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# Message from the Editors

I am pleased to announce fifth issue of The Online Journal of Distance Education and e-Learning (TOJDEL) in 2014. In this issue, our journal diffuses its interdisciplinary perspective through various researches in education field. In order to share valuable researches from different fields, this issue sheds a light to open discussion in the academic platform.

January 01, 2014
Prof. Dr. Aytekin İŞMAN
**Editor in Chief**

Dear TOJDEL Readers;

We are very pleased to publish fifth issue in 2014. The Online Journal of Distance Education (TOJDEL), this issue is the success of the reviewers, editorial board and the researchers. In this respect, I would like to thank to all reviewers, researchers and the editorial board.

January 01, 2014
Prof. Dr. Cengiz Hakan AYDIN & Assoc. Prof. Dr. Mübin KIYICI
**Editors**

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# A Proposal for the Development of 'E-Mentor' For Efl Learners

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**ABSTRACT**

E-Mentor categorizes its users according to the particularized objectives of learning, content difficulties, age of target learners, educational environments, and both contents and system satisfactions of users. Unfortunately, the rise of educational demand for MALL eventually brought about quantitative changes in the field of English education – the boom of variety of applications – which is causing inconvenience and confusion to learners who are highly motivated in applying MALL. E-Mentor gives EFL-Learners a standard by which to measure and choose the proper applications for English learning. Furthermore, the actual development and experimental studies of E-Mentor will possibly suggest a new paradigm of language learning, and it will enable researchers and teachers to be interested in trying the new methodological approach towards MALL. In this article, we briefly discuss the functional categories of E-Mentor and guide through the process of development of E-Mentor.

**Keywords:**

## INTRODUCTION

Mobile-Assisted Language Learning (MALL) is evolving beyond the qualitative growth of technological innovations of smart devices. With various inventive applications, MALL invites learners to become organizers, active participants, and evaluators themselves in the different learning situations. The feasible conception of E-Mentor is essentially an adviser on the operating systems of smart devices to introduce EFL-learners to the most effective and proper applications for English educational purpose on a case-by-case basis. One of the major features of the E-Mentor's mentoring system is the technological realization of functional categories based on analysis of the users' (EFL-learners) linguistic competence.

## DEFINING MALL and E-Mentor

### What is MALL?

Mobile-Assisted Language Learning can perhaps be defined as the use of mobile technologies and devices in language teaching and learning as an extension of the field of CALL, Computer-Assisted Language Learning. Earlier studies on the MALL focused on mobile applicability and usability in educational contexts using mobile devices such as PDAs, mobile phones and mp3 players (Kukulska 2007). MALL is to enable the learners and teachers to better achieve their responsibilities, both inside and outside the classroom, and find their activities 'personal', 'spontaneous', 'informal', 'context-aware', 'bite-sized', and 'portable' (Traxler 2007). Recent studies focused on the emerging technologies with the rapid growth of the smart devices such as Smartphone and Tablet PC (Warschauer 2010).

### What is E-Mentor?

E-Mentor is an application for EFL-learners that provide them with the most useful information of various English educational applications, allowing users to choose the most appropriate applications available to them. Applications will be carefully analyzed based on six criteria: particularized objectives of learning, content difficulties, age of target learners, educational environments, and both contents and system satisfactions of users. The criteria should be determined by the specialists in English education, and any possible subsections of the criteria can be altered either by adding or creating further subcategories to the E-Mentor's operating system, as it becomes necessary. Learners not only will be able to build their own learning plans by considering their individual learning goals, English language competency, and personal interests, but also will be able to control their learning performances and evaluate the achievements themselves through the E-Mentor.

## METHODOLOGY

### Critical Analysis of English Learning Applications

This research and proposal on the initial planning step of E-Mentor is tentatively targeted at the English learning applications which have developed on the assumption that the users are mostly Korean EFL-learners. English learning applications account for the majority of all the categories for language educational applications in Korea.[1] In this article, the critical analysis of English learning applications has been done with the top-100-sales applications according to the 'iTunes store' [2]for the 31 days immediately preceding and ending May 2013 by way of showing an example. The applications are sorted according to the six criteria as previously stated, and the analyzing applications should clearly show sufficient explanations to the questions below.

- Is the content of the application valid enough to focus on certain purpose of learning activities?
- Is there a sustained consideration of difficulty among the words, phrases, and sentences used in the context?
- For whom is the application intended? Is the application intended for learners on any specific purposes?
- For which language-skills is the application focused on?
- Can we figure out the validity and the reliability of the contents by utilizing the E-Mentor?

### Categorization of Applications
### Particularized Objectives of Learning

Most applications that exist for Korean EFL-learners are to improve their language skills for assessment tests such as TOEFL, TOEIC, and the National College Scholastic Ability Test of Korea. Learners who need to prepare for the above tests normally search for appropriate applications by keywords, and surely the providers offer information related to particularized objectives of their applications. However, there are also some applications that are not clearly focused on certain learning objectives, and that obviously lacks any significant impact on the learners. E-Mentor configures and analyzes the applications and finds out suitability in each differentiated categories based on learning objectives.

**Table.1 Number of Applications Categorized by Learning Objectives**[3]

| Objects of Learning | College scholastic ability test | TOEFL | TOEIC | Conversation & Speaking | Vocabulary | Grammar | Business English | Etc. |
|---|---|---|---|---|---|---|---|---|
| Number of Applications | 10 | 10 | 25 | 20 | 27 | 13 | 4 | 13 |

(Top-100-sales applications of the iTunes store, May 2013)

### Content Difficulties

E-Mentor does not simply categorize the applications and learners into various levels such as Beginners, Intermediates, and Advanced categories by subjective or unilateral criteria. E-Mentor evaluates through both the application and the learner's linguistic competence by an elaborate analysis of applications or thoroughly designed level-

[1] There are 62 English learning applications out of the top-100-sales that have been sold at the 'iTunes store', and 46 out of 100 at 'play store' for the 31 days immediately preceding and ending May 2013.

[2] Apple Inc's 'iTunes store' is an operating online marketplace for buyers and sellers of applications and services.

[3] Part of the application-counts can be relevant in various areas.

testing stage in the operating process. Assignments of the E-Mentor's level-testing stage developed by experts of English education should be clear, concise, and comprehensive which also should take into account the characteristics of MALL.

### Age of Target Learners and Educational Environments

The number of applications which have been developed for certain age-groups, English learning for children for example, is consistently increasing. Moreover, the various challenges on the approach of application development for the English learners who have a specific purpose in a particular learning environment, such as aged learners who have never experienced English learning or disabled learners, could bring forth rapid progress in MALL. E-Mentor should be watching for any developments of both technology and learning contents in the field of MALL and attract qualitative growth from the application developers and English educators. This fact being given, E-Mentor will be able to recommend the appropriate applications to learners under the various circumstances.

### Improvement of Certain Language skills

In Korea, significant numbers of English learners are interested in improving their Speaking, Listening, Writing or Reading skills intensively. It seems to be that it is due to most Korean EFL-learners who are encouraged to prepare for various assessment tests, which is generally divided into 4 subjects, including Speaking, Listening, Writing and Reading. Consequently, English learning applications for Korean EFL-learners are the vast majority, which focuses on separate improvement of each English skill. E-Mentor classifies the applications into 5 categories, applications for Speaking, Listening, Writing, Reading skills and Vocabulary, considering the distinct situations of EFL learning in Korea.

**Table.2 Number of Applications Focused on Certain Language Skills**[4]

| Language Skills | Speaking | Listening | Writing | Reading | Vocabulary |
|---|---|---|---|---|---|
| Number of applications | 25 | 27 | 4 | 17 | 22 |

(Top-100-sales applications of the iTunes store, May 2013)

### Content and System Satisfactions

E-Mentor builds up the criteria for a detailed evaluation of applications to ensure the learner's content and system satisfaction as stated below.

**Table.3 Criteria for Evaluating Content Satisfaction**

| Content Satisfaction | Detailed Evaluation of Content Satisfaction |
|---|---|
| Content Usability | · Advantages of MALL, such as portability and personalization, have been taken into account.<br>· Convenient to learn when compared to offline education. |
| Achievement of Learning Objectives | · Contents contribute to accomplishing learning objectives.<br>· Include contents related to educational goals. |
| Content Reliability | · Contents and their organization are reliable.<br>· Contents are rational and useful for students. |
| Content and System Suitability | · Include well-founded information related to content and the visual materials (video clips, pictures) aids the retention of information. |

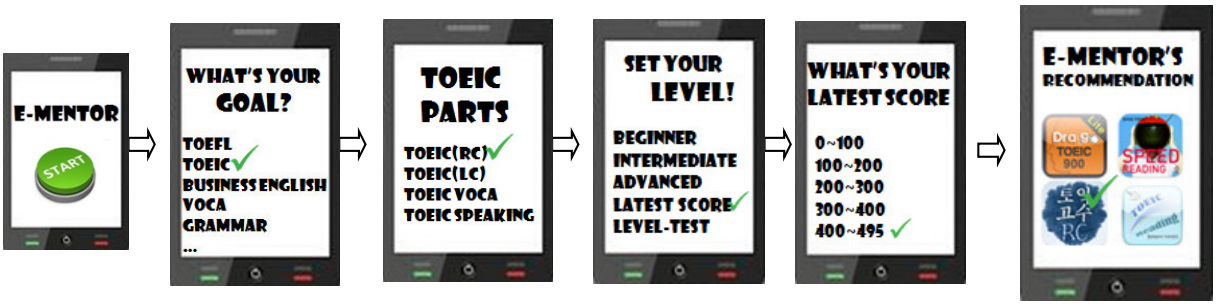
[4] Part of the application-counts can be relevant in various areas

## RESULTS AND DISCUSSION

**Hypothetical Operating Process and User Interface of E-Mentor**

The following in an example of E-Mentor showing a hypothetical operating process used by a learner who is preparing for the Reading Comprehension component of TOEIC.

**<Hypothetical Operating Process and User Interface of E-Mentor>**




**Information and Mentoring for Learners**

E-Mentor provides information to its learners in their own native language to ensure the accurate understanding of the contents regarding to the applications.

**<Information and Mentoring for Learners>**


## CONCLUSION

As a new educational paradigm of 21st century, E-Mentor plays its role as a 'mentor' for learners and teachers to approach to MALL more efficiently. Considering huge demand for English education in Korea, need for infrastructure to realize MALL, trend of education policy, rapid formation of MALL market, and increasing educational content providers, E-Mentor has unlimited potential as a pioneer for mobile-assisted foreign language education. Furthermore, the additional Studies on the development of the E-Mentor will enable researchers and teachers to be interested in trying the new methodological approach towards MALL.

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# EDU.CARE: An Innovative Model of Training for The Elderly Caregivers

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**ABSTRACT**

This paper presents the EDU.CARE project (Education for Care), approved by the European Community under the Grundtvig program. The general objective is developing "new caregivers for new elderly people": creating new professional profiles of offering an adequate service to the elderly, social subjects who are anthropologically changing. Needs Analysis of carers and elderly has focused on communication, personal support and active aging. Furthermore, the relationship between the elderly and technologies was investigated: seniors developing in Internet use, e-health programs, and e-learning. According to these findings and in order to develop news skills of trainers and carers an original learning methodology, which includes classroom training, coaching, e-tutoring, project work and web2.0 training, will be proposed. A brief description of the evaluation strategy that will be followed in order to assess the efficacy of the training methodology and the expected results are also presented.

**Keywords:** *Elderly carers, active aging, training, coaching, e-tutoring, web 2.0 training*

## INTRODUCTION

"EDU.CARE" (Education for Care) aims to develop an innovative model of training for adults intended for a professional who is becoming one of the main forms of assistance for the elderly: the elderly caregivers/carers/ home health aides. This phenomenon appears mainly in Italy but also in other European countries like Spain and France.

The EDU.CARE project was approved by the European Community under the Grundtvig program in 2012 and was launched in November 2012 for a term of two years. EDU.CARE Consortium is a group of public and private organizations that, with different perspective and specificity, work in education and adult learning projects, share the aim of bringing innovation and improving effectiveness in lifelong learning processes. The geographical coverage governed the structure and competences of the partners who were involved compared to the geographical origin of the elderly carers. In fact an east-west migration phenomenon, especially of women, is charactering the elderly carer profiles.

The partnership is made up: the Italian co-ordinator Tuscia University of Viterbo, Entropy (Italian SME specialized in training and consultancy), Universitat Jaume I (Spanish University of Castellon), The Jan Kochanowski University (Polish University in Kielce), Babes-Bolyai University (Romanian University of Cluj-Napoca).

The central objective of this pilot training program is to transfer knowledge to trainers and consequentially develop skills to caregivers in Europe in order to: - change the negative perception of caregivers to the elderly, - forward awareness of the role of caregivers for themselves, - revisit their qualification training in national/regional schemes. The general objective is developing "new caregivers for new elderly people": creating new professional profiles of offering an adequate service to the elderly, social subjects who are anthropologically changing. As defined in various contexts, the new elder is a person capable of expressing their active cognitive and affective resource es, needs help and is less willing to accept a passive containment nursing care, low-level cognitive, emotional, cultural and social stimulation.

The innovative model of training will be settled through a methodology developed by EDU.CARE, which will be applied to all players in the 'chain' of this social phenomenon that will be involved in the project: the trainers of elderly caregivers, through organizations and institutions to which they refer, caregivers and the elderly people. Moreover, the partnership capitalizes previous experiences, based on achieved outcomes in former projects, following previous cooperation amongst the consortium members.

The training courses for trainers and carers will be supported by Web 2.0 Platform that will be a tool for trainers and carers to find materials, documents and resources. The project will have impact on different entities that indirectly and directly are involved in the question of the elderly people.

**Seniors' educational needs and new learning spaces**

The research conducted among the elderly and their carers, within the Need Analysis, compatible with objectives of the EDU.CARE project, points out the important role of communication needs, since communication is an essential foundation for social interactions, whereas for old age it is the most significant media of possibilities to adapt and integrate with the social environment. The respondents emphasised the huge importance of a need to overcome difficulties, express themselves, cooperate and influence each other. Except the first aspect, all are connected with direct communication. The need to express oneself is fulfilled at the level of human's linguistic capabilities. Whereas, the need for cooperation is contained in conversation mechanisms, and the need for influence (persuasion) satisfies and explains the level of functioning, covered by the scope of linguistic pragmatics. The elderly are not sufficiently prepared in the informative terms to be able to manage senile changes in communication. Seniors do not notice individualistic or social consequences due to various communication disturbances. This is in fact one of the issues in the solution of which seniors should be supported by their carers/advisers who would indicate possibilities and instruments to compensate occurring deficiencies. What is indicated and highly accentuated in partner countries (Italy, Spain, Romania, Poland) is the needs for personal contact, conversation, respect and acceptance, accompaniment not only in basic existential activities but also mental accompaniment - to be and enter into interpersonal and intergenerational relationships as well as the need for practical accompaniment, acquisition of economic skills, skills which improve the functioning in everyday life (Internet, pay card, e-health), skills to perform social roles more fully preventing ipso facto the exclusion of the elderly from particular dimensions of social functioning,.

Partners of the project are in agreement that the need to be active is one of the most important needs of seniors, for activity determines satisfaction of all human needs. Changes within the scope of performed social roles and cessation of labour market participation lead to generation of a great deal of spare time and necessity to modify the form of instrumental activity which dominated earlier (related to work in which a human heads for a particular target, reaping the benefits and satisfaction of work) into the expressive one (by choice, to meet their desires and needs, to extend their own living space).

In all the partner countries the approach to needs of the elderly can be regarded as unified. It is stressed that other people, contact with them or a possibility to be appreciated in the eyes of others are significant to seniors. Additionally, the need for satisfying exploitation of leisure time, which seniors have quite a lot, is emphasised. The elderly can realise themselves, direct their activities to new areas, take actions which enhance their functioning in a number of fields, beyond their reach so far, such as new technologies.

Education, which is of great importance in acquisition of new skills and competences, essential for efficient functioning in everyday life, is one of the forms of activity among seniors, because teaching the elderly requires an autonomous attitude, application of flexible solutions, and interactivity. This leads to popularisation of "Life Long Learning" which aim is to "promote an intercultural dialogue, help in self-realisation and practice of entrepreneurship among the elderly". Furthermore, within the Grundtvig program a number of projects are implemented. They support education of adults and the elderly, including education of "new" carers for "new" seniors.

In all countries of the EU, in the space of last several years, special emphasis has been put on courses in media education. Technological revolution - computers, Internet, mobile phones and pay cards have modified everyday life in which also seniors function. To quell concerns and fears towards these modern devices it becomes necessary to prepare this social group for skilful use of new media (Chaffin& Harlow, 2005). Importance of media education of seniors is emphasised by a draft resolution of the European Parliament on the ability to use media in a digital environment informing that media education needs to include all citizens: children, youths, adults, the elderly and the disabled (The Culture and Education Committee 2008/2129 (INI). In the context of development of information society and gradual transfer of most activities taken by humans in cyberspace, application of information and communication technologies becomes one of the basic skills enabling effective satisfaction of own needs, self-realisation and social integration. In the face of dynamic development of electronic media, and in particular interactive multimedia, it becomes extremely significant to provide the elderly with a possibility of acquiring skills to use them. Some studies prove that computer usage may increase the well-being of old generations (Dickinson, 2005). Digital networks enable mainly the elderly to

communicate in everyday life and remain independent as long as possible.

The mastery of an ability to use the Internet is of special importance for contemporary seniors (Czaja & Lee, 2007), because thanks to the use of different websites and emails the elderly gain the possibility of following events that take place outside their homes and being in regular touch with members of their families and friends living far away (Osman, 2006). This contact is frequently intensified owing to an ability to use the Skype service or a similar application for mutual visual contact. Internet chat rooms may enable the elderly, doomed to stay at home, to contact people with corresponding interests, and as a consequence to reduce their isolation.

What is an extremely significant element of Internet education is an ability to use e-health instruments, including any use of information and communication technologies in prevention of diseases, diagnostics, treatment, control and leading a healthy life-style. Instruments of this kind serve inter alia the purpose of communication between patients and service providers from the healthcare sector, provision of data between particular institutions and direct contact both between patients and healthcare staff. They can also include networks of information on health, electronic registers, telemedicine services as well as portable communication devices or communication devices which can be carried, used for supporting patients and monitoring their health. The e-health system may turn out to be extremely helpful, in particular for those seniors who for different reasons will be forced to stay at home for a long time.

During Internet courses, seniors-learners are also prepared to make purchases via the Internet on their own. This ability may prove to be indispensable and bring tangible gains for persons who find it difficult to move. At the same time, it is essential to raise awareness among learners of the risks to which they may be exposed while using this Internet service.

Application of an individual bank account is an extremely valuable skill acquired during classes in exploitation of Internet resources. For a number of seniors it is a huge barrier. They have a distrustful attitude to overload of information which is completely new and unclear to them. E-banking, logging, passwords, pins, a lot of signatures and envelopes with mysterious numbers are (usually) a barrier impossible to overcome. This situation is changed by courses during which learners are familiarised with rules on safe use of a bank account via the Internet. They learn how to carry out operations, check a balance, make transfers etc. After acquisition of this skill, they become more available, independent and self-reliant.

The ability to use the Internet is gradually being exploited by seniors, also for e-learning. Mainly old age pensioners who have access to technical innovations start to reap the benefit of this type of education. Such a form of teaching makes contact at a distance with eminent personages of social, economic, medical, artistic etc. life possible thanks to video- or audio-conferences. For a number of seniors the use of e-learning is still a huge barrier, but they realise that such education enables them to enhance knowledge, meet on the Internet with a huge crowd of peers from all over the world, and finally to gain a good quality of life (Duay & Bryan, 2006).

## Emerging needs: from a deposit model to a greenhouse model

The research carried out within the EDU.CARE project expressly shows that it is essential to show paths, properly support and manage seniors for the purpose of creating new forms of activity, as well as new life-styles for the old age. This will be achieved by means of appropriate information, practical skills, social relationships and offer of local and supra-local environments, adequate to seniors' needs. It would be a good solution, which could meet all needs of the elderly, to provide them with a supporting person (carer/assistant/adviser) who would not only ensure everyday care, but would mainly show seniors the possibilities and instruments to compensate occurring deficiencies. In this context, it is understandable that the current form of individual support for seniors related to care (also hygienic), maintenance of their good health, concern for safety, but also frequently related to certain limitation of self-reliance (deposit model) should be replaced with another model - supporting, greenhouse. This model will include assistance, sanitary and personal care, concentration on safety, social rehabilitation, continuation of social relationships, commencement of animation and activation measures as well as a psychological support. Thus, the functions of "new" carers - guardians become assistants who accompany, understand, support and activate persons under their care change.

In search of an optimal model of preparing future assistants of seniors, the necessity to equip them with such knowledge, skills and competences that at work with seniors will enable introduction of the elderly in areas of social life which have been inaccessible for them so far (e.g. already mentioned new technologies) come to the fore so that seniors can feel more independent and will not feel excluded. Assistants should know how to stimulate seniors' activity so that persons under their care will not only aim at maintaining status quo within the scope of the basic level of fitness, but also try to keep up with changes in the contemporary world, show interest in offers addressed to them from different institutions and organisations as well as realise their interests and passions.

A future assistant of an elderly should be characterised by rich, sensitive, empathic personality, should have a

special attitude to a person under his/her care. It would also be advisable to possess organisational competences and impeccable manner. Such an assistant needs to understand the essence of processes that take place in human body, having an influence on health, fitness and frequently also on mental deficiencies as well as know how to identify needs. He/she must be prepared to accompany, discreetly observe, converse (not to talk about himself/herself, but to listen to an interlocutor) and to rapidly respond in critical situations.

During work with a senior, an assistant should know how to develop such a model of cooperation as to enable both parties to be self-sufficient, self-reliant and autonomous (within the limits of the basic mutual subjective relationship between the carer - senior; senior - carer). Assistants need to take actions (including educational activities) to update their economic knowledge, skills of management of own resources (tangible and non-tangible such as: interests and skills, competences and aspirations, knowledge and experience), to effectively teach new (often indispensable) practical skills, including efficiency in application of new technologies that facilitate everyday life as well as the functioning in society and family, to carry out social and altruistic activities (e.g. to encourage seniors to participate in volunteer work). Seniors' activity focused on self-development and empowerment, actions taken of their own free will (which will enable them to maintain individual and social identity), self-identification, a positively realistic self-redefinition as the elderly, auto-creation and if supra-subjective needs arise, accepting cooperation and dignity with respect to provided/received care and support should be the ultimate effect of assistants' operations.

As it has already been mentioned, a potential assistant of seniors should be up to challenges arising from the latest technologies. Apart from basic skills (knowledge about computer equipment and software, simple operations connected with files and folders, creation of simple text documents, operation of a web browser and email), it is advisable for an assistant to know how to search for information (acquire information on the Internet, save information in a format that is useful for him/her, to know issues related to safe use of a personal computer and the Internet). These skills would aim at preparing seniors for e-participation and e-education in which they under care could take part later on their own. Apart from practical skills in this area, an assistant needs to be aware of seniors' deficiencies arising from their age, health state (physical deficiencies connected with correct visual and auditory perception as well as shaking hands during the use of a keyboard or mouse) which could make exploitation of a computer difficult. Thus, assistants should also be familiar with availability of equipment for persons with dysfunctions (of eyes, hearing organs and the locomotor system) to be able to indicate possibilities of practical use of these facilities in private lives. Assistants of seniors should provide the persons under their care with a high level of activity for old age and optimal model of support and assistance for seniors to be active in different dimensions of their social lives. This will enable them to achieve the priority target i.e. maintenance of self-reliance and self-sufficiency as long as possible and as a consequence will lead to improvement of the quality of life of this social group. It means that activity of seniors themselves as well as actions taken by carers and educators of the elderly focused on the support to be active in different fields of family and social lives are of crucial importance in the model of favourable/positive ageing.

As a result of such operations, ageing (which is a process) and old age (as a stage in the life-cycle) will be treated as a developmental task, the time for building independence, subjectivity, identity and personal development.

## METHODS AND INSTRUMENTS

With Need analysis and scientific review the Consortium has analyzed existing studies and former projects on caregiving, training models in caregiving; in addition it has identified the training needs of the training of trainers of elderly carers and elderly carers. Need analysis has allowed to formulate criteria for the design of Methodology and learning path.

In this step the training model was defined: training objectives, training tools, users' characteristics, knowledge and skills of trainers and caregivers, and guidelines for the implementation of the model. All the information are organized into 4 areas:

- Programs relating to the conduct of training activities in the classroom, training online activities and coaching for the project;
- Tools for use in various stages of participants training and assessment in the path provided;
- Evaluation tools;
- Guidelines and tips for the trainers, coaches and facilitators of the training program to support them in implementing methodology.

Moreover, in the design phase, contexts of application of the training model were chosen: each country has indicated the targets' characteristics (specifications), describing the specific context of work and paying attention to nationality of carers for the training effectiveness. In this task specific guidelines for each specific country and

different target were defined.

The EDU.CARE model involves a training program that will be articulated into different tools:

- Classroom training
- Coaching and Tutoring on the job
- E-tutoring
- Web-based training
- Project work of the trainers.

This training architecture is useful to realize the "Training, tutoring and project work"; the trial is organized in "First trial on trainers (classroom training, collegial sessions)" and "Tutoring on the job and project work of the trainers". The two different phases will allow the transfer of specific knowledge and at the same time development of skills for the management of the target carers.

For the "First trial on trainers (classroom training, collegial sessions)" the contents have also been identified: Skills on Basics of Anthropology and Gerontology of the Elderly, Skills on Basics of Psychology, Skills on Help Relationship, Coaching Skills, and Web Skills.

For "Tutoring on the job and project work of the trainers" the training objectives are: to develop coaching skills of trainers to support a path of development and growth of Carers, to develop a project work, to find new ways to manage and empower the elderly, to switch from a "deposit model" to a "greenhouse model". The identified contents are: how to manage the relationship with the elderly and how to support the caregiver in building appropriate styles of behaviour to be adopted into practice with the elderly. The training tools that have been identified to implement this program are:

- Coaching: individual and group meeting through the involvement of a scientific supervisor and coaches for each country. A scientific supervisor is involved in group meetings; 3-4 coaches are involved in individual coaching (every coach can have more trainers);
- E-tutoring: through the involvement of a tutor for each country. Each tutor supports trainers in project work giving stimuli and managing the forum on the web-platform;
- Web-based learning: access the platform using tools and content sharing.

The development of Web 2.0 Platform supporting the process of training the trainers in the future will be a tool for training and updating of carers. WEB 2.0 Platform is a shared place where trainers of different countries can exchange files and work like in a community of practice.

Therefore, EDU.CARE.WEB platform must support the entire learning process, performing the following functions:

1. storage and consultation of documents and files related to training;

2. information exchange and discussion between people involved in the project, using advanced features enabled on the platform;

3. learning by creating a community of practice. Through the Web 2.0 platform the users (trainers and carers) will have access to resources, content and contributions that affect their training, share information and experiences, offer services and advice for carers beyond the term of the project (virtual desk).

At a glance in the learning process we will use 4 different kinds of actions:

- Training: transfer specific knowledge and develop competences for training e-managing carers
- Tutoring: support trainers and carers in the learning process
- Evaluation: evaluate the learning process and introduce improvements
- Advice: trainers and carers support other carers in the management of elderly people; participants could add information to the training programme according to their own experience.

**Evaluation Strategy**

The mail goal of WP6 is to evaluate the experiences carried out and results obtained in the trial that will be conducted in order to assess the effectiveness and efficiency of the training program supported by the EDU.CARE.WEB platform. A second goal, according to the obtained results, will be the definition of the final version of the EDU.CARE Program.

Regarding the first goal, at the end of the trial several aspects will be assessed by both target groups (trainers and carers). Next a brief description of the assessment areas and tools that will be used to evaluate the training program is offered:

- *Learning*
  - A questionnaire for evaluating the contents included in the training program (basics of gerontology and anthropology, psychology, help relationship, coaching) will be designed. This questionnaire will be a multiple choice test.
  - Critical incidents. This methodology consists of presenting problematic situations related to the objectives of the training whereby the participant has to decide which one is the most appropriate solution out of several solutions presented.

These tools will be completed before and after the training program in order to assess the knowledge acquired by the participants.

- *Satisfaction* scales and questionnaires will be developed for both target groups (trainers and caregivers):
  - Satisfaction questionnaire with the training program in general,
  - Satisfaction scales with the EDU.CARE.WEB platform in particular. These scales will assess issues like how logic was the WEB platform, to what extent they were satisfied with it, if they would recommend it to other colleagues, if they found it useful to train new skills to trainers and caregivers, etc.

These tools will be completed by the participants after the training course. The satisfaction of the part of the coachers will also be evaluated.

- *Usability*. An adaptation of the System Usability Scale (SUS Brooke, 1996) will be used in order to assess issues such as difficulty, easiness of the use of the WEB platform.

The results of this evaluation will feed into a report that will contain the guidelines for implementing the training program format for trainers and carers. The training program format will be divided in:

- One format for trainers. In the Training program format for trainers it will be possible to find, through EDU.CARE web Platform, resources, contents and contributions that affect their training, to share information and experiences, to offer services and advice for carers beyond the term of the project. Trainers continue to train carers and to develop their skills profile. Trainers act as facilitators (tutors) of cognitive development of their users.
- One format for carers. In the Training program format for carers it will be possible to find, through EDU.CARE web Platform, resources, contents and contributions that affect their training, to share information and experiences. Carers have the possibility to consult trainers for their work with elderly. Moreover carers themselves could help other carers giving advice in their work and relation with the elderly people.

The training in cascade allowed by the training program supported by the EDU.CARE.WEB platform that will be implemented within the framework of the present project will make this training efficient by reaching many potential beneficiaries (trainers, caregivers and elderly people).

## EXPECTED RESULTS

The project aims to support elderly in order to promote an active aging culture and practice through the personal assistance. The challenges posed by a changing society require an update of how caring is thought and the introduction of innovative criteria in the interaction between support staff, care institutions, and social institutions involved at various levels in elderly care. The project will have an impact on different entities that indirectly and directly are involved in the question of the elderly: a-social awareness to the issue of active aging on local and national media, b-awareness of the institutions that administer health and public assistance (regions /districts, local communities, health organizations, education), c-scientific community, d-professional communities where the initiative will be communicated (doctors, psychologists, nurses, social workers), e- private and public entities that provide training to carers (municipalities, cooperatives, non-profit, universities, educational and training associations, trade unions), f-union associations of elder carers, g- institutions representing senior citizens (academies for older people, social centres for the aged, cultural associations, cultural and philanthropic associations), h- families with older persons, i- older people directly.

The expected impacts are mainly three: (i) to train trainers and carers on care services and to introduce innovative criteria in the interaction between support staff, care institutions, social institutions involved at various levels of elderly; (ii) provide innovation to learning practices thanks to an original and interactive methodology; (iii) ensure the effective valorisation and exploitation of project results and products.

(i) EDU.CARE Training Program will test the Training Program in 4 countries: Italy, Spain, Poland, Romania. Target groups will be divided in two categories:

- Universities that will involve in the trial master students specializing in geriatrics; we expect that the Universities involved in the trial phase, will continue to use EDU.CARE for their students.

- Elderly residencies and Health care organizations that shall involve in the trial carers of elderly and elderly themselves.

The operational plan is to involve: 60 trainers, 70 carers, 65 elderly.

(ii) innovation in learning practices is an important expected outcome of EDU.CARE. Trainers and carers will be involved in the trial: it will transfer the skills to deliver services to the elderly, as well as formalise two professions. EDU.CARE Consortium intends to reach this goal thanks to an original learning methodology.

(iii) The project's dissemination strategy will be designed to support the exploitation plan. Key activities will include: a project web site; a strong presence on web sites used by potential users, through websites network of all partners involved (universities, elderly houses, institutions for health and social services); multilingual publicity materials; an International Public Awareness Event; a strong presence in conferences, exhibitions and trade fairs, publications on academic and professional journals, and dedicated activity to press releases and to mass media.

## CONCLUSIONS

The methodological approach of the project EDU.CARE, at a glance, wants to achieve two objectives. The first objective is to design an innovative model of training for service providers of the elderly, using coaching and new technologies, contributing to a change in approach to management of the elderly. Carers must focus on active stimulation of the cognitive skills of the elderly and therefore not limited to the task of caring. The second objective is to spread the use of learning through new technologies in different target groups: trainers, caregivers, seniors. The use of the "language technology" contributes to the dissemination of new technologies and especially the inclusion of categories that usually do not use.

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# Effects of Implementing C&U-Message through Smartphones on English Grammar Learning for College Students

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**ABSTRACT**

With the advanced development of mobile technology and portable devices, learners can do their learning activities anytime and everywhere when Internet access is available. Integrating pedagogical and technical strengths of mobile technology into learning settings proves imperative in previous research. Thus, this study aims to investigate the effects of implementing a ubiquitous multimedia message transmitting platform (C&U-Message) on college students' English learning. A total of 26 college students participated in a 6-week experiment used client-side application system C&U-Message (C&U-Msg) system for English learning through Android-based mobile phones. Data collected from the pre- and post-tests and a learning satisfaction survey questionnaire were analyzed. The findings of this study reveal that C&U message application on mobile English learning, learning content for mobile English learning, practical use of C&U message, user satisfaction with learning achievements, use of digital learning materials, and user's attitude toward learning language through mobile devices. Finally, the C&U-Msg system can be effectively utilized for English learning.

**Keywords:** *C&U-Message (C&U-Msg), mobile learning, smartphone,*

## INTRODUCTION

With the advance of mobile technology and the growing population of owning a smartphone, an invisible language lab is gradually constructed. Cloud computing spaces have been establishing to satisfy the requirement of information transmit and push/pull technology in the cyber space. Smartphones equipped with sound multimedia function are made to be language learning tools. Therefore, at the beginning of the 21st century, some research and projects, regarding language learning and mobile technology, have been conducted. In the West, European Union even support a series learning programs to study the effectiveness of the application of mobile handhelds to learning. Besides E.U.'s effort, some researchers (Thornton: 2002, 2003, and 2005; Kiernan: 2004; Levy: 2005) made their subjects to access to language learning material designed for mobile learning. They did language teaching programs through cell phones, utilized their cell phone to learn vocabulary and English idioms, took quizzes, and submitted surveys.

Contrary to that independent learning mentioned in previous passage, we provide our users with learning material that is related to the English course they were taking. By assigning the students exercises through the cyber platform—C&U Message, the Application or App, instead of the traditional paper-based exercises in their textbook, we tend to discover the differences in their learning achievement. Podcast and Apps for language learning are available for learners to do self-study any time and everywhere. Although learners can benefit from information technology (Chinnery: 2006), research on the effects of user's applying mobile technology to dependent language learning has not been done. In our study, we are going to discover the influences of mobile technology on the achievement of language learning. We, in this study, adopted C&U Message, a Ubiquitous multimedia messaging platform (U-Msg)," powered by Google. With this App, students can access to learning materials via their smartphone. By using C&U Message, we also study a learner's attitude toward using a smartphone as a learning device. Even if information technology is beneficial

to learners, a learner's attitude of learning a language by using information technology is another crucial factor on the learner's language achievement. In addition to the users' achievement on their language learning, their attitude toward using mobile devices for learning is also what we would like to find out in this study.

**Literature Review**

Integration of IT and language learning

As mobile technology, information technology, and portable devices have been advancing, educators apply those tools to learning and teaching to create a learning and teaching environment which is not restricted by time and locations. Facer (2004:1) claimed that most teachers and students, in the U.K., had then taken mobile technologies a familiar part in their daily lives. Since then, information technology has got involved in education. As long as information technology can benefit language learning, learner's achievement can depend on the accessibility and convenience of a learner's using a mobile device for learning. (Chinnery, 2006)

Mobile language learning

The developing mobile technology facilitates retrieving and transmitting information. This technology has been fast growing, and the features equipped in mobile devices have become more various. Mobile learning has been the main stream worldwide. McFarlane, Triggs, and Yee (2008)o presented benefits of applying mobile devices to teaching and learning. EU-funded mobile learning projects (Pęcherzewska & Knot, 2007) confirm that mobile handhelds, mobile phones are the most frequently used gadget of all the mobile devices, including personal digital assistants (PDAs) and iPods, which receive a little less attention though. "A typical m-learning activity," stated by Laurillard (2007), "could build in more opportunites for digitally-facilitated site-specific activities, and ownership and control over what the learners do." Agnes Kukulska-Hulme and Shield (2008) also revealed mobile learning is generally expected to employ mobile phones, palmtop computers, and other mobile handhelds. This acknowledges us about the present trend of the application of mobile devices to support language learning.

Mobile technology has been advancing, and Smartphones dominant.

A smartphone as a mobile phone that is able to perform many of the functions of a computer, typically having a relatively large screen and an operating system capable of running general-purpose applications. (Oxford: 2013) With the trend of mobile learning, many learning materials have been developed, in the form of Podcast, widget, and APPs, while others embed the features of interactions and communication (*Kukulska-Hulme, and* Shield, 2008) to enhance the effectiveness of language learning by using mobile devices.

## RESEARCH METHOD

In this study, university students volunteered to join in this case study. For the study effectiveness, we conducted a pre-test and a post-test on the students. The implementation of this study included traditional in-class teaching and mobile learning after class. Afterwards, a questionnaire survey was administered. A total of 26 subjects were all university students from 4 different general English classes at the same level. Based on students' English grade in the national entrance examination, the students were all replaced to form a class with students whose English is level. They volunteered to join in this 6-week teaching experiment. The research instruments in this research include a pre-test and a post-test, and a questionnaire on the experience of using U-Msg system for English learning and the experience of mobile learning. Prior to this experiment, the students were requested to take a pre-test on grammar, covering present simple, past simple, and relative cause. One grammar concept was taught every two weeks in four classes in classes. In addition to the teaching in class, the 26 students received questions for practice every other day and were asked to reply the next day. In these 6 weeks, exercises on handout prepared by the teacher of the classes were the only practice for all students, and no quizzes were conducted to check their progress. The students, at the final stage, took a post-test which is identical to the pre-test and completed a questionnaire. These test questions and sentences in both the pre-test and the post-test were adapted from Grammar in Use by Murphy, published by Cambridge Press. All the questions in the pre-test and the post-test were proofread and approved by 3 English teachers to ensure all the test questions cover the grammar points which were taught in class. The survey questionnaire consists of one checklist with two questions on student's self-study habit and six dimensions regarding C&U message application on mobile English learning, learning content for mobile English learning, practical use of C&U message, user satisfaction with learning achievements, digital learning materials, and the attitude to learning language by mobile devices. The 5-point Likert scale was used in these six dimensions. The students were also requested to provide comments to the two open-ended questions. To sustain the reliability and fidelity of this questionnaire, it is approved by expert's content validity test; three college professors and three English teachers reviewed on the content.

**Data analysis and discussion**

All the quantitative data collected from the questionnaire was analyzed by *SPSS* 19.0 descriptive statistics, t-test, and One-way ANOVA. *SPSS* 19.0 was utilized for statistical analysis in this study. T-*test* helped to observe the progress of students' performance by the tests. between the experiment and control group and detect improvements in these two groups. The improvements within each group were also calculated. Finally, the responses in the questionnaires were examined and computed by *SPSS* descriptive analysis.

**Table 1: Average grades of the pre-test and the post-test**

| | Mean | N | SD. | MD. |
|---|---|---|---|---|
| **Pre-test** | **50.4** | **26** | **19.438** | **3.812** |
| **Post-test** | **58.7** | **26** | **21.567** | **4.23** |

**Table 2: Paired Sample t-test on the pre- and the post- tests**

| Statement | Mean | SD | t value | Sig. |
|---|---|---|---|---|
| **Paired 1 pre-test and post-test** | **-8.269** | **14.487** | **-2.910** | **0.007** |

Tables 1 and 2 show the performance in the pre-test and the post-test the. Table 1 shows the average score of the 2 tests on grammar. We can observe that average grade of the post-test is 58.65, while that of the pre-test is 50.38. Table 2 shows the figures from t-test: t(25)=-2.91, p = .007 <.05, d=-.57, indicating the students' learning is significant improved. In other words, the use of App helps the students in learning English grammar. The following section displays the analysis result of the survey on 6 aspects, including C&U message application on mobile English learning, learning content for mobile English learning, the extent of practical use of C&U Message Application, User satisfaction with learning achievements, the use of digital learning materials, and user' attitude to learning language by mobile devices.

**Table 3: Learning Content for Mobile English Learning**

| Item | Statement | Mean | SD | t value | Sig. |
|---|---|---|---|---|---|
| II.1 | The exercise questions pushed to the App are related to the lesions of my English course. | 4.69 | 0.471 | 18.333 | .000 |
| II.2 | The exercise questions pushed to the App can help me review the grammar taught in class. | 4.50 | 0.510 | 15.000 | .000 |
| II.3 | The 3-time-a-week practice can keep up the familiarity to grammar. | 4.08 | 0.796 | 6.897 | .000 |
| II.4 | The exercise questions are just enough to help me with review grammar points without adding up my study load | 4.19 | 0.634 | 9.594 | .000 |

Test value = 3

Table 3 indicates the domain of learning content for mobile English learning. The obtained means are greater than 3 with p= .000<.01. The students take a positive attitude toward the learning materials and the way which was conducted for more practice after class. Also, this statistics reveals that these exercises do not lay extra load on their schoolwork and helps them review and get proficient at what was taught in class.

**Table 4: Practical Use of C&U Message**

| Item | Statement | Mean | SD | t value | Sig. |
|---|---|---|---|---|---|
| **III.1** | **App can let me learn English whenever there is Internet access.** | **4.00** | **0.693** | **7.36** | **.000** |
| **III.2** | **App can be a sufficient aid tool to my English learning.** | **3.81** | **0.694** | **5.935** | **.000** |
| **III.3** | **I can effectively use scrappy time to review English.** | **3.96** | **0.662** | **7.404** | **.000** |
| **III.4** | **App can help me twice the result with half the effort in learning English.** | **3.65** | **0.745** | **4.474** | **.000** |
| **III.5** | **Compared with the traditional paper-based homework, exercises pushed on to the App can better force me to complete the homework.** | **3.62** | **0.941** | **3.333** | **.003** |

Test value = 3

III1 to III5 are the questions on the practical use of the App, C&U message. The means of these questions range from 3.62 to 4 (p=.000<.01), indicating the participants think it helpful to learn English by the online learning platform, from the aspect of make an effective use of scrappy time. Item III. 5 " Compared with the traditional paper-based homework, exercises pushed on to the App can better force me to complete the homework." reached the lowest means of 3.62, however, the subjects thought they were pushed to complete the assignment because they were told to submit the answers the next day when they received the exercise questions. In that case, the teacher can assure that the students did the exercise according to the record on the platform.

**Table 5 User Satisfaction with Learning Achievements**

| Item | Statement | Mean | SD | t value | Sig. |
|---|---|---|---|---|---|
| **IV.1** | **I feel satisfied that I can figure out some grammar ideas.** | **3.69** | **.679** | **5.196** | **.000** |
| **IV.2** | **I am satisfied that I have learnt and corrected the errors that I had before.** | **3.85** | **.732** | **5.897** | **.000** |
| **IV.3** | **I feel satisfied with my familiarity with correct use of grammar and concepts.** | **3.81** | **.801** | **5.142** | **.000** |
| **IV.4** | **I am satisfied with my overall learning achievement.** | **3.69** | **.736** | **4.797** | **.000** |
| **IV.5** | **Comparing with the pre-test, I can have better understanding in answering the questions.** | **3.77** | **.587** | **6.682** | **.000** |

**Test value = 3**

The statistics presented in Table 5 illustrates learners' satisfaction with their achievements. The means ranges from 3.69 to 3.85. p value is .000<.01 and significantly indicate that the subjects felt satisfied with what they had learnt and correct wrong concept and ideas that they used to be confused with.

**Table 6: Statistical results of digital learning materials**

| Item | Statement | Mean | SD | t value | Sig. |
|---|---|---|---|---|---|
| V.1 | I will read the detailed explanation uploaded to "Digital Materials" by the teacher. | 3.730 | 0.827 | 4.503 | .000 |
| V.2 | I will read the detailed explanation uploaded to "Digital Materials" by the teacher only when I can access to the Internet and browse it on line. | 3.62 | 0.898 | 3.495 | .002 |
| V.3 | I will download the materials uploaded in "Digital Materials" and read it when off line. | 3.00 | 1.02 | 0 | 1.000 |
| V.4 | I will review the detailed explanation constantly. | 3.00 | 0.8 | 0 | 1.000 |
| V.5 | I think it very convenient that I can read the digital material on line without downloading the text. | 4.00 | 0.849 | 6.009 | 0.000 |
| | Test value = 3 | | | | |

Table 6 presents participants' thoughts about the digital materials provided for them to recapture the grammar points and detail explanation to the exercise questions they did. The means range from 3 to 4. Both Item V.3 "I will download the materials uploaded in "Digital Materials" and read it when off line." and V.4 "I will review the detailed explanation constantly." obtained 3, which tell that to download the digital materials for off-line review was not positively supported by the students.

**Table 7: Statistical results of the Students' language learning attitude through Mobile phones**

| Item | Statement | Mean | SD | t value | Sig. |
|---|---|---|---|---|---|
| i.1 | I can accept learning English by a mobile device. | 4.27 | 0.724 | 8.935 | .000 |
| i.2 | I can accept teacher assigns me homework and I submit it with App. | 4.12 | 0.864 | 6.584 | .000 |
| i.3 | For efficient time management, I can accept learning English with App. | 4.15 | 0.732 | 8.041 | .000 |
| i.4 | For forced study, I can accept learning English with App. | 3.62 | 1.023 | 3.068 | .005 |
| i.5 | To improve my own learning achievement, I can accept learning English with App. | 4.19 | 0.749 | 8.113 | .000 |
| | Test value = 3 | | | | |

Table 7 demonstrates students' attitude toward the use of App on a smartphone to do language learning. The means of all the items range from 3.62 to 4.27 (p=.000<.01). Item i.1 " I can accept learning English by a mobile device." clearly shows that the students are with high acceptance in using a smartphone as a learning tool. From Item i.4 with the mean of 4.19, the students showed a positive attitude to mobile learning in the condition of improving their performance in English, while Item i.4 (m=3.62), the lowest in this domain, may tell that the students do not want to have pure English learning through App. They accept mobile learning through App on a smartphone only when this activity is schoolwork-relevant. This fact echoes the commons on the advantages of C&U Message. From our questionnaire, most of the students stated that they can still review grammar after class without a textbook. Some students said it's good to bring the exercise question everywhere to discuss with other people. In general, they gained more chances to practice and get familiar with grammar points taught in class. Therefore, teachers may assign their students homework through an App instead of a traditional paper-based homework. In this case, the students can make use of their choppy time to finish their assignment. For the teachers, they can easily monitor the status of their students' reply in the platform.

**Table 8 User's attitude to utilize other English learning Apps**

| Item | Statement | Mean | SD | t value | Sig. |
|---|---|---|---|---|---|
| ii.1 | I can still choose and install suitable language learning App to do learning. | 4.230 | 0.765 | 8.208 | .000 |
| ii.2 | I think a smartphne is suitable as a device for English learning | 4.19 | 0.849 | 7.157 | .000 |
| ii.3 | I think I can learn English by a smartphone anytime and everywhere. | 4.42 | 0.643 | 11.28 | .000 |
| ii.4 | I think, for learning English, the screen of a smartphone is big enough. | 3.96 | 0.871 | 5.63 | .000 |
| ii.5 | I think it is handful to use a touch screen to type when I use a smartphone to learn English. | 3.88 | 1.033 | 4.368 | .000 |
| ii.6 | I think using a smartphone as a learning device can motivate me to learn English. | 4.31 | 0.62 | 10.795 | .000 |
| ii.7 | I think I can use scrappy time more effectively to learn English by a smartphone. | 4.38 | 0.571 | 12.362 | .000 |
| ii.8 | I think a smartphone helps me with time management for learning English. | 4.00 | 0.632 | 8.062 | .000 |
| ii.9 | Overall, I think a smartphone as a learning device can benefit learning English. | 4.23 | 0.71 | 8.835 | .000 |
| | Test value = 3 | | | | |

Table 8 reveals the User's attitude to utilize other English learning Apps after they experienced the learning model during the past 6 weeks. Item ii.1 to ii.9 obtained means raging from 3.88 to 4.42 with p=.000<.01. Although the comments these students made on the disadvantages of C&U Message App, the results indicate that the subjects retain a positive attitude of mind to utilize a language learning App in a smartphone.

According to the comments in the questionnaire on the disadvantages of C&U Message, the App, they all mentioned about the problem of not receiving instant notices from the App if there is a new exercise or if they have not yet completed and submitted their answers. Additionally, the system is not stable enough when applied to smartphones with different brand, which are all equipped android system. Disconnection to the C&U Message and its auto shutdown are the 2 drawbacks stated in the questionnaire. However, Item ii.3, ii.7, and ii.8, regarding time management for study, obtained the mean of 4.42, 4.38, and 4. These results explain that flexibility in the use of time and less restriction in locations obtain the users' high acceptance in adopting a learning Apps to learn a language by a smartphone.

## CONCLUSION AND SUGGESTIONS

Based on the findings of this study, in terms of familiarity with the use of grammar, doing lesson-related practice by C&U Message is more effective for the students than doing exercises in their textbook. The score of the pre-test and the post-test suggests that they made a significant improvement. As to the impact of mobile technology on language learning, the students could complete exercises in their fragment time, so the App helped them with time management for reviewing and refreshing grammar in lessons. Despite of C&U Message's instability which the students experienced during the experiment, they still hold confidence in learning language with an App on a smartphone. We, especially, found that they are more willing to use a language learning App when the learning materials are school course related. This explains that the participants retain a positive attitude to the application of mobile technology on learning. In this mobile technology dominated society, from the aspect of efficient learning, we can encourage teachers to be familiar with the latest and popular educational technologies, and assign their students homework through such a language learning platform as C&U Message. Finally, to utilize the media functions for mobile learning, the effectiveness of using recording and filming features in improving verbal communication, or speaking ability can also be a future research to do.

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# Impact of Innovation Attributes and Psychological Wellbeing Towards E-Learning Acceptance of Postgraduate Students: Comparison of Sri Lanka and Malaysia

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**ABSTRACT**

E-learning is a method of delivering knowledge using electronic media for the remote users. The advantages of e-learning method can be fully achieved with the postgraduate studies as majority of the postgraduate students are engaged in learning while they are working and also geographically dispersed due to the family and work life thus physically appearing for the lecture sessions are difficult to them. The Diffusion of Innovation theory identifies five attributes of innovation namely relative advantage, compatibility, complexity, trialabiltity, observability which impact for the acceptance of technology. Further, psychological wellbeing of the postgraduate students also play a major role in accepting technology as they are adult learners. Thus this study is going to compare the e-learning acceptance of postgraduate students between Sri Lanka and Malaysia as these two countries have more similarities in terms of history, geography and culture. A Random sample of 400 was drawn from the postgraduate students in locally based universities in Sri Lanka and Malaysia and structural equation model is used for the analysis. It was found that both Sri Lankan and Malaysian postgraduates' e-learning acceptance is nearly similar.

**Keywords:** *e-learning, acceptance, postgraduate, Sri Lanka, Malaysia ,innovation attributes, psychological wellbeing*

## INTRODUCTION

The teaching and learning activities have been developed with parallel to the technological developments. In the digital age, electronic media are mainly used to disseminate knowledge. According to a widely accepted definition for e-learning by The Ministry of Education in New Zealand, e-learning defines as *"e-Learning typically involves some form of interactivity, including online interaction between the learner and their teacher or peers. e-Learning opportunities are usually accessed via the Internet and its associated tools and software. However e-Learning is evolving to include an increasing use of a wide and diverse range of other technologies and tools. These include video and audio conferencing, mobile phones, data projectors, digital cameras, global positioning systems and interactive whiteboards."* (Ministry of Education New Zealand, 2009). e-Learning facilities can be in either synchronous or asynchronous form. Asynchronous e-learning is where the teaching and learning takes place even when the participants cannot be online. Though the users can still access to information and content and download them send feedbacks to the instructors via email, discussion boards, blogs, discussion forums etc. In contrast to this synchronous learning is real time interaction between the learner and the instructor through videoconferencing, teleconferencing chat, instant messaging etc (Hrastinski, 2008; Koller et al., 2001). Therefore e-learning is a very advantageous method of accessing geographically dispersed users easily with the use of technology.

In view of the fact that the postgraduate studies are mainly followed by the individuals who are working fulltime, geographically dispersed than undergraduates and with other obligations to fulfill such as commitment to families and social lives, and also as they possess a different set of characteristics, there is a requirement for more flexible

postgraduate courses offering with the help of the technology to address the needs of that particular clientele which allow them to obtain necessary qualifications overcoming the barriers. It is also found that higher educational institutions have also benefited from virtual classrooms as their cost can be reduced. The past studies done in abroad found that the online MBA courses are attracted adults over 35 years of age, females, part time, married students (Cao, 2010). Engelbrecht(2003a) (2003b) found that the students enrolled for e-learning Master's programme in Taxation of the University of South Africa are full-time employees and many of them are in the process of building a career and family and students indicated work pressure and family commitment as reasons for not completing the studies. This condition is also similar among the postgraduate students in Sri Lanka and Malaysia as they also engaged in learning while they are working and thus physically appearing in a class room is rather difficult to them.

Nowadays most higher educational institutions in Sri Lanka and Malaysia are offering e-learning facilities. E-learning is now becoming popular in Sri Lanka and many higher educational institutes are now adopting e-learning to access the remote users. On the other hand it was found that though higher educational institutes implementing e-learning solutions, their usage of such systems are not fairly good (Gunawardana & Ekanayaka, 2009; Gunawardena & Pathirana, 2011). Further it is understood that Malaysia is a country with e-learning is more popular than Sri Lanka. It is known that both Sri Lanka and Malaysia has similarities in terms of location, history and had a similar socio economic status after the independence. Sri Lanka is one of the top countries in Asia in terms of healthcare, education, widespread of English language usage, trained human capital in the field of accountancy. However Malaysia developed more rapidly than Sri Lanka with the consistent political policies and was able to gain considerable economic growth. Therefore it is suitable of making a comparison between Sri Lanka and Malaysia as these two countries were similar in the past yet Malaysia showed a substantial growth than Sri Lanka. Therefore comparison with Malaysian postgraduate students' acceptance of e-learning is also to be made as to identify the lessons learnt by these two countries.

Thus the objective of this study is to compare the e-learning acceptance of postgraduate students between Sri Lanka and Malaysia.

**E-LEARNING DEVELOPMENT IN SRI LANKA**

The Open University of Sri Lanka (OUSL) is a pioneer in higher education institute in Sri Lanka in providing distance education since its inception in 1980 and now OUSL offers its programmes using ICT such as providing audio and video self study materials, email communication, virtual class room sessions etc ((PANdora: Distance and Open Resource Access, 2009). The School of Computing of the University of Colombo introduced the e-learning Centre (eLC) in late 2002 to provide e-learning services to undergraduate and graduate students. Currently eLC offers courses through e-learning to its undergraduate and postgraduate students. In 2003, Sri Lanka Distance Learning.

Centre (DLC) opened under a World Bank project and it facilitates to connect Sri Lanka with 50 international DLCs via worldwide video conferencing system. National Online Distance Education Service (NODES) operating under the Ministry of Higher Education facilitates and coordinates online distance learning programme development in educational institutes in Sri Lanka. NODES is linked with Sri Lankan mobile operator Mobitel to use m-learning facilities with the view of overcoming geographical discrepancies when disseminating higher education throughout the country (www.nodes.lk). As a pioneer in introducing state-of-art technology, University of Colombo offers Postgraduate Diploma in Business Management and Executive Diploma in Marketing through m-learning facilities. University of Moratuwa also offers Bachelor of Information Technology programme for the external students through online. University of Kelaniya offers Master of Business programme through m-learning mode.

**E-LEARNING DEVELOPMENT IN MALAYSIA**

The Government of Malaysia promotes the ICT sector through the implementation of Malaysian plans introduced by time to time. Under the 6$^{th}$ Malaysian Plan the National Information Technology Council has been established and the more stress has been put on the development of the manufacturing sector through ICT. Under the 7$^{th}$ Malaysian Plan the National Information Technology Agenda was formed and the Multimedia Super Corridor (MSC) Project was launched to attract the best ICT companies to Malaysia. Under the 7$^{th}$ Malaysian Plan, the Multimedia University was established to develop human capital and promote research on ICT and multimedia. The 8$^{th}$ Malaysian Plan has given priority to expand ICT among general public and rural communities. Under this, cellular telephony, internet and broadcasting technologies were integrated. The 9$^{th}$ Malaysian Plan prioritizes the further expansion of ICT by reducing the digital divide, development of cybercities and encourages new sectors such as bioinformatics (Strategic ICT Roadmap for Malaysia, 2007).

In 2000, Malaysia established the National e-learning Centre (NELC) with the view of promoting research and development, to promote and increase the awareness of e-learning, advisory and consultancy and develops e-learning standards. The Open University Malaysia and University Tun Abdul Rasak are the pioneers of providing e-learning programmes in Malaysia. As to date many other Malaysian universities such as, Multimedia University, University Pendidikan Sultan Idris, University Malaysia Sarawak, University of Malaya, University Utara Malaysia offer e-learning

facilities for the students.

Apart from that the Asian e university (AeU) has been set up in Malaysia under Asia Cooperation Dialogue (ACD) of which Sri Lanka also has been a member. AeU was established in Malaysia after the ACD Ministerial meetings held in Islamabad 2005 and Doha 2006. It offers Bachelors and postgraduate programmes around the world through the e-learning mode.

**LITERATURE REVIEW**

Adapting to an e-learning system is always a new approach for its users. Therefore e leaning can be considered as an innovative method of learning. Rogers Diffusion of Innovation theory (DOI) has been used in many fields such as agriculture, medicine and ICT to measure the adoption of new innovations. According to Rogers (2003) the innovation decision process contain five stages namely, knowledge, persuasion, decision, implementation and confirmation. In the second stage of innovation process, i.e in the persuasion stage an individual may build either a negative or a positive attitude towards the innovation. Attitude is defined as "in individual's enduring evaluation of feelings about and behavioral tendencies towards an object" (Pride & Ferrell, 2005) (p.208). Since Rogers describes the innovation diffusion process as 'an uncertainty reduction process" the process attributes that are discussed under the persuasion stage help to decrease the uncertainty on innovation. The attributes that are discussed in this stage are relative advantage, compatibility, complexity, trialability and observability.

Rogers explains relative advantage as the "degree to which an innovation is perceived better than the ideas it supersedes" (p.229). Relative advantage is measured in terms of economics, social prestige, convenience and satisfaction. Also motivational aspects, demand, value are the most hunted advantages that an individual seeks. Compatibility is the "degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters. (p.240). The Compatibility dimensions include to what extent an innovation fits the values, beliefs, previous ideas and needs of the users (Perkins, 2011).As per Rogers complexity is 'the degree to which an innovation is perceived as relatively difficult to understand and use" (p.257). If the complexity of the innovation increases the adoption is decreased. If the system is user friendly and the users have a prior training on the use of computer equipment, support systems and technical knowledge then the adoptability increases (Jesus, 2003). As Rogers defines, trialability is 'the degree to which as innovation may be experimented with on a limited basis" (p.258). More the innovation is tried the faster the adoption is. According to Rogers observability is "the degree to which the results of an innovation are visible to others" (p.258). If the results are visibly observable by people then the adoption is increased.

Based on the attitude that the user built up in the persuasion stage he or she might accept or reject the innovation. i.e a person act upon the attitude he or she built in the persuasion stage. In attitude-behavior researches such act is defines as' behavioral intention'(Ajzen & Fishbein, 1977).

Rogers's diffusion of innovation has been tested by many studies on users' technological acceptance and various conclusions have been made in different contexts.

According to Liao & Lu (2008) perceived compatibility positively influences the students' intention to use e-learning and trialability is negatively related with e-learning adoption. Further it found that perceived e-learning advantage; complexity and observability have no significant effect on students' intention of adoption of e-learning. As per Duan, et al.,(2010) only the perceived compatibility and trialability have a significant influence on e-learning adoption among the Chinese undergraduates. Another Chinese study done on e-learning adoption of undergraduates, found the most influential factors for e-learning adoption was found to be pricing under relative advantage, education quality under compatibility, IT equipment under complexity and flexibility under relative advantage (Fu et al., 2010). Fu et al., (2010) found perceived e-learning relative advantage, compatibility, trialability and observability have a significant positive influence on students' e-learning adoption and that perceived level of complexity has no significant effect on students' e-learning acceptance. Similar findings were derived by Al-Gahatni (2003) where relative advantage, compatibility, trialability and observability shows a positive signification correlation with computer technology adoption in Saudi Arabian knowledge workers and complexity shows a negative relation with computer adoption. Lai & Chang (2011) also found that compatibility has a significant positive impact on intention of using e books among the Taiwanese. A study done in teachers' adoption of web technology in secondary school in Sydney has revealed that relative advantage and traialbility has a strong and significant relationship with using web technology for preparation for study materials and compatibility has a strong and significant relationship with teachers' usage of web for delivery (Jebeile, 2003). Further Huang (2010) found that relative advantage positively impact for attitude of smart phone usage and trialability found a negative impact on attitude of using smart phone.

The researchers also made attempt to find out the impact between innovation attributes and attitudes of using technologies, because attributes of innovation would have been an effect on changing the attitude of a person before altering the behavioral intention of the users. A study conducted to measure the impact of innovation attributes on the

attitude of using information technology of the lecturers in the National University of Lesotho has concluded that relative advantage, complexity and observability has a positive influence and observability found to be the highest influenced attribute. Further this study found that compatibility and trialability do not contribute for the attitude of using information technology (Ntemana & Olatokun, 2012). A study done among USA citizens on their attitude for using internet for voting has revealed that relative advantage has a positive impact on attitude towards using internet for voting and compatibility was not a significant factor (Carter & Campbell, 2011). Nor & Pearson (2007) found that relative advantage and trialability has a significant positive impact on attitude towards using internet banking among Malaysian postgraduate students and compatibility is not a significant positive impact factor on attitude on using internet banking. It further found that attitude of using internet banking has a significant positive impact on intention of using internet banking. A study done in Jos, Plateau state in Nigeria on Automated teller Machines adaptation in among the citizens , it was found that relative advantage, complexity, compatibility has a significant positive impact on attitude on using ATM which in turn has a significant impact on intention of using technology. Among them observablity has the highest impact on attitude while trialability was the least impact factor on attitude (Olatokun & Igbinedion, 2009). Similarly Putzer & Park (2010) found that observability and compatibility are the significant factors which contribute for the attitude of using Smartphone among the nurses in Southeastern hospitals in United States. A study done among Taiwanese potential internet bank users on the attitude of using internet banking had found that relative advantage and compatibility has a positive significant impact on attitude of using internet banking which in turn has an impact on intention (Lin, 2011). A Malaysian study done on consumer attitude on online shopping found that relative advantage and compatibility has a significant impact on attitude while complexity is not a significant predictor of attitude towards using online shopping (Zendehdel & Paim, 2013). Folorunso (2010) concluded that relative advantage and complexity did not show a significant impact on attitude but compatibility, observability and trialability have a positive significant impact on attitude of using social network sites of the student in Nigerian universities. They further elaborated that though students see speed, availability, ease of use in other social network sites they do not like to switch from one network to the other network. Therefore relative advantage does not provide any significant effect on attitude. It also found that social network sites are not easy to use and not widely spread. Therefore contribution of complexity is also found to be insignificant. The observability of the technology was affected from the others perception and influence. The trialiability shows a higher significance towards the attitude of using technology, because students have already tested the trialability of the site and perceived it as high. It is also found that innovation attributes are significant determinants of internet banking attitude of the users.

**PERCEIVED PSYCHOLOGICAL WELLBEING OF ACCEPTING TECHNOLOGY**

The Well-Being Institute of University of Cambridge defines wellbeing as “positive and sustainable characteristics which enable individuals and organizations to thrive and flourish”(Dingley, 2010). Organization for Economic Co-operation and Development (OECD) defines human wellbeing as “the necessity of congregating various human needs which are vital and at the same time to achieve the goals which leads to success and makes one satisfied with one’s life”(OECD, 2011).

It was found in many research studies that certain psychological phenomena of the people shape the attitude and behavioral intention of using technology for their day-to-day activities. People, who feel lonely, depressed and lack social skills are found to be more users of internet (2003; Hamburger & Artzi, 2002; Kim et al., 2009). Morahan-Martin & Schumacher (2003) found that lonely people are more towards to use online communication than non-lonely students to increase their social behavior and also report a higher satisfaction. A study done on Israel students’ wellbeing and e-learning attitude it was found that high self-esteem students shows a positive attitude towards e-learning and that there was no correlation between loneliness and attitude towards learning (Kurtz & Hamburger, 2008). In contrast to this Ehrenberg et al (2008) found that low self esteem students are more towards using instant messing than high self esteem students. Further lonely Turkish adolescents found to be developed increasing attitude towards online than non-lonely adolescents (Erdoğan, 2008). Erdogan (2008)further argued that different studies found conflicting results of psychological wellbeing towards attitude of using internet due to the cultural differences.

It is observed that Rogers DOI theory would be more comprehensive if the psychological wellbeing factors also be included as it gives broader picture on how postgraduate students’ e- learning acceptance is affected. Thus the following conceptual frame work in Figure 1 is derived.

**THE CONCEPTUAL FRAMEWORK**

The innovation attributes of relative advantage, complexity, trialability, compatibility observability and psychological wellbeing of the students (loneliness, depression, self esteem) impact on both the attitude using e-learning and behavioral intention of e-learning of the students.

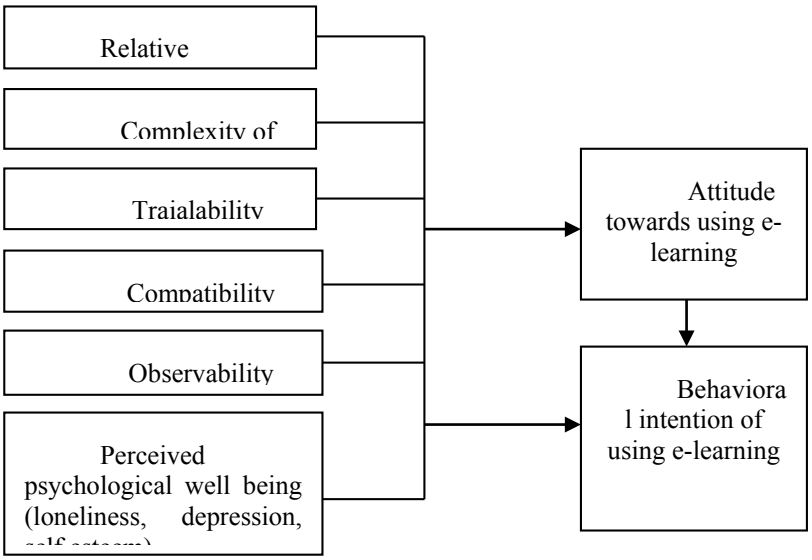


**Figure 1: The conceptual framework**

**METHODOLOGY**

This study intends to exploit Structural Equation Modeling (SEM) as the statistical data analysis method. Since SEM approach is known as a large sample size technique it requires at least a minimum sample of 200 as a goal (Hu & Bentler, 1999; Kenny, 2012; Kline, 2011). Thus 200 respondents from each country were selected as the sample. The University Grant Commission (http://www.ugc.ac.lk) of Sri Lanka has 15 universities, 7 postgraduate institutes and 9 other institutes in Sri Lanka under its purview and the total postgraduate enrolment for the 15 universities in 2010 as per statistics published by UGC is 17,844 and in postgraduate institutes 5,709 and in other institutes 763. Therefore the highest numbers of postgraduate students are registered with the universities. The highest number of enrollment is recorded from the universities located in the Western Province which is 15,470. This represents 85% of the total postgraduate enrollment in the whole country. Out of the 6 universities operating in the Western province, 4 of them was selected based on the random numbers generated using Excel 2007to draw the sample. Then through the Registrar of each university the list of postgraduate students enrolled in year 2010 was obtained and it was merged which contained 5,322 students. Then 215 random numbers were generated using Excel 2007 to select the respondents.

According to the Annual report 2010 of the Malaysian Department of Higher Education the total enrollment of local students for postgraduate studies in public universities and private universities are 70,562 and 17,842 respectively. Therefore the total enrollment for postgraduate studies in Malaysian universities is 88,404. Among this the highest local students enrolled for postgraduate studies are recorded from the state of Selangor which is 40,961 for public universities and 5,469 for private universities. The total enrolment is 46,430. This represents 57.4% of the total postgraduate enrolment in Malaysia. According to the Annual report 2011 of the Malaysian Department of Higher Education, there are 19 universities currently operating in the state of Selangor. By generating random numbers in Microsoft Office Excel 2007, the researcher has chosen 5 universities among the list of universities which operate in the state of Selongor. Then the list of local postgraduates who were enrolled in year 2010 was obtained from the Examination Departments of the selected 5 universities. Then all the lists of the postgraduate students were merged and it contained 8,454 local students. A sample of 215 random numbers was generated using Microsoft Office Excel 2007 to select the respondents from the list.

A pilot study is carried out to investigate the feasibility of the study by identifying potential problems which affect quality and the validity of the results and hence will identify the modifications, if any, needed for the main study. Hence a pilot study was carried out with 30 postgraduate students. The table 1 shows the reliability statistics of the pilot study and the main study.

**Table 1: Reliability statistics of the Pilot and the main study**

| Scale | # items | Pilot study Cronbach's alpha | | Action taken | # items | Main study Cronbach's alpha | |
|---|---|---|---|---|---|---|---|
| | | Sri Lanka | Malaysia | | | Sri Lanka | Malaysia |
| Relative advantage | 9 | .806 | .912 | | 9 | 0.850 | 0.884 |
| Compatibility | 7 | .844 | .962 | | 7 | 0.893 | 0.909 |
| Complexity | 6 | .785 | .812 | | 6 | 0.879 | 0.891 |
| Observability | 4 | .767 | .890 | | 4 | 0.811 | 0.780 |
| Trialability | 6 | .609 | .941 | 1 | 5 | 0.866 | 0.873 |
| Loneliness | 6 | .754 | .847 | | 6 | 0.708 | 0.702 |
| Depression | 13 | .801 | .852 | | 13 | 0.831 | 0.840 |
| Self esteem | 15 | .698 | .837 | 2 | 14 | 0.678 | 0.741 |
| Intention | 5 | .903 | .943 | | 5 | 0.841 | 0.858 |
| Attitude | 4 | .923 | .963 | | 4 | 0.840 | 0.797 |
| Action taken after the pilot study was as follows<br>Item 3 is removed from the construct<br>item 15 is removed from the construct | | | | | | | |

**DATA ANALYSIS**

The SEM approach used in this study employed a two stage method over one stage method. In two stage method, the Confirmatory Factor Analysis (CFA) is first performed as the preliminary step of SEM analysis. In CFA it determines the relationship between the latent construct and its observed variables to assure that the hypothesized structure has a good fit to the data. In CFA the cut off value for factor loading between the observed variable and latent variable should equal to 0.5 (Naziman et al., 2012; Wang & Wang, 2012). The factor loadings below 0.5 indicate a lack of convergent validity. Therefore such indictors should be removed from the construct. After removing the items with low factor loadings, then the model fit indices were checked and if there are any modifications to be done to the construct they were done based on the modification indices shown by the AMOS 20 software.

After the confirmatory factor analysis, the initial measurement model is drawn and it shows the model fit values as $\chi^2$/df=1.749,SRMR=0.0521,Hoelter's CN=245 (0.05 level), CFI=0.925, IFI=0.926, TLI=0.918, RMSEA=0.041 and PCLOSE=1. The Bollenstine p value is 0.06. Therefore the initial model can be accepted since it has met the model fit criteria.

**Table 2: Regression results of e-learning acceptance**

| Exogenous variable | Endogenous variable | Sri Lanka Standardized regression | Sri Lanka P value | Malaysia Standardized regression | Malaysia P value |
|---|---|---|---|---|---|
| Relative advantage | Attitude | .151 | .268 | .246 | .041* |
| Complexity | Attitude | .116 | .168 | .073 | .382 |
| Trailability | Attitude | -.155 | .183 | -.021 | .819 |
| Compatibility | Attitude | .361 | .009* | .244 | .022* |
| Obervability | Attitude | .368 | .023* | .299 | .021* |
| Loneliness | Attitude | -.005 | .954 | -.156 | .092 |
| Depression | Attitude | -.155 | .055 | -.038 | .643 |
| Self-esteem | Attitude | .132 | .148 | .063 | .432 |
| Relative advantage | Intention | .297 | .031* | .179 | .111 |
| Complexity | Intention | .004 | .965 | .027 | .725 |
| Trailability | Intention | -.122 | .302 | .002 | .985 |
| Compatibility | Intention | -.240 | .089 | .013 | .894 |
| Obervability | Intention | .390 | .022* | .155 | .207 |
| Loneliness | Intention | .148 | .110 | -.001 | .989 |
| Depression | Intention | -.064 | .433 | .050 | .503 |
| Self-esteem | Intention | -.074 | .417 | -.061 | .410 |
| Attitude | Intention | .606 | .000** | .553 | .000** |

*significant at 0.05 level **significant at 0.01 level

According to the Table 2, there is a significant positive influence of compatibility and observability on attitude of using e-learning among both Sri Lanka and Malaysian postgraduate students. This finding confirms the findings of Olatukun & Igbinedion (2009), Putzer & Park (2010), Lin (2011), Zendehdel & Paim (2013) and Folorunso et al (2010) which compatibility has a significant impact on attitude of using e-learning. However with contrast to this finding Ntemana & Olatokun (2012), Cater & Cambell (2011) and Nor & Pearson(2007) found that compatibility has no impact of attitude of using technology. Similar with this study Ntemana & Olatokun (2012), Olatukun & Igbinedion (2009), Putzer & Park (2010) and Folorunso et al (2010) also found that there is a significant impact on observability on attitude towards using technology. Folorunso et al (2010) and Huang (2010) found that trialability has a significant impact on attitude and similar findings were derived by Ntemana & Olatokun (2012) and Olatukun & Igbinedion (2009) found that trialability has no impact of attitude of using technology. Similar with this study, Zendehdel & Paim (2013) and Folorunso et al (2010) have concluded that complexity has no impact on attitude of using technology as found in this study. In contrast to this Ntemana & Olatokun (2012) and Olatukun & Igbinedion (2009) was found that there is a significant impact of complexity on attitude.

Relative advantage has a significant positive influence on attitude of using e-learning among Malaysian postgraduate students and no significant impact was found among Sri Lankan postgraduate students. Ntemana & Olatokun (2012), Cater & Cambell (2011), Nor & Pearson (2007), Olatukun & Igbinedion (2009),Lin (2011), Zendehdel & Paim (2013) also found that there is a significant positive relationship between relative advantage and attitude of using technology while Folorunso et al (2010) found relative advantage has no impact of attitude of using technology.

Sri Lankan postgraduate students' intention of using e-learning is significantly determine by relative advantage and observability while there are no significant impact was found in innovations attributes on intention of using e-learning among Malaysian postgraduate students. Liao & Lu (2008) found that relative advantage has no impact on intention of using technology and Fu et al (2010) Al-Ghatani (2003) Jebeile (2003)found that there is a significant relationship between relative advantage and intention of using technology. With similar to this study Liao & Lu (2008) also found that trialability has no impact on intention of using technology while contrast to this study Fu et al (2010) Duan et al(2010), Al-Ghatani (2003) and Jebeile (2003)found that there is a significant positive relationship between trialability and intention of using technology. Similar with this study Liao & Lu (2008)and Fu et al (2010) also found that complexity has no impact on intention and Al-Ghatani (2003) found that there is a negative relationship between complexity and intention of using technology. Related with this study Liao & Lu (2008) found that there is no relationship between observability and intention of using technology, although Fu et al (2010)and Al-Ghatani (2003) found that there is a significant impact of observability on intention of using technology.

It is also observed that psychological factors of the postgraduate students do not influence on either attitude of using e-learning or intention of using e-learning. In contrast, Hamburger (2002), Kim et al(2009), Caplan (2003), Erdoğan (2008) found that loneliness leads to higher level of technology usage while similar to this study Kurtz and Hamburger (2008) found that there is no relationship between loneliness and attitude towards technology usage However, Ehrenberg et al(2008) found that there is a relationship between low self esteem and attitude of using technology. Also Kurtz & Hamburger (2008) found that there is a relationship between high self esteem and attitude of using technology. Erdagon (2008) argued that different cultures have different impact of psychological wellbeing on attitude of using technology.

Both Sri Lankan and Malaysian postgraduate students' perception of attitude towards using e-learning has a significant positive influence on intention of using e-learning. This is similar with Nor & Pearson (2007), Olatokun & Igbinedion (2009) and Lin (2011).

**DISCUSION, CONCLUSIONS AND RECOMMENDATIONS**

It was observed that almost both Sri Lankan and Malaysian postgraduate students show similarity in terms of how innovation attributes impact on attitude of using e-learning. In both countries compatibility and observability shows a significant impact on attitude of using e-learning and however only Malaysian postgraduate students are perceived that relative advantage has an influence on attitude towards e-learning. Traialbility and complexity did not show any significant impact on attitude towards e-learning in both countries. This similarity might due to the fact that both Sri Lankan and Malaysian workforce and the higher education sector now have been exposed to the latest developments of the technology and students now only seek how the technology is consistent with their life style and career goals (compatibility) and whether benefits can be seen (observability). If so, they would build positive attitude towards e-learning. On the other hand prior experiments on e-learning (trialability) and the intricacy in using e-learning (complexity) is not a matter for the postgraduate students in Sri Lanka and Malaysia as they are using technology for everyday life.

Though the factors of influencing attitude towards e-learning in both countries seems to be almost similar, the factors influencing intention of using e-learning found to be fairly different between Sri Lanka and Malaysia. While Sri

Lankan postgraduate students' intention of using e-learning is significantly determined by relative advantage and observability, there is no any significant factor found to be on intention of using e-learning among Malaysian postgraduate students. Though the postgraduate students in Malaysia build a significant positive attitude through relative advantage, compatibility and obeservability no factor is affecting for act upon such attitude. This difference is might due to the fact that since e-learning is more popular in Malaysia, the postgraduate students already aware on the technological attributes of e-learning and therefore those attributes might not make any significant influence of altering the intention of using e-learning in Malaysian postgraduate students. However the popularity and awareness of e-learning is rather low in Sri Lanka, the postgraduate students of Sri Lanka specifically interest to know about the benefits and facilities of e-learning before using it.

Neither any psychological wellbeing factors were affected in Sri Lankan or Malaysian postgraduate students' attitude and intention of using e-learning. Erdagon (2008) argued that different cultures have different impact of psychological wellbeing on attitude of using technology. Since Sri Lanka and Malaysia posses similar cultural and geographical backgrounds, the believes and values of the two countries are identified to be similar. Thus this similarity might lead to the finding of none of the psychological wellbeing factors has a significant effect on altering the attitude of using e-learning or intention of using e-learning. Therefore loneliness, self esteem or depression are not significantly affecting for attitude and intention of using e- learning in both Sri Lankan and Malaysian postgraduate students.

Both Sri Lankan and Malaysian postgraduate students show a significant positive impact on attitude of using e-learning on intention of using e-learning. Thus both perceived that intention is significantly determine by the attitude towards e-learning.

Therefore it can be concluded that both Sri Lankan and Malaysian postgraduate students perceived similarity in terms of attitude towards e-learning and intention of using e-learning.

It was discovered that both Sri Lankan and Malaysian postgraduate students' perceived relative advantage is a significant positive predictor of intention of using e-learning and attitude of using e-learning respectively. Therefore the educational institutes who provide e-learning contents should further communicate the students on usefulness that can be gained from e-learning in terms of cost, flexibility, efficiency and effectiveness. Also lecturers who are currently involving and hoping to involve in e-learning mode also consider the ways of improving the students' e-learning advantages as it develops likeness and intention of using e-learning. Further e-learning solution providers can consider how they can develop the software, platforms and other necessary infrastructure by reducing the cost and increasing the efficiency and effectiveness of e-learning.

Also the higher educational institutions and the e-learning service providers of the two countries should thoroughly consider the compatibility and observability of e-learning as they are found to be the significant factors. Thus e-learning should be promote as a method which well-suited for the life style and career goals of the working students as it would certainly increase the likeness of e-learning among the postgraduate students in Sri Lanka and Malaysia. Also the positive attitude towards e-learning lead to increase the intention of using e-learning in both countries, the educational institutes should conduct awareness programmes on e-learning to increase the positive attitude towards e-learning which eventually lead to increase the intention of using e-learning hence increase the students who follow e-learning mode.

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# Student Perceptions of a Cloud Assessment Learning Environment

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**ABSTRACT**

This paper describes a multi-method study conducted at a New Zealand polytechnic which investigated student perceptions of a cloud assessment learning environment. Factors examined included teacher-student interpersonal behaviour, conceptual change, student achievement, attitude and computing confidence. This unique study provides a clear insight into student perceptions of the cloud assessment learning environment. Educators will be able to utilise data from this study to better prepare students, manage expectations, and emphasise positive aspects of their own classroom learning environment.

**Keywords:**

## INTRODUCTION

This paper presents a summary of an investigation into student perceptions of the cloud assessment learning environment and draws its findings from a much larger study. The cloud assessment learning environment is a unique learning environment made possible by the recent advent of cloud computing and the associated technologies. The implementation of a cloud assessment learning environment allows teachers to monitor and guide student progress over the duration of an assessment (Google, 2011a). This is in contrast to traditional assessment methods where teachers often only see student work in summative assessment items at the end of the teaching and learning period (Race, 2007). Although the cloud assessment learning environment offers educators the benefit of being able to monitor and guide students throughout an assessment, an important question which existed as the fundamental motivation behind this study remained, namely, what do students make of this new assessment environment?

### Background

The cloud assessment learning environment exists when the collaborative sharing features of a cloud computing tool (e.g. Google Docs) are utilised for a continuous assessment. Continuous assessments being those assessments where students are given an extended period of time (usually weeks) to complete an assessment task (e.g. write a report). At the beginning of the assessment (day 1) each student uses a cloud computing tool to start their assessment (e.g. create a blank document in Google Docs). Each student then shares their work with their teacher by using the collaborative sharing feature of the cloud computing tool. It is this act of 'sharing' that allows the teacher to then monitor and guide each student throughout the duration of the assessment. This process allows a high degree of individualised and personal interaction with the students also. The cloud assessment learning environment can therefore be defined as the learning environment that exists when the collaborative sharing features of cloud computing tools are utilised by teachers to monitor and guide students during continuous assessments. Figure 1 provides a visual representation of the cloud assessment learning environment.

This study exists loosely within the overlap between cloud computing and learning environments research. The literature reveals that a number of studies over the past 30 years have been conducted into the areas learning environments. Many of these studies utilise instruments such as the QTI (Questionnaire on Teacher Interaction) (Coll,

Taylor, & Fisher, 2002), (Telli, den Brok, & Cakiroglu, 2007), (den Brok, Fisher, Wubbels, Brekelmans, & Rickards, 2006), (Maulana, Opdenakker, den Brok, & Bosker, 2011) as well as other instruments unique to specific learning environments (Fraser, 1978), (Ketelhut, Dede, Clarke, Nelson, & Bowman, 2007), (Shaft, Sharfman, & Wu, 2004), (Levine & Donitsa-Schmidt, 1998). The literature also reveals a number of studies have been conducted in the area of cloud computing in education (Petrus & Sankey, 2007), (Brodahl, Hadjerrouit, & Hansen, 2011), (Ó Broin & Raftery, 2011), (Guth, 2007). However a lack of research into student perceptions of the cloud assessment learning environment is also evident from the literature.

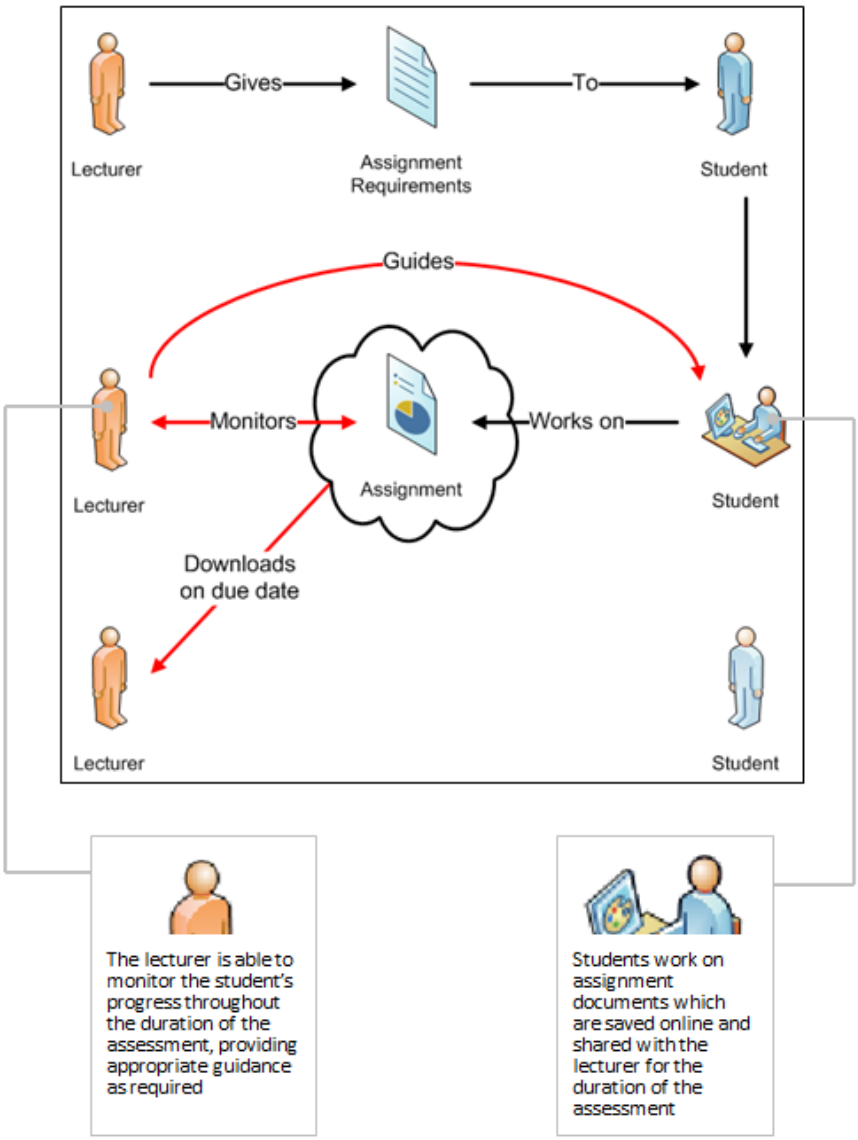


**Figure 1: Cloud Assessment Learning Environment**

## METHOD

Building from the motivating question which initiated this study a number of specific research questions were developed. The two main research questions which will be addressed in this paper are:

- What factors of the cloud assessment learning environment do students perceive as either positive or negative?
- Is there a conceptual change in student understanding of the cloud assessment learning environment?

In order to investigate student perceptions of the cloud assessment learning environment, and consequently address the research questions, a multi-method ethnographic case study approach was selected for the study with the

researcher acting as a participant observer. Both qualitative and quantitative data were collected from the research sample through a variety of methods, these were: the LIQ (Lecturer Interaction Questionnaire) instrument (an adaptation of the QTI), the CAQ (Cloud Assessment Questionnaire) instrument (a questionnaire unique to this study that is focused on aspects of the cloud assessment learning environment), concept maps, class interviews, focus group interviews, written lecturer descriptions, participant observations, virtual participant observations, online activity statistics, attendance records, and achievement levels. Furthermore, a number of the aforementioned data collection methods have also been used in a pre-test post-test design. Accordingly, both qualitative and quantitative data were collected with the results from the various data sources being used to help support, validate and triangulate the overall findings through methodological triangulation (Cohen et al., 2000). Table 1 provides an overview of the data collection methods utilised over the course of a 16 week semester.

The main instrument utilised by the study to collect data on student perceptions of the cloud assessment learning environment was the CAQ. The CAQ was administered twice during the study, first at the beginning of the assessment to capture student pre-engagement perceptions and then again at the end of the assessment to capture student post-engagement perceptions. The CAQ included five main sections: Monitoring, Google Docs, Feedback, Cloud Storage, and Preference. Each section contained both quantitative Likert scale items, and open-ended short answer questions.

**Table 1: Data Collection Overview**

| Data Collection Method | Occurrence |
|---|---|
| LIQ | Week 4 & 8 |
| CAQ | Week 6 & 10 |
| Concept Maps | Week 6 & 10 |
| Class Interviews | Week 6 & 10 |
| Focus Group Interviews | Week 10 |
| Lecturer Descriptions | Week 10 |
| Participant Observations | Weeks 1-16 |
| Virtual Participant Observations | Weeks 1-16 |
| Online Activity Statistics | Weeks 1-16 |
| Attendance Records | Weeks 1-16 |
| Achievement Levels | Weeks 4, 9, 12 & 16 |

The collected data was analysed at the conclusion of the semester using various approaches. The quantitative data was analysed using the SPSS software package, the qualitative data was coded and analysed manually, and where appropriate, also analysed statistically.

The research sample used for this study consisted of 50 ICT students enrolled in a second year IT Project Management course of a three year degree. The researcher was also the sole teacher of the IT Project Management paper in which this study was conducted. The study focused specifically on student experiences during a project management plan (PMP) assessment that was conducted within a cloud assessment learning environment. The assessment required students to use Google Docs (a cloud computing word processing tool) to write a PMP for a given scenario over a four week period (due at the end of week nine of the semester).

## RESULTS

The results presented in this section are a subset of the results from a larger study and will focus on the key findings from that study.

As mentioned earlier, the main instrument utilised by the study to collect data on student perceptions of the cloud assessment learning environment was the CAQ. The internal consistencies of the scales included within the CAQ were calculated and revealed statistically acceptable levels (see table 2).

**Table 2: CAQ Internal Consistency**

| | Alpha Reliability | |
|---|---|---|
| Scale | CAQ1 | CAQ2 |
| Monitoring | .85 | .85 |
| Google Docs | .72 | .71 |
| Feedback | .91 | .97 |
| Cloud Storage | .78 | .83 |
| Preference | .78 | .77 |

N = 48 CAQ 1, n = 40 CAQ2

Each scale consisted of five point Likert scale items. For each item students could either: agree (value of 1), disagree (value of 5), or select a value in between (2, 3, or 4). The CAQ was administered twice throughout the study in order to only capture student perceptions of the environment but to also capture any changes in student perceptions over the course of the assessment period. Accordingly a mean comparison for each of the scales is given in table 3 and will be discussed in greater detail in the discussion section. The following sub-sections will also present summaries of the qualitative results from each of the five areas of the CAQ.

**Table 3: CAQ Scales Mean Comparison**

| Scale | CAQ1 | CAQ2 | Difference |
|---|---|---|---|
| Monitoring | 3.57 | 3.98 | .42* |
| Google Docs | 3.36 | 2.88 | -.48* |
| Feedback | 4.38 | 4.40 | .02 |
| Cloud Storage | 4.27 | 4.13 | -.14 |
| Preference | 3.02 | 2.96 | -.06 |

* Change is significant at the 0.05 level, n = 40

## MONITORING

The first section of the CAQ focused on Monitoring. This specifically looked at student perceptions of having their assignment document shared with their lecturer for the duration of the assessment, thus enabling the monitoring of progress. The short answer question put to students in this section was *"What do you think about your lecturer being able to see your assignment document for the duration of the assessment?"*

The results of the first short answer question suggested a number of common perceptions shared among the students. The majority of students were positive about having their assignment progress monitored, some students initially had concerns about this aspect of the cloud assessment learning environment but the majority of these concerns were alleviated after having gone through the assessment process. This ultimately resulted in an increase in positive student perceptions relating to the monitoring aspect of the cloud assessment learning environment. The improvement in positive perceptions also coincides with a quantitative increase in the corresponding Monitoring scale (see Table 3).

### Google Docs

The Google Docs section focused on student perceptions of the cloud technology used for the assessment (i.e. using a web browser to access and complete their assignment in Google Docs). The short answer question from this section was *"What do you think about using Google Docs (an online/web based document editor) for this assignment?"*

A number of common themes appeared to emerge from the student responses to the second question. Students began with a relatively optimistic view of using Google Docs for the assignment despite many having not used it before (this evidenced by the results to the *"Had you used Google Docs before this assignment?"* item also included in the

study). The notion of being able to use a free, online, Google product was appealing for many. However, a number of students had reservations regarding perceived limitations of the web based word processing tool. After engaging with the tool (Google Docs) for the assessment, overall student perceptions underwent a noticeable shift. Many students drew attention to the problems and issues they had with the tool during the assessment process and indicated that the tool did not live up to their expectations. The main areas of concern were a lack of features, and bugs experience during the use of the system. Interestingly, the change in the short answer results is also reflected in a reduction of positivity in the corresponding quantitative scale. However, it is also worth noting that despite the limitations of the tool, a many of students still expressed a positive attitude towards Google Docs.

### Feedback

Section three of the CAQ aimed to discover student perceptions of the early feedback mechanism made possible by the cloud assessment learning environment. The short answer question from this section was *"What do you think about your lecturer being able to give you assignment feedback before the due date?"*

Regarding the responses to the feedback related question, it is worth highlighting that not a single negative response was given either before or after engaging with the cloud assessment learning environment. The post assessment responses remained consistent with the pre assessment responses with the majority of comments being positive in nature. Many of the students saw the feedback mechanism as a safety net that would help them to stay on task and also as a means for improving the quality of their submitted work.

### Cloud Storage

The fourth section of the CAQ was focused on student perceptions of having their assignment document stored accessed, and submitted through the cloud. The question from this section was *"What do you think about having your assignment stored online and automatically submitted on the due date?"*

The short answer responses from this section revealed a number of key perceptions shared throughout the student group. Generally, students appeared to see online storage as positive, however a number of students seem to express initial mistrust with regards to the technology. This mistrust was later compounded by reported reliability problems with Google Docs. The students also appeared to be divided concerning automatic submission, many saw the aspect as a motivating positive, while others felt the feature restricted their ability to complete last minute work and submit the assignment late. Interestingly, a number of students preferred being able to submit their work manually as opposed to waiting for automatic submission.

### Preference

The Preference section of the CAQ focused on students perceptions of using the cloud assessment learning environment and associated technology (i.e. Google Docs) for the assessment as opposed to a traditional assessment environment with a desktop word processing tool (i.e. Microsoft Word). The short answer question from this section was *"What do you think about using an online word processor (Google Docs) for this assessment instead of a traditional desktop word processor (Microsoft Word)?"*

Based on the short answer responses prior to engagement with the environment student preference varied regarding the use of an online word processor as opposed to a traditional desktop word processor. Although many indicated a preference for Google Docs, a large number also noted a perceived lack of features. Also, a notable number of students also indicated a preference for a traditional word processor often citing familiarity and better features as the reasons.

Post engagement, the short answer responses revealed that students had mixed views which largely varied depending on their individual experiences. Some students appeared to have had a positive experience with Google Docs and valued the online tool over traditional desktop solutions. Students also noted that the concept behind Google Docs for assessment was essentially 'good', however they felt let down by the actual implementation. Other students reported a mixture of positive and negative experiences with many focusing primarily on aspects they found frustrating, in particular, the lack of familiar formatting features emerged as a common concern.

## DISCUSSION

The results from the first CAQ provided insight into the research samples perceptions of the cloud assessment learning environment prior to engagement. Likewise, the results from the second CAQ provided insight into student perceptions after having engaged with cloud assessment learning environment. The CAQ included five sub sections relating to various aspects of the cloud assessment learning environment.

### Monitoring

The quantitative results suggest that before engaging with the cloud assessment learning environment students viewed the feature of the environment that enabled their lecturer to monitor their progress as slightly on the positive side of neutral. The short answer responses added depth to this statistic by revealing that the students had mixed opinions about this aspect of the environment with the majority of students expressing positive viewpoints which included non-specific positive remarks, and positive remarks with a specific focus, i.e. feedback, motivation, and helpfulness. However, a number of students also expressed concerns relating to this feature, these concerns included remarks relating to constant scrutiny, lecturer misunderstanding, lecturer inconsistency, and compulsion to change approach (i.e. start earlier than normal). Interestingly, this mix of opinions was also expressed through the initial class interview, the initial concept map collection, and participant observations of the research sample during the same time period (data not presented in this paper). Overall, prior to engagement, students seemed positive regarding the monitoring features of the cloud assessment learning environment but also had some reservations relating to how it would be used in actuality.

After engaging with the cloud assessment learning environment the quantitative results reveal that the slightly positive view students had previously expressed, had significantly increased (from 3.57 to 3.98, $p = .04$). The short answer responses relating to this aspect of the environment also support this shift and reveal an increase in the number of positive written responses and a decrease in the number of concerned responses. The short answer responses appear to suggest that the majority of the concerns that were initially expressed had been alleviated through experience (i.e. initial fears did not become a reality and therefore were not expressed post engagement). Again, this increased acceptance of the monitoring aspect of the cloud assessment learning environment also emerged from a number of the other data sources including the second class interview, the second concept map collection, the focus group interviews, participant observations, and virtual participant observations (again data that has not been presented in this paper). Overall, after having engaged with the cloud assessment learning environment students viewed the ability for their lecturer to monitor their progress as a positive.

### Google Docs

The Likert scale results from the first CAQ suggest that students initially viewed the use of Google Docs as an overall slightly positive aspect of the cloud assessment learning environment. The short answer results from the first CAQ support this slightly positive initial view. Interestingly, many of the positive responses appear to have come from students who had not used Google Docs before, but were expecting a positive experience. This initial positive expectation regarding Google Docs was also noted in a number of the other data sources including the initial concept maps, initial class interview, and participant observations (data not presented in this paper).

In contrast to the quantitative scale results from the first CAQ, the results from the second CAQ suggest that students ended up viewing the use of Google Docs as an overall slightly negative aspect of the cloud assessment learning environment. A paired sample T test revealed a statistically significant drop in the results relating to the quantitative Google Docs scale (from an initial score of 3.45 decreasing to 2.88, $p = .01$). This decrease of .57 was also the largest change out of the five cloud assessment scales. These results suggest that after engagement, student viewed the use of Google Docs more negatively than they had prior to engagement. The short answer responses also support this notion of increased negativity with the number of positive comments decreasing and the number of negative comments increasing (when compared to the results from the first CAQ). Although there still remained a comparable number of positive comments regarding the use of Google Docs post engagement, the contrast with the first CAQ results suggested the change represented an apparent shift in perceptions.

One noticeable change in the short answer results was the obvious lack of expectantly positive comments. Having engaged with the cloud assessment learning environment, students were no longer in a position to express an opinion based on expectations, but instead were able to express opinions based on experience. Another noticeable change was the increased number of negative comments relating to the various limitations and bugs students had experience through their use of Google Docs. This overall change in perceptions regarding Google Docs was also reflected in other data sources form the study.

The change in student perceptions regarding the use of Google Docs within the cloud assessment learning environment is one of the most obvious changes observed in this study. This change in perceptions can be seen to stem from the difference that existed between student expectations and the eventual experience had by students. The results suggest that many of the students initially had high expectations regarding Google Docs and unfortunately for many, it appears these expectations were not met.

### Feedback

The early feedback mechanism made possible by the cloud assessment learning environment was viewed as a

very positive aspect of the environment according to the scale results from the first CAQ. Based on the results from the first CAQ, the early feedback feature of the environment was viewed as the most positive out of the five cloud assessment sub scales. The short answer responses from the first CAQ also support this view with the overwhelming majority of comments being positive in nature, with only a few responses expressing a mixed view (e.g. conditionally positive so long as the feedback is appropriate). Interestingly, there were zero negative comments provided relating to this aspect of the cloud assessment learning environment.

The Likert scale results from the second CAQ were almost identical to the results from the first CAQ with regards to the early feedback aspect of the cloud assessment learning environment. Again, the results suggest that the early feedback mechanism was still perceived as very positive from a statistical standpoint (4.40 up from an initial 4.38). As with the first CAQ, the short answer responses from the second CAQ also support this positive view of the feedback mechanism. Interestingly, the early feedback mechanism within the cloud assessment learning environment is made possible by the collaborative features of Google Docs. In contrast to the results from the previous section, where through experience students perceptions of Google Docs became more negative, the results from this section indicate that student perceptions of this particular aspect of the cloud assessment learning environment are essentially unchanged and remain positive (despite the feedback aspect being a core feature of Google Docs). This unchanged positive view of the feedback mechanism of the cloud assessment learning environment is also expressed through a number of the other data sources from the study (data not presented in this paper). It is also worth noting that the feedback aspect was also the most commonly cited positive aspect of the cloud assessment learning environment.

### Cloud Storage

The scale results of the first CAQ indicated that the online (cloud) storage and automatic submission aspect of the cloud assessment learning environment was also perceived as a positive by the research sample. The short answer responses also support this view with the majority of comments being positive in nature, many of which cite a perceived reduction in workload and reduced concern regarding the loss of work. The initial written responses also included a number of concerns regarding privacy and security factors related to the online cloud storage. This generally positive perception also emerged as a theme in many of the other data sources included in the wider study.

The results from the second CAQ were consistent with those from the first, and suggest that students continued to view the online storage aspect of the cloud assessment learning environment positively. However, it should be noted that there was a slight drop in the Likert scale results (4.30 down to 4.13), however this was not found to be statistically significant ($p = .37$). The written responses also remained consistent with those from the first CAQ however there was a slight drop in the number positive comments which was coupled with an increase in the number of students who elected not to provide a written response to the short answer cloud storage item in the second CAQ.

It was interesting to note that a number of students expressed a degree of mistrust regarding the automatic saving feature of Google Docs. For this single aspect of the cloud assessment learning environment a number of differing themes emerged from the data, these included a positive view relating to the convenience and reliability of online storage, a mistrust regarding the automatic saving feature, and a generally positive view of the automatic submission feature.

### Preference

The first CAQ revealed that from a statistical perspective, students did not have an overwhelming preference for the cloud assessment learning environment over a traditional approach. Interestingly, this seemingly neutral quantitative result becomes more complex when the short answer responses are considered. The written responses relating to preference indicate a mixed view was held by the members of the research sample with an almost even spread of positive, mixed neutral, concerned and negative responses. This mix of short answer responses also suggests that the quantitatively neutral result may have been caused by a levelling out of different opinions.

The Likert scale results from the second CAQ are slightly less favourable than the initial results, however the resultant scale mean scores remain relatively consistent (2.96 down from 3.11). Again, when the scale results are viewed in light of the short answer responses, the same pattern emerges as was seen in with the results of the first CAQ (i.e. a mix of responses). The main theme that emerged from the post engagement written responses was the notion that the idea behind the cloud assessment learning environment was good, however the implementation did not live up to expectations due to limitations and bugs experienced within Google Docs.

## CONCLUSION

This paper sought to present an investigation into student perceptions of the cloud assessment learning environment. Specifically, the study aimed to answer two main research questions that looked at student perceptions of positive and negative factors of the environment and whether or not there is a conceptual change in student understanding of the environment.

### Positive and Negative Perceptions

A number of key themes emerged from the study that highlighted aspects of the cloud assessment learning environment that students perceived as either positive or negative, these will now be summarised.

The feedback mechanism was universally viewed as a positive aspect of the cloud assessment learning environment. The online storage aspect was viewed as either positive or negative and appeared to be dependent on the student's user experience (i.e. whether or not students had experienced bugs). The automatic submission feature was also viewed as either positive or negative. However, this perception appeared to be dependent on student's personal preference and was not found to be associated with the student's user experience. The limited feature set was predominantly viewed as a weak negative by the research sample, with many becoming content with this issue. Bugs experienced within the Google Docs system emerged as the most significant negative aspect of the cloud assessment learning environment as perceived by the research sample. This negative perception appeared to be dependent on individual students user experiences, accordingly the significance of this negative perception varied across the research sample ranging from a mild inconvenience through to an intense dislike for the entire system. Interestingly, the research sample felt that overall, the positive aspects of the cloud the assessment learning environment outweighed the negatives with only those students who had experienced significant bug related issues subscribing to the alternate position.

### Conceptual Change in Understanding

The second research question covered in this study focused on conceptual change in student understanding of the cloud assessment learning environment over time. In order to address this research question the same data was collected both prior to and after students had engaged with the cloud assessment learning environment. This dual collection provided data that allowed a comparative analysis of students' conceptual understanding of the environment pre and post engagement.

The study concludes that there is a conceptual change in student understanding of the cloud assessment learning environment over time. Prior to engagement students had a simple, hopefully expectant conceptual understanding of the environment. The environment was generally viewed as interesting, new and potentially very beneficial. Students expressed a curious excitement and initially had a number of unanswered questions relating to the environment.

After the assessment, students' conceptual understanding of the environment had changed from simple and hopefully expectant to a clearly refined, detailed, and experienced based understanding. Where students had been initially generally positive about their expectations, students had become very specific about what they understood as positive and negative aspects of the environment and based these views on first-hand experience. Accordingly, the unanswered questions initially expressed by the students were no longer present post engagement perceptions. Interestingly, the conceptual understanding that emerged prior to engagement was generally consistent across the entire research sample, in contrast, the final conceptual understanding that was captured post engagement tended to vary significantly depending on the individual student's user experience with Google Docs. Although there existed variation in the conceptual understanding possessed by students post engagement, each member of the research sample was seen to undergo a similar change from simple and expectations based to detailed and experienced based. Initial student expectations were primarily positive, whereas actual student experiences were more balanced between both positive and negatives aspects of the environment.

Ultimately, this paper has provided a unique insight into student perceptions of the cloud assessment learning environment. It has utilised an extensive multi method, multiple data collection research design for both quantitative and qualitative data (although only a subset of this data has been presented here). The study has provided interesting findings relating to an emergent area of computer use in education for learning and assessment and has consequently made a unique contribution to the literature in its associated areas. Finally, the study has provided a solid foundation for future research into cloud assessment learning environments that may allow others to test the outcomes of this study in their own unique educational contexts.

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