TRANSFORM meaning of the analysis

Based on the above analysis and reflecting on our own experiences, we recommend a direct instructional approach and an active learning approach to teach database concepts to accounting and business students.

According to the direct instructional approach model, a new body of knowledge can be broken into small steps with clear objectives which are based on known knowledge, providing learners with opportunity to practise with feedback on each step learnt; a direct instructional approach is appropriate when students are yet to form understandings about a particular topic (Magliaro, Lockee, & Burton, 2005).

An active learning approach, takes into the account students’ strong preference for practical applications. It facilitates interaction between educators and students by making educators’ guidance and feedback available during class. This is a preferred learning style of the current generation of students, known as NetGen learners (Walters, 2011). By integrating real-life worked-example scenarios into teaching, students can see the relevance of AIS subject to their needs and future careers, thus they are motivated (Kearns, 2010) and are encouraged towards deep learning (Delotell et al. 2010).

The blend between direct instructional and active learning approaches has been successfully implemented at a research-intensive metropolitan Australian University to deliver FIMS courses to professional staff (Tran and Anvari, 2013).

6.4 ACT on the decisions decided in Transformation dimension

6.4.1 A direct instructional approach:

The direct instructional approach teaches students subject matter, underlying concepts, thought processes and problem solving (Bower et al. 2010). The purpose of this approach is to teach students factual and conceptual knowledge of database concepts. Even though students learn at the low rung of the cognitive process dimension, it is essential that they remember and understand essential terms and concepts before they can move to the higher level of the cognitive process dimension.

To design course materials we have successfully used the Bloom’s Revised Taxonomy as a framework (Tran and Anvari, 2013). Table 3 shows the application of the Bloom’s Revised Taxonomy Knowledge Dimension in teaching database concepts to accounting and business students. It contains examples of learning outcomes, samples of teaching and learning processes and learning activities. The Knowledge Dimension categories are listed in order of the Cognitive Process Dimension from the lowest to the highest rung.

Table 3: Samples of the application of Bloom’s Revised Taxonomy Knowledge Dimension in teaching database concepts to accounting students.

<table>
<thead>
<tr>
<th>TEACHING AIMS: KNOWLEDGE DIMENSION</th>
<th>LEARNING OUTCOMES</th>
<th>LEARNING PROCESSES</th>
<th>TEACHING PROCESSES &amp; LEARNING ACTIVITIES</th>
<th>COGNITIVE PROCESS DIMENSION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factual Knowledge of database.</strong></td>
<td>Identify database key terms such as tables, fields, rows, columns, attributes, normalisation, relationships and entity.</td>
<td>Memorising key terms. Understanding concepts.</td>
<td>Explanation; Listening; Reading; Memorising.</td>
<td>Remember</td>
</tr>
<tr>
<td><strong>Conceptual Knowledge of database components.</strong></td>
<td>Compare and contrast the various database components such as tables, queries, reports.</td>
<td>Understand key database components. Understand how tables work. Express the differences between tables, queries and reports.</td>
<td>Explanation; Worked-examples used as modelling by educators; Reading; Thinking; Practice on using worked-example with</td>
<td>Understand</td>
</tr>
<tr>
<td>TEACHING AIMS: KNOWLEDGE DIMENSION</td>
<td>LEARNING OUTCOMES</td>
<td>LEARNING PROCESSES</td>
<td>TEACHING PROCESSES &amp; LEARNING ACTIVITIES</td>
<td>COGNITIVE PROCESS DIMENSION</td>
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<tr>
<td><strong>Conceptual Knowledge</strong> of relationships normalisation.</td>
<td>Interpret and differentiate various table components such as rows, columns, fields, attributes, normalisation, relationships and entity.</td>
<td>Construct various tables; Classify and label key components such as rows, columns, fields and attributes.</td>
<td>Case Studies; Exposure to Real-life worked-examples and processes; Modelling data structures by educators; Practices with feedback.</td>
<td><strong>Apply and Analyse</strong></td>
</tr>
<tr>
<td><strong>Procedural Knowledge</strong> of first, second and third normalisations.</td>
<td>Solve a normalisation problem.</td>
<td>Understand cause and effect in relation to remove or add certain fields to a table; Distinguish transactions in various tables.</td>
<td>Case Studies; Exposure to Real-life worked-examples and processes; Modelling by educators; Scaffolded exercises; Practices with feedback.</td>
<td><strong>Evaluate</strong></td>
</tr>
<tr>
<td><strong>Meta-cognitive Knowledge</strong> of Relational Database concepts.</td>
<td>Interpret the features and components of a small Relational Database. Create tables and interpret their relationships. Create queries to query a simple database.</td>
<td>Recognise rules and analytical reasoning to be able to discriminate tables' components; Creating tables and queries; Recognise the various applications of Relational Database for accounting and business processes.</td>
<td>Explanations; Case Studies; Exposure to Real-life worked-examples and processes; Modelling by educators; Scaffolded exercises; Repeated practices with feedback.</td>
<td><strong>Create</strong></td>
</tr>
</tbody>
</table>

Video snippets and PowerPoint slides, used worked-examples of real-world scenarios as the modelling technique to introduce key concepts such as normalisation, table, relationships and entity to students is in line with direct instructional approach and students can practise the subject on their own. At the end of the direct instructional approach session, students write one minute papers. Through one-minute papers educators encourage students to stop, focus their thoughts and pinpoint their questions (Stowe, 2010).

### 6.4.2 An active learning approach:

The purpose of active learning approach is to teach students procedural and meta-cognitive knowledge. We have found that three-hour intensive hands-on workshops on real-world scenarios benefit the learners and maximises their learning abilities (Tran and Anvari, 2013). Hands-on approach motivates students and supports their understanding of business processes (Draijer and Schenk, 2004). Students would learn at the higher rung of the cognitive process dimension as they apply, analyse, evaluate and create tables and queries using a database. To teach database concepts to 2nd year AIS students, educators can implement Information and Communication Technology (ICT) based active learning in the computer laboratory, integrating real-life worked-examples that demonstrate the usefulness and importance of database knowledge into course materials.
To implement ICT-based solutions, we will discuss:

1- ICT applications;

2- reasons for selecting the application and its suitability;

3- how the proposed applications can enhance students learning abilities;

4- design the proposed applications;

5- how to use ICT applications to integrate real-life worked-examples into teaching.

6.4.3 ICT applications

Two interactive workshops of three hours each would be sufficient for teaching database concepts to accounting and business students. Relational databases are the dominant technology for storing financial information. Microsoft Access has been used as a tool for students to practise database concepts learned (Vician et al. 2012). Students learn to design and create tables and query financial information based on real-life worked-example scenarios modelled by the educators.

6.4.4 Reasons for selecting the application and its suitability

Microsoft Access database is easy to learn as it utilises a visual query language, Query By Example (QBE) which bypasses the need for users to learn SQL programming language (Pillsbury and Wang, 2011). Loraas and Searcy (2010) used Microsoft Access to teach students how to analyse a complete general ledger that consists of a year’s worth of transactions. From our own professional experiences, we have found that Microsoft Access is an effective and efficient tool to design prototype financial applications and it is not difficult to learn.

6.4.5 How the applications can enhance students learning abilities

Due to a small amount of time allocated to teach database concepts in traditional face-to-face tutorial classes, video snippets and PowerPoint slides will help students to learn before and after classes. The direct instructional approach is considered more appropriate when students are yet to form an understanding of the topic (Magliaro et al. 2005). The active learning approach allows students to implement theoretical discussions in a meaningful way (Harrast et al. 2010). Active learning with technology has positive effects on students learning; real-world application of the materials heighten students’ interest and enhance their learning abilities (Ragan et al. 2006).

6.4.6 Design the applications

The ICT resource-based solutions contain examples and instructions that are related AIS topics. The active learning approach is designed to engage students by asking them to apply course concepts to real world environments and learn-by-doing. Database topics taught during the later weeks of the course would facilitate worked-examples to reflect the examples from other topics of the AIS. Students can view the video as many times as they need. They can capture the screens and make notes.

6.4.7 How to use ICT applications to integrate real-life worked-examples into teaching

Using real-life scenarios to teach database concepts and integrate the teaching of database with other AIS topics such as Revenue Cycle or Expenditure Cycle would benefit the students by reinforcing topics learnt in the AIS subject. For example for the Revenue Cycle, educators could develop worked-example models that consist of Customer, Sales person, Product, Order, Inventory, Shipment and Invoice tables and use these tables to teach integration of revenue cycle and transactions into a system. By getting students to solve problems that they will meet in their professional careers, educators help students to see the relevance of the AIS subject for their future careers, thus heighten their motivation. By integrating the teaching of database concepts with other AIS topics, students gain procedural and meta-cognitive knowledge.

6.5 EVALUATE

The blend between direct instructional and active learning approaches to teach database concepts can be evaluated in several ways: a students’ perception survey questionnaire; pre- and post-test measures of
students’ knowledge of database concepts before and after the three-hour workshops; and students’ results at the completion of their assignments and exams. Perception surveys cover questions about relevance, motivation, understanding, perceived difficulty and effort in learning database concepts. Pre- and post-test measures of students’ knowledge of database concepts cover questions which test all levels of the knowledge dimension and the cognitive process dimension. Comparison of the past and future exam results are measured to evaluate and analyse the effects of teaching database concepts using blended teaching.

7. Conclusions

High quality teaching of FIMS or AIS requires instructors to actively update their knowledge of accounting systems and information technology and to reflect on their teaching techniques. Constructivist Learning theory and Cognitive Load theory help instructors to design course materials that assist learners to absorb new information.

Systematic reflection, within the proposed framework, is an effective strategy. Furthermore Bloom’s Revised Taxonomy, the Peer model, one-minute papers and expectation forms are tools that can assist instructors to reflect, and ultimately to design and deliver courses that enhance participant’s learning abilities. Being a reflective instructor enables teachers to learn about themselves and to improve their teaching techniques.

We have provided insights into the application of constructivist theory and reflective practice strategies in teaching FIMS. The constructivist framework adopted in our case is a blend of the participants’ personal and developmental position as well as a blend of ICT-based solutions and hands-on activity workshops. The implication of our study is that three-hour intensive hands-on FIMS workshops on real-world scenarios will benefit the learners and maximises their learning abilities. We outlined a combination of a direct instructional approach and an active learning approach that promotes deep and active learning among FIMS and AIS students. We presented examples which apply Bloom’s Revised Taxonomy to design materials for teaching relational database concepts to accounting students. We proposed the five-dimensional reflective cycle framework and demonstrated its application as reflective practices among academic and professional instructors.

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