IRRODL

THE INTERNATIONAL
REVIEW OF RESEARCH IN
OPEN AND DISTANCE LEARNING

Vol 15
No 3

July 2014

The International Review of Research in Open and Distance Learning

Editorial – Volume 15, Issue Number 3

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Your early summer reading is here! Or is it?! Clearly, for an international journal, this seasonal reference represents a Western/Northern-based sentiment. Perhaps that's just one small illustration of the scope and accompanying challenges of making sense of the diverse contributions that IRRODL attracts.

In this issue of more than 15 articles, we once again present to you the range of research that you have come to expect from us – research that spans the world and many aspects of the ODL field. What *don't* we have in this issue? There is nothing on OER this time around; however, watch for an upcoming special issue that will feature current research in this quickly developing area.

This issue features several pieces that highlight the business of successful teaching, faculty-learner and learner-learner interaction. From Serbia, Raspopovic, Jankulovic, Runic, and Lucic examine, in a case study, success factors in e-learning, from the perspective of a developing country in transition from traditional modes of learning to technology-enhanced modes of learning. Similarly, Mbatha gives us a case study that considers global transition in higher education as the University of South Africa transitions from a traditional model of learning to a new socially mediated model. And in another case study, Sadykova examines mediating knowledge through peer interaction in a multicultural online course offered in the US.

Samuels-Peretz considers the nature of learners' interactions with others, also at an American institution, with a special emphasis on gendered knowing, using Belenky, Clinchy et al.'s 1986 seminal study that produced *Women's Ways of Knowing*. Chang, Shen, and Liu explore the faculty role in online instruction while Vu, Cao, Vu, and Cepero researched success factors for learners in an online professional development course. Clearly, we are still intrigued, internationally, with *what* makes online teaching and learning successful. How can we make it better? Borup, West, Thomas, and Graham suggest, in their piece on the impact on students of video feedback, that the resultant learner-instructor connection is enriched. Video use is also the topic of

Lujubojevic, Vaskovic, Stankovic, and Vaskovic's research on its efficacy as a tool for increasing the quality of experience (QoE) in multimedia instruction.

Social environments and personal learning environments continue to also pique our research interest. Diaz, Martinez, and McMullin, in a Spanish study, put forward the suggestion that social networks can be transformed into learning communities, into rich environments that meet many learner needs. Also looking at ways to enhance online learning environments, Alden Rivers, Richardson, and Price, in a British study, analyzed educators' own perspectives to determine what is needed to create a more fertile ground for reflective learning.

In more specific areas of our field, two articles deal with mobile learning. Huang, Hsiao, Tang, and Lien, exploring mobile learning, contend that language learning success lies not only in technology-supported learning activities, but also in consecutive learning opportunities. And in another piece that considers the interplay of language learning with mobile technology, Young and Hung researched open courseware at National Tsing Hua University (NTHU), concluding that support for the use of mobile learning is essential for learner motivation and success, and for the continued growth of accessible learning opportunities.

But there's more! Ching examines the use of role-play in peer feedback using VoiceThread technology as an example of constructivist learning. Tustin, presenting another South African perspective, considers the advantages of telecommuting for academic performance in that country's open and distance learning culture.

Lastly, this super summer issue offers reading in the Technical Notes and Leadership Notes sections. Suen's piece on the sticky business of MOOC assessment is not only interesting but also serves as a good example of what a "note" can look like in IRRODL; it's a handy publication vehicle for items that are not classified as research articles. And from Athabasca University students, complementing the two articles on mobile and language learning, another "notes" piece outlines, from a leadership perspective, a pilot project on mobile language learning. IRRODL's notes sections offer good publication opportunities for in-progress or formative research initiatives. Consider submitting to this venue!

THE INTERNATIONAL REVIEW OF RESEARCH IN OPEN AND DISTANCE LEARNING

Success Factors for e-Learning in a Developing Country: A Case Study of Serbia




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Abstract

In this paper, DeLone and McLean's updated information system model was used to evaluate the success of an e-Learning system and its courses in a transitional country like Serbia. In order to adapt this model to an e-Learning system, suitable success metrics were chosen for each of the evaluation stages. Furthermore, the success metrics for e-Learning evaluation are expanded by providing several systems for quantifying the given success metrics. The results presented in this paper are based on courses that were taught both online and traditionally in three different subject areas: graphic design, information technology, and management. Of particular interest were success metrics which can be determined using quantifiable data from the e-Learning system itself, in order to evaluate and find the relationship between students' academic achievement, usage of learning materials, and students' satisfaction. The results from different courses were used to illustrate the implementation and evaluation of these success metrics for both online and traditional students.

Keywords: e-Learning; distance learning; assessment factors

Introduction

Innovations in computing disciplines have enabled development and implementation of e-Learning information systems in formal and informal education. The design and implementation of web-based e-Learning systems, defined as the process of extending learning or delivering instructional materials to remote sites (ITC, 1998; Waits & Lewis, 2003), have grown exponentially in the last years, benefitting from the fact that students and teachers can be in remote locations and that this form of computer-based education is virtually independent of any specific hardware platform (Romero et al., 2009).

Although substantial progress has been made to implement and use the Internet and computing technologies in learning, educators are still exploring different methods for the best presentation of learning materials, as well as the best practices for effective presentation of the material and students' retention and understanding of presented information. Many educators are interested in using e-Learning systems; however, it is of great importance to have appropriate methods to evaluate the success of such systems.

Evaluation of an e-Learning system is both vital for accepting its value and efficiency as well as for its understanding and acceptance in the society, which is crucial for the further development and expansion of e-Learning. Various factors have been identified as important in the success of information systems. Success of e-Learning systems is not measurable with a single factor such as user satisfaction (Shee & Wang, 2008). Considering different e-Learning success factors in different countries, research of quality measurement in distance learning, different regions or countries, and whether a country is developed or not is of great importance, as these countries may face more challenges in successful implementation of new and innovative technology methods in education.

This paper expands the success metrics for e-Learning evaluation by providing several systems for quantifying the given success metrics (Raspopovic & Lucic, 2012). Sample metrics are evaluated based on the DeLone and McLean model and data gained from an e-Learning system built on Oracle iLearning platform. The paper focuses on three dimensions: use, user satisfaction, and net benefit. Of particular interest is to determine key factors within these dimensions that have an impact on academic success and the differences between academic success of traditional and online students. The goal of the paper is to find a correlation between different success factors in these three dimensions based on the case study on the University in Serbia.

Analysis of e-Learning Evaluation Models

E-Learning, as an instructional content or learning experience delivered or enabled by electronic technology (Pantazis, 2001), is placed between information and communication technology (ICT) and education. Progress in the field of e-Learning has been very slow, and some researchers have accredited this slow progress to problems mostly associated with the poor interface design of e-Learning systems (Zaharias, 2005). However, as users' experience certainly does depend on the interface, it is not the only parameter significant to evaluation and expansion of e-Learning.

A large number of e-Learning success models are based on service quality and especially on the conceptual model SERVQUAL developed by Parasuraman et al. (1985). On the other hand, some authors suggest that evaluation of e-Learning systems should be done through various aspects because of their multidisciplinary character. Some of the models for evaluating success factors of e-Learning can be roughly characterized in three groups: technology acceptance model, user satisfaction model, and e-Learning quality model. The technology acceptance approach for evaluation of e-Learning mainly focuses on investigating factors that affect students when adopting the e-Learning system (Abad et al., 2009; Ngai & Chan, 2007). The user satisfaction assessment approach analyzes system success from the perspective of learner satisfaction investigating learners' perceptions of the relative criteria (Shee & Wang, 2008; Jung et al., 2011). Shee and Wang found that various national, regional, and international initiatives have been undertaken with regard to quality assurance in e-Learning which implies the importance of regional research in this field. The e-Learning quality assessment approach evaluates the quality of the entire e-Learning system, not just the service quality. Success is analyzed in terms of structure, content, delivery, service, outcomes, and the quality perception of e-Learning (MacDonald & Thompson, 2005; Lee & Lee, 2008).

E-Learning evaluation is not a one-time activity, but rather a complex systematic process parallel to e-Learning development as well as its implementation. The best way to prepare the methodology for e-Learning evaluation should be the systematic approach (Dvorackova & Kostolanyova, 2012). The study of Ćukušić et al. (2009) in 14 schools from 10 European countries identifies the relationship between the systematic e-Learning management and the e-Learning performance, as well as the independence of e-Learning performance from the subject of e-Learning. According to them, the success of e-Learning seems to be determined by the systematic management of the process and educational institutions must adapt themselves by designing and managing e-Learning processes providing quick, targeted, inexpensive, and highly flexible information delivery to their users.

A number of studies confirm that the degree of learners' satisfaction with e-Learning has been widely used to evaluate the effectiveness of e-Learning (Zhang et al., 2004; Levy 2007). Further research papers confirm a number of different proposed factors in different regions. Lee et al. (2009) in their research of learners' acceptance of e-

Learning in South Korea found that instructor characteristics and teaching materials are the predictors of the perceived usefulness of e-Learning, and perceived usefulness and playfulness are the predictors of the intention to use e-Learning. Jung's research (2012) presented Asian learners' perception of quality in distance education based on the presented research from the EU, India, the USA, Australia, South Korea, China, and on this basis proposed a conceptual model of 10 dimensions and 3 domains (supportive, pedagogical, environmental) which could be used as a framework for distance learner providers in Asia. On the basis of the theory of multi-criteria decision making and user satisfaction from the fields of human-computer interaction, Shee and Wang (2008) proposed a multi-criteria methodology from the perspective of learner satisfaction with 13 criteria and 4 dimensions: learner interface, learning community, system content, and personalization. In their study, Wang and Chiu (2011), developed a theoretical model to assess user satisfaction and loyalty intentions to an e-Learning system using communication quality, information quality, system quality, and service quality. They confirmed that the improvement of these categories is very useful for sustaining loyal users of e-Learning systems. Selim (2007) specified e-Learning critical success factors (CSFs) perceived by university students of United Arab Emirates grouped into four categories, namely instructor (professor), student, information technology, and university support. Volery and Lord (2000) identified three CSFs in e-Learning, technology, instructor, and previous use of technology, from the perspective of an Australian university student. The study of Bhuasiri et al. (2012) identifies the CSFs that influence the acceptance of e-Learning systems in 25 developing countries from Asia, the Middle East, South America, Africa, and Europe. This study categorizes e-Learning success factors into seven dimensions based on several theories such as social cognitive theory, IS success model, and motivation theory. The seven dimensions include: learners' characteristics, instructor's characteristics, e-Learning environment, institution and service quality, infrastructure and system quality, course and information quality, and motivation. A study of three qualities in e-Learning international benchmarking projects shows that various aspects of accessibility, flexibility, interactive-ness, personalization, and productivity should be embedded in all levels of management and services within the field of e-Learning in higher education (Ossiannilsson & Landgren, 2012).

A number of studies proposed models for e-Learning applications evaluation. O'Droma et al. (2003) in their research about architectural and functional design of e-Learning delivery platforms and applications and learning management systems (LMS) on the e-Learning platform reference model of the Institute of Electrical and Electronics Engineers (IEEE) Learning Technology Standards Commitee's (LTSC), found that this model provides a good basis for the evaluation of e-Learning. In their study, Ozkan and Koseler (2009) proposed a conceptual e-Learning assessment model suggesting a multi-dimensional approach for LMS evaluation via six dimensions: system quality, service quality, content quality, learner perspective, instructor attitudes, and supportive issues. In a survey of 163 e-Learning experts regarding 81 validation items developed through literature review, Kim and Leet (2008) proposed suitability of design, interoperability of system, and user accessibility among seven factors defined in their research for evaluating LMSs: suitability of design in screen and system; easiness of course procedure; interoperability of system and suitability of academy administration; easiness of instruction management and appropriateness of multimedia use; flexibility of interaction and test and learner control; variety of communication and test types; user accessibility. Usability of e-Learning applications plays a significant role in e-Learning success. A consolidated evaluation methodology of e-Learning application does not yet exist or is not well documented and widely accepted (Ardito et al., 2006). In their research Ardito et al. (2006) proposed methodology for systematic usability evaluation (SUE) for the evaluation of e-Learning applications with 4 dimensions: presentation; hypermediality; application proactivity; user activity. Granic (2008) reported about the experience with the usability assessment of intelligent learning and teaching systems and suggested that the main issues regarding universal design related to e-Learning systems include: learner-centered design paradigm, context of use approach, individualized approach, pedagogical framework, and guideline framework. For the evaluation of e-Learning systems statistical analysis of data used by learners are of great importance. In the research of Hogo (2010), the Logo Pro tool was used for statistical analysis and description. The obtained pattern from this tool may be very useful in collecting some statistics about the data and the tool provided good feedback to the e-Learning systems about the monthly, weekly, and daily traffic on the site as well as the types of data needed and the important directories for the students. In the research of Hassanzadeh et al. (2012) combining models and previous studies, a model for measuring e-Learning system success entitled MELSS is presented with components suitable for measuring e-Learning systems, such as technical system quality, educational system quality, content and information quality, service quality, user satisfaction, intention to use, user loyalty to system, benefits of using the system, and goal achievement. Roca et al. (2006) applied the technology acceptance model (TAM) and found that the users' intention is determined by their satisfaction, which is determined by the perceived usefulness, information quality, confirmation, service quality, system quality, perceived ease of use, and cognitive absorption. Previous studies are in accordance with the DeLone and McLean model.

One of the very important factors for e-Learning success is the time spent on learning via LMS. Romero and Barbera (2011) examined the impact of quantity and quality of academic time spent learning (time-on-task) by students enrolled in online education programs. Time quality in online learning depends on their availability, willingness, and motivation to devote quality cognitive time to online learning tasks. They found positive relation between the time-on-task devoted by students and their academic performance, and discovered that a higher performance is connected to activities during the morning and weekend days. Grabe and Christopherson (2008) in their study found that students made very little use of the audio recordings and that the use of online lecture resources and examination performance were positively related.

DeLone and McLean e-Learning Evaluation Model

The DeLone and McLean model investigates the factors which are used for evaluating the success of designing and delivering information systems (DeLone & McLean, 2003). In this model the authors took into account both the technological aspects of an information system and different individual and organizational impacts. The DeLone and McLean model was very often cited (until 2002 285 refereed papers in journals and proceedings). Most frequently papers investigated the associations among the measures identified in a model, multiple success dimensions and their relationships, the association between system use, system quality and information quality to individual impacts and extensions and recommendations (DeLone & McLean, 2003). On the basis of this entire work, they proposed an updated IS success model.

Holseapple and Lee-Post (2006) adapted DeLone and McLean's updated success model and expanded it to assess the e-Learning system. Holseapple and Lee-Post have fully defined a success metrics for evaluation of a Blackboard e-Learning system. This paper examines the success factors adopted from DeLone and McLean's model, while expanding on the success metrics, which are used for the evaluation of e-Learning systems. They suggest that there is a need to formulate holistic and comprehensive models for assessing and evaluating e-Learning programs. According to Wang et al. (2010), Holseapple and Lee-Post adopt an open system perspective on general systems theory of Von Bertalanfy (1950) stating that wholes function the way they do due to the arrangements of the components and their interaction with each other. Wang et al. (2010) offer a model for evaluation based on the socio-technical system theory evaluating distance learning from the instructor's perspective where distance learning can be viewed as a socio-technical system. Previous studies based on DeLone and McLean's model argue the need for a systematic approach for e-Learning modeling.

The e-Learning assessment model presented in this study is adopted from DeLone and McLean's updated information system model. This model presumes that evaluation is conducted by incorporating assessment factors grouped in six categories: information quality, system quality, service quality, use, user satisfaction, and net benefits (Figure 1). Even though this model has been used for evaluation of many different types of information systems, success metrics for each evaluation dimension need to be specified in order to be system specific. DeLone and McLean in their work specified success metrics related to evaluation of eCommerce systems, while Holseapple and Lee-Post (2006) defined sample metrics for evaluation of e-Learning systems based on the Blackboard platform.

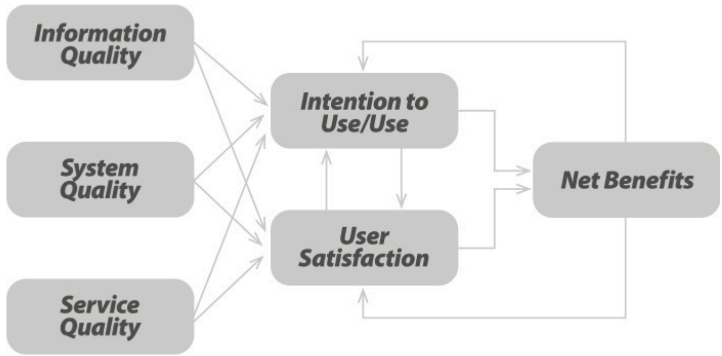

Figure 1. DeLone and McLean's updated information system model.

A particular interest of this paper is to investigate the model in the context of e-Learning information systems. The results, which are discussed later in this paper, are collected from the e-Learning that uses Oracle iLearning as an e-Learning platform. Furthermore, metrics that are used are related to this platform and educational systems used in online and traditional style education in Serbia. Evaluating e-Learning systems on other platforms may need adjustment in modifying the metrics.

The first three dimensions of assessment in the DeLone and McLean model are system quality, information quality, and service quality. These three dimensions represent quality assessment for system design. In the context of e-Learning, system quality evaluates the characteristics and effectiveness of the used platform such as flexibility, stability, reliability, security, responsiveness, and user-friendliness. Information quality evaluates the quality of course content and can use success metrics such as clarity, organization, presentation, and currency of course materials. Service quality evaluates the quality of student-instructor interaction and can use metrics such as promptness, availability, helpfulness, and organization and clarity of the lectures. The proposed success metrics for these three evaluation dimensions are given in Table 1. These metrics are very similar to the metrics used for any other information system. System quality tends to evaluate the technological portion of the system; therefore, this metric will not be the scope of this paper. However, other dimensions are discussed in the later sections.

Table 1

Comparison of e-Learning Success Metrics for Three Success Factors: Systems Quality, Information Quality, and Service Quality

Success factor	e-Learning assessment model success metrics
Systems quality	Flexible for adaptation Flexible for personalization Stable Reliable Secure Responsive User-friendly
Information quality	Well-organized Consistent Clearly written Systematic Useful Personalizable to the individual learning needs Relevant to the subject
Service quality	Displayed knowledge Availability Promptness Helpfulness Evaluation grade for instructors given by students Stimulating interest in the subject Understanding the professor Obtaining feedback from the professor

The use evaluation dimension measures the degree to which the learning material is used, comparing it with its effectiveness. These materials may include audio narrated PowerPoint presentations, video clips, reading assignments, examples, tutorials, homework assignments, practice examples, practice examinations, and so on. The user satisfaction quality factor takes into consideration students' overall satisfaction with the course, their experience, and whether they would recommend this course and style of learning to others.

The final stage of the evaluation of the success of the e-Learning system is the analysis of the system's outcome, both positive and negative, through the net benefit. Ultimately, it is necessary to evaluate learning enhancement, academic achievement, time saving, and overall knowledge received and retained by students. However, according to DeLone and McLean's updated information systems model, there are also certain negative aspects in the evaluation. In the context of e-Learning, the negative aspects that should be taken into consideration are social isolation, dependence on technology, and quality concerns.

Some of the aforementioned metrics in all six dimensions of evaluation of e-Learning are not easily quantifiable. Some of them are based on the students' attitude, and their intention to use certain materials, while others take into consideration individual perceptions. Table 2 shows success metrics and proposes several methods which can be used to provide quantifiable results for their evaluation. Even though the surveys can be used to quantify the majority of the given metrics, their susceptibility to individual perception and attitudes may give biased results.

Table 2

e-Learning Success Metrics for Use, User Satisfaction, and Net Benefits

Success factor	e-Learning assessment model success metrics	System for evaluating success metrics
Use	- Audio narrated Power Point presentation - Video clips - Tutorials - Reading assignments - Examples - Homework assignments - Practice examples - Practice examination	- Frequency of usage of learning materials
User satisfaction	- Overall satisfaction - Student's experience - Recommendability	Student survey: - Number of complaints - Perceived importance of learning material - Whether a student would recommend this course - Active involvement in the learning process - Understanding the course materials - Applying course material
Net benefit	- Learning enhancement - Academic achievement - Time saving - Gained knowledge	- Percentage of students that submit their assignments on-time - Percentage of students who fulfill the requirement to take final exams in the first examination period - Average passing grade percentage of students that passed the course - Average length of studies

Methodology

In this paper we investigate the statistical metrics that can be derived from information quality, service quality, use, user satisfaction, and net benefit success factors. These data were obtained from the e-Learning system using Oracle iLearning as a platform. In the presented results we try to find the relation between these success factors. The presented results involve iterations through all stages of evaluation. First, in the net benefit factor we analyze the academic achievement and performance through two success metrics: percentage of students who took the final exams and percentage of students that passed the course. Second, we analyze the connection between net benefit and use factors, and whether academic achievement relates to the frequency of usage of learning materials. We also analyzed whether there was a statistically significant difference between students who had and had not passed the exam depending on the average percentage of used learning materials. The null hypothesis states that this difference is not statistically different. In order to accept or reject null hypothesis, the independent sample *t*-test was used. Third, we iterate between user satisfaction, information quality and service quality success metrics in order to determine how these success factors are connected.

Research was conducted in several stages. In the first stage, students were enrolled in 6 undergraduate classes in three different study areas: management (60 online and 53 traditional students), graphic design (34 online and 43 traditional students), and information technology (111 online and 113 traditional students). From each study area, two courses were selected based on their passing rates in previous semesters, one with high and another with low passing rates. All of these courses were offered both for online and traditional students. Both traditional and online students were provided with the same learning materials and course assignments. Traditional students had in-class lectures and instructions, while online students were provided with online consultations through email, forums, and Skype.

In the second stage, data were collected from the e-Learning system. Data that were collected included:

- number of students who took the final exam,
- number of students who passed the course,
- frequency of usage of learning materials on the e-Learning system.

The number of students who took the final exam was used to determine taken-exam rates, and the number of students who passed the course was used to determine the passing rates. Taken-exam rate represents the ratio of the number of students who took the exam and the total number of students registered for the course. The passing rate is defined as the ratio of the number of students who passed the exam and the total number of students registered for the course. These indicators were analyzed aggregated, but also separately for traditional and online students. These two indicators were chosen due to the educational style at the university in Serbia. It is mandatory that students complete their tests, homework tasks, and projects with a satisfactory grade, before they are allowed to take the final exam. Students are allowed to take final exams during any of the eight provided examination periods, once they have completed their requirements.

This study tries to identify whether academic success is related to students' activities in the class. Hence, the frequency of usage of learning materials on the e-Learning system was analyzed. These materials included audio narrated PowerPoint presentations along with the reading materials. In all six courses, materials were divided into 15 separate lectures, each providing one audio presentation and one written lesson for each lecture, along with course assignments and tests. Results were examined in the context of finding a connection between the time spent on the system and studying all of the provided materials. Students spent a certain amount of time in order to download written portions of materials that were provided as PDF documents. Presuming that they have reasonable internet connection, which is the case in most instances for students in Serbia, they could have spent the least amount of time on the system performing this activity. On the other hand, listening to an audio narrated PowerPoint presentation requires more time to be spent on the system.

In the third stage, at the end of the course, students filled out a questionnaire which involved a series of questions that allowed them to express their satisfaction with a series of factors that may have influenced their overall satisfaction, experience, and future recommendability of the course. Linear dependence between all parameters was analyzed using Pearson correlation method, in order to analyze the correlation between variables and to determine whether the existing correlation is strong and statistically significant. As Pearson's relation coefficient, r, is given in the range between -1 and 1, 1 indicating perfect positive linear correlation, we have taken into account positive and strong correlation that is indicated when r is greater than 0.5. This signifies that increase in one variable indicates increase of the other variable, and vice versa, decrease of one variable indicates the decrease of the other variable.

Results and Discussion

Success Metrics for Evaluating the Net Benefit Factors

The first evaluation stage focused on the success metrics for evaluating the net benefit factor through the academic performance and achievements. Of particular interest was to determine the percentage of students who took the final exam (taken-exam rate) and percentage of students who passed the final exam (passing rate). These results are shown for the three study areas: graphic design (GD), management (MG), and information technology (IT). Table 3 shows comparison of taken-exam and passing rates for online and traditional students in all three areas. It can be noticed that for students who are studying graphic design, these two rates are identical. For management and IT students these rates differ, but not significantly. This may indicate that students are adequately prepared for the final exams, which is most likely the result of a high emphasis on satisfactory completion of the course assignments and tests.

Results show that the taken-exam rate for traditional students is the highest for IT, 66.52%, while the lowest one is for MG, 57.52%. On the other hand, taken-exam rate of online students is the highest for IT, 63.96%, while it is the lowest for MG, 43.33%. Furthermore, it can be noticed that online students are less successful in passing the courses in all of the three areas. However, the most significant difference in the passing rates between online and traditional students can be seen with MG students. This can be caused by additional factors that should be further studied, such as students' motivation, personalization of learning materials, and suitability of the particular study area to be an online course. However, these factors are out of the scope of this research paper. On the other hand, it will be seen in the results that follow that subjects that require a more hands-on approach such as design and programming courses tend to have lower passing rates, leading to the conclusion that different pedagogical methods for online courses should be further analyzed and developed in order to increase learning efficacy for online students.

Table 3

Taken-Exam and Passing Rates for GD, IT, and MG Courses

	Taken-exam rate			Passing rate		
Area	Online	Traditional	All	Online	Traditional	All
GD	55.88%	65.12%	61.04%	55.88%	65.12%	61.04%
IT	63.96%	69.03%	66.52%	54.05%	61.95%	58.04%
MG	59.52%	88.10%	73.81%	54.76%	78.57%	66.67%

In order to further analyze academic achievement and performance through passing rates, comparisons were conducted at the course level for six different courses. Courses were selected based on their passing rates, so that within one area two courses can be compared, one with traditionally higher and another with traditionally lower passing rates. In all three cases the first course (i.e., IT course 1) is a course with a lower passing rate and the second one (i.e., IT course 2) is a course with a higher passing rate.

Figure 2 shows the chosen indicators at course level for GD, IT, and MG. All of the shown rates indicate that traditional students were more successful than online students. These findings are consistent with the previous results which were analyzed on the cumulative level, indicating the lower passing rates of internet students in all study areas. The gap between the passing rates of online and traditional students is the least pronounced in IT courses, and the most in MG courses. On the other hand, a similar effect occurs when we compare two GD courses. GD course 1 is a more hands-on course with a lot of drawing assignments, while GD course 2 is a more theoretical course. This also indicates that suitability of implementation of online studies may not be adequate for all types of courses and that different pedagogical methods should be implemented.

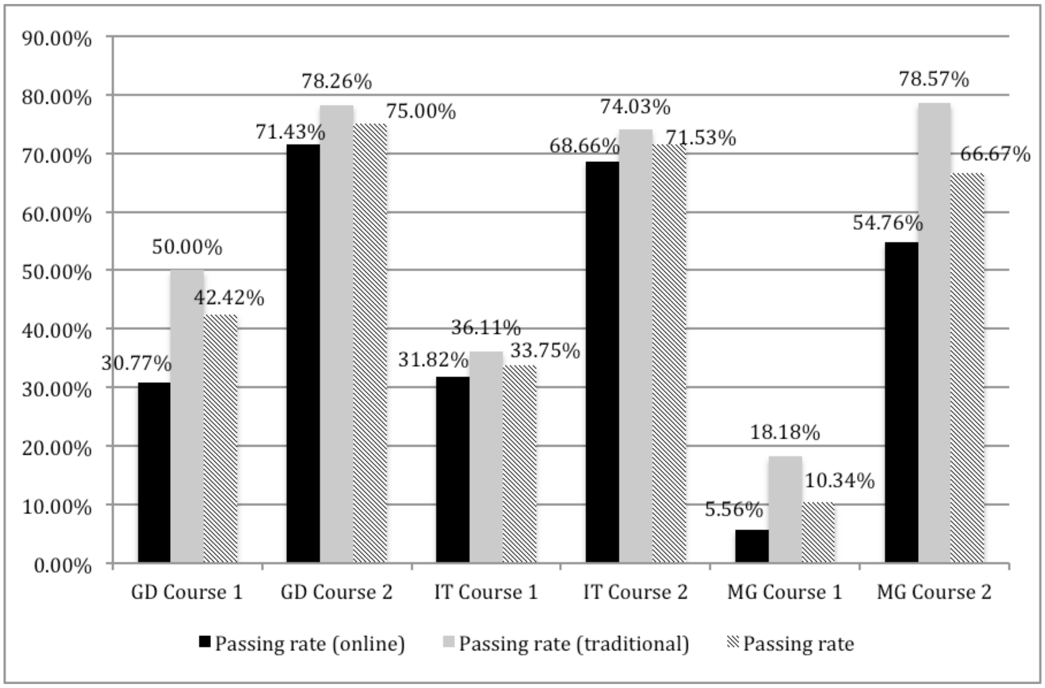

Figure 2. Taken-exam and passing rates for individual courses.

The educational system in Serbia mandates that students should be given a minimum of six final examination periods for a course. It is of interest to indicate in which examination period students have the highest passing rates, in order to determine their academic performance. Figure 3 shows taken-exam rates for courses in all three areas, analyzed based on the examination periods. Eight examination periods that are available throughout the academic year are labeled based on the month when they are conducted. It can be seen that the final examination periods taken in January, April, and June are the periods when most students fulfill the requirements to take the exams, as the passing rates are higher.

Nevertheless, taken-exam rates for online students, when analyzed for individual examination periods, are lower than the same rates for traditional students. January and June examination periods occur a few days after the end of the semester. Hence, this may indicate that students who are consistent with their course activities throughout the semester are most likely to be ready to take exams at the earlier times. Furthermore, higher passing rates during the early examination periods indicate the motivation and interest of students to study throughout the semester. Typically, traditional students are given hard deadlines for their assignments, while online students are given more flexibility and soft deadlines. The results point in the direction that new activities should be developed in order to engage online students to be more active throughout the semester. On the other hand, the optimal timeframe for deadlines for online students should be studied in order to drive them to be less passive and work consistently during the semester.

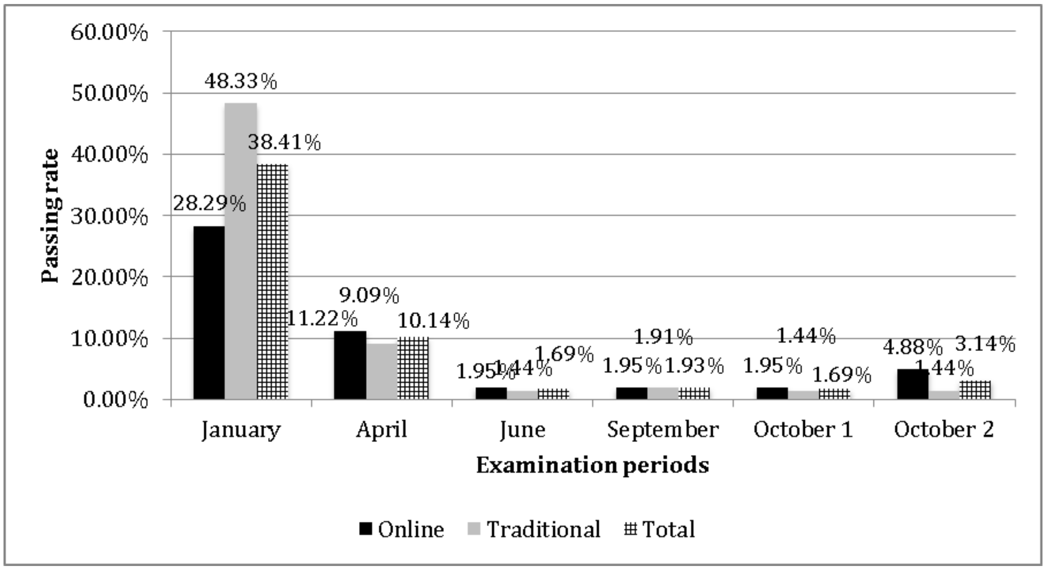

Figure 3. Passing-rates compared at different examination periods.

Success Metrics for Evaluating the Use Dimension

As we noticed, passing rates are lower for online students when compared to traditional students, and these metrics do differ between individual courses. Due to these findings we further analyze the use success metrics for these particular courses. It is of particular interest to analyze whether these academic success findings relate to the frequency of usage of learning materials posted on the e-Learning system.

Students were divided in three groups based on the time spent on the system when they were using the learning materials: the group of students that did not use any of the learning materials (0 minutes), the group of students that used learning materials less than 12 minutes, and the group that used materials for longer than 12 minutes. As described previously, activities that relate to the second group of students who spent less than 12 minutes on the system using the material are most likely performing activities related to downloading written lectures (PDF format) and course assignments. Listening to audio narrated PowerPoint presentations requires more time, and this group of students is included in the third group. Figure 4 shows the comparison of the percentage of students who passed the course in each group for both online and traditional students. It can be noticed that for all three groups, the number of students who have passed the course increases as their time spent on the system also increases. Furthermore, there is a significant difference between the first and the second group. An interesting result occurred with the first group. In the first group of students who did not use the learning materials on the system, the percentage of students who passed the course was higher than zero. Intuitively, this rate might have been expected to be 0%, assuming that students did not study at all. However, the later analysis will show that the existing rate is mainly contributed by GD students, and a course that does not require theoretical background (Figure 4).

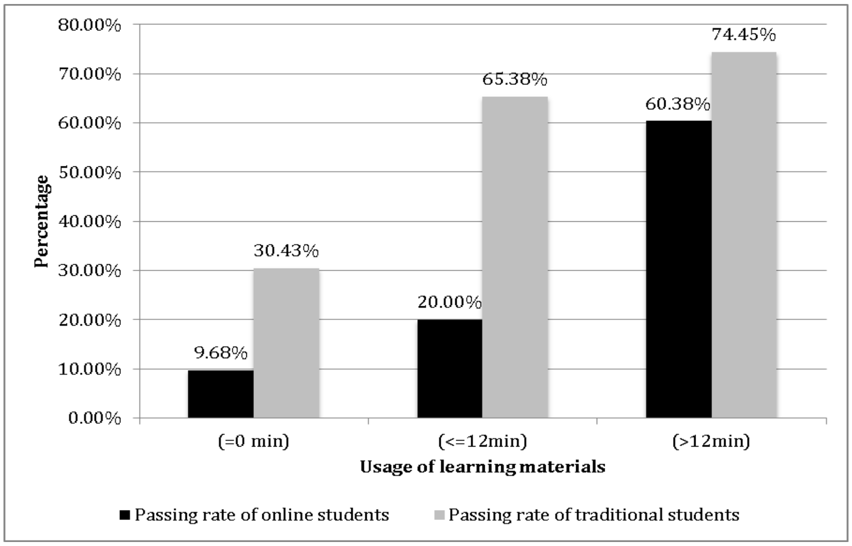

Figure 4. Comparison of percentage of students who passed the course within each group.

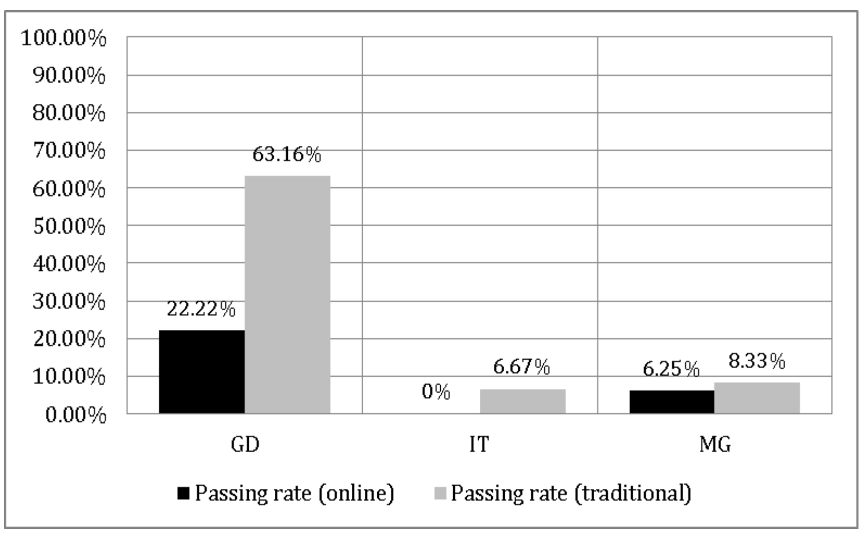

Figure 5. Percentage of students who passed the course for GD, IT, and MG for students who did not use learning materials.

Out of all students who did not use materials on the system, GD students have the highest passing rates even though they did not use the materials. As many as 63.16% of GD traditional students who did not use learning materials on the system passed the course along with 22.22% of GD online students. As traditional students have in-class lectures, this high rate is not surprising considering the style of lectures and course assignments. Given that GD course 1 assignments are drawing and painting based it is more likely that students focused their time on doing the assignments without reading the posted materials. This strengthens the argument that different forms of learning materials should be considered for GD, such as video tutorials and other forms of visual and interactive demonstrations. On the other hand, none of the online IT students who did not use learning materials passed the course, while there were 6.25% of MG online students who did. Also, some of these students may have been students who retook these courses and may have been using previously downloaded materials.

Figures 6 and 7 represent the passing rates for students who used materials for less than or exactly 12 minutes and the groups of students who used learning materials for more than 12 minutes on the system, respectively. It can be seen that traditional students had a better passing rate than online students although they listened to the teaching material for less than 12 minutes, while online students showed a significantly lower passing rate in such short listening time, regardless of the course they took. When the length of listening was more than 12 minutes, the high passing rate was expressed in all courses. These findings are in accordance with research of Grabe and Christopherson (2008).

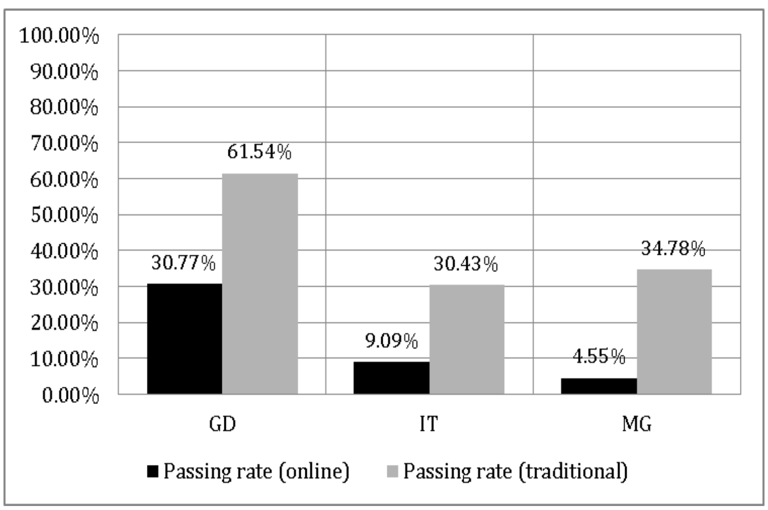

Figure 6. Percentage of students who used learning materials for less than or equal to 12 minutes and who passed the GD, IT, and MG courses.

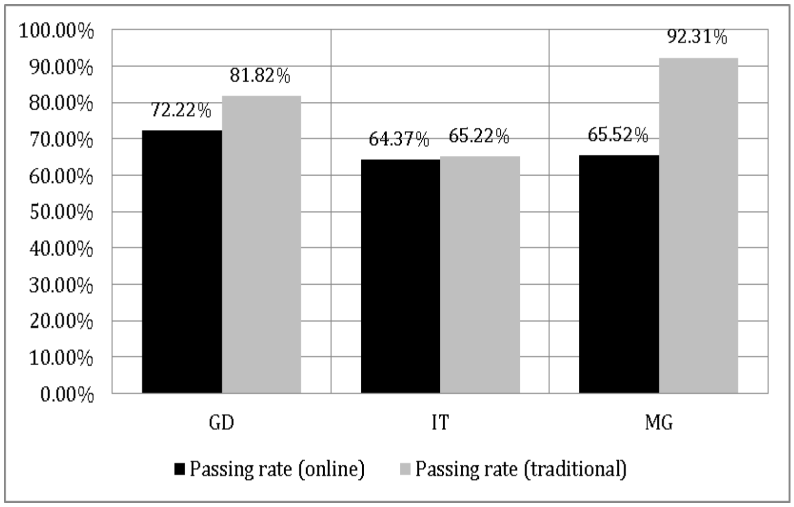

Figure 7. Percentage of students who used learning materials for more than 12 minutes and who passed the GD, IT, and MG courses.

The presented results have shown us that there is a relationship between the usage of learning materials and academic success. Based on this, the null hypothesis, stating that there is no statistically significant difference between students who passed and those who did not pass the exam as compared to the average percentage of used learning materials, using the independent samples t-test was rejected. T-value of the independent samples t-test was 5.547 at significance level, $p = 0.000$, which is less than the limit value of 0.05. This signifies that the probability of error in rejecting the null hypothesis is equal to zero. Based on these results, we accept the alternative hypothesis, stating that there is a statistically significant difference between the students who passed and did not pass the exam depending on the percentage of the length of listening to learning materials. The average percentage of used learning materials among students who passed the course is 42.85% and 21.44% for students who did not pass the course. This is in accordance with the study of Romero and Barbera (2011).

Success Metrics for Evaluating the User Satisfaction

At the end of the courses, students filled out the questionnaires that were used to analyze their satisfaction with the factors included in use satisfaction, information quality, and service quality factors. These analyses singled out the variables which demonstrated significant results such as students' satisfaction with their professors and teaching assistants, as well as the manner in which they perceive the importance and quality of materials that related to theory (theoretical aspects), lab exercises (practical aspects), course assignments (tests, homework, and project), and consultations and interactions with professors and teaching assistants.

Linear dependence using Pearson correlation method was analyzed between these success metrics. Results from these questionnaires are expressed through correlation coefficient, r, and significance, p. A strong linear correlation ($r > 0.5$ and $p < 0.05$) was found between the importance of theoretical aspects and students' satisfaction with teachers ($r = 0.603$), which signifies that students relate theoretical work and its importance to their satisfaction and work with their professors. In other words, students will give more importance to lectures and theory if they are satisfied with the professor. Similarly, there is a strong correlation between online tests and theoretical aspects ($r = 0.579$), which is not surprising considering that a majority of online tests are based on the questions that vastly relate to theory. On the other hand, students relate their satisfaction with teaching assistants with the importance of practical aspects ($r = 0.614$). The conclusion can be derived that assistance provided by teaching assistants improves the perception and acceptance of practical implementation of the studied subject. This poses another question of how online tests, and online evaluation methods in general, can be improved to involve a more interactive and problem solving approach in order to increase students' satisfaction and perception about the importance of coursework beyond the classification that parts of a course are theoretical or practical.

There is a correlation between the course assignments, where correlation was found between perceived significance of homework with practical aspects of the course ($r = 0.664$), and homework and project assignments ($r = 0.675$). This again points out that students clearly distinguish what they perceive as theory and what is a more practical and problem solving approach. Furthermore, students found course assignments highly important if they ranked high satisfaction with consultations they had with professors and teaching assistants (practical aspects: $r = 0.616$; homework: $r = 0.583$; project: $r = 0.516$). Students who regularly go to the consultation and do homework attain more success at projects. This result is significant as the mentoring and more frequent interactions and discussions with students will lead to higher satisfaction and quality of educational system conducted through online studies or blended learning. The results of all of these indicators are important as they can be used to improve students' perception of the quality of a course and in the long term their satisfaction with the quality of the academic program they are enrolled in.

Conclusions

This paper presented a model for evaluation of e-Learning success factors and its success metrics. Of particular interest were metrics that provide quantifiable data independent of students' perception. The presented results involve iterations through the following stages of evaluation using Delone and McLean's model: net benefit, use, user satisfaction, information quality, and service quality. Academic achievement and performance success factors compared traditional and online students, showing that online students showed lower taken-exam and passing rates. It was shown that while online students had lower passing rates in courses, one of the reasons for this may lie in the fact that the majority of them had never used the assigned learning materials. On the other hand, the passing rates and the frequency of usage of learning materials have shown that different types of courses may require a different pedagogical approach when presenting materials online. Similarly, the passing rates compared in three different areas, graphic design, information technology, and management, showed significant differences. It was shown increased length of time spent on using learning materials influenced the increase in passing rates, and that there is a statistically significant difference between the students who passed and did not pass the exam depending on the percentage of the used materials. A significant statistical difference was shown between success factors in user satisfaction, information quality, and service quality metrics. These parameters showed a significant relation between the usage of learning materials and students' satisfaction with the interaction with their teachers.

Furthermore, in order to increase students' engagement in the course throughout the semester further studies should be conducted such as analysis of students' motivation, personalization of learning materials, different pedagogical methods that will increase interactivitiy, optimal deadline policy for assignment, and suitability of the particular study area to be delivered through e-Learning. Future research should focus on the analysis of whether all academic areas are suited for online studies, especially as this research has shown that success for online studies is different not only for different areas, but as well as for courses that may have more of a hands-on approach as compared to the more theoretical courses. Evaluation of the presentation styles and course structure for each course material should be further analyzed, as these indicators point out the existence of a clear distinction between things that students perceive as practical and theoretical. One step further should be made in the direction of structuring the learning materials with integrating an approach with a less noticeable border between theory and problem solving parts of the course. Most importantly, the results point in the direction that online students still require a lot of interaction throughout the course, so new methods for encouraging teamwork and consultations should be considered.

Acknowledgment

The work presented here was supported by the Serbian Ministry of Education and Science (project III44006).

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THE INTERNATIONAL REVIEW OF RESEARCH IN OPEN AND DISTANCE LEARNING

Mediating Knowledge through Peer-to-Peer Interaction in a Multicultural Online Learning Environment: A Case Study of International Students in the US

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Abstract

The continuous growth of online learning and its movement towards cross-border and cross-culture education has recently taken a new turn with the epic hype that currently surrounds the development of massive open online courses (MOOCs) (Beattie-Moss, 2013). This development brings to focus the experiences of international students who take online courses designed and offered within the paradigm of Western pedagogy. Employing a sociocultural theoretical framework (Vygotsky, 1978; Scollon & Scollon, 2001), this paper examines the mediating roles that peers may play in the context of multicultural online learning environments. This two-stage, mixed methods study explored the experiences of 12 international graduate students who took fully online courses in a large research university in the northeastern region of the United States. The data included a survey, online interviews, as well as a case study that took a close look at the experiences of a female student from China. Findings of the study demonstrated that international students that come from diverse native academic backgrounds and cultures may necessitate a close relationship with peers they meet in the US courses. Peers become invaluable mediators of knowledge for international students who seek peer assistance to compensate for the lack of culture-specific knowledge and skills and to satisfy their interest in the host culture. The study suggests that course developers and facilitators should be proactive when assigning group projects and activities so as to enable close peer-to-peer interaction and opportunities for building personal relationships with other class members.

Keywords: Online learning; international students; peer-to-peer learning; culture; sociocultural framework

Introduction

While most universities and colleges see their native citizens as their primary target audience, growing world population mobility and interest in higher education have increased the number of students who wish to obtain a tertiary degree from a foreign institution. It is predicted that by the year 2025, there will be about 8 million international students as compared to 2 million in 2004 (Albach, 2004). Currently most of those students – over 764,000 – are heading to the United States making higher education one of the country's largest service sector exports (Institute of International Education, 2012). Clearly, US universities and colleges are interested in attracting international students; however, how can educational institutions help make these students' learning experiences more successful? How welcoming is the learning environment for this group of learners? What happens when an international student has little or no face-to-face interaction with members of learning communities, that is, when she/he is engaged in online learning?

While US universities and colleges are happy to accept foreign students and scholars, these new members of a learning community are expected to conform to the norms of the American academy (Albach, 2004; Marginson & Wende, 2007). The "sink or swim" policy seems not to have changed much with the rapid growth of online learning and its movement towards transnationalism, which have significantly increased the possibilities of cross-cultural interactions. The recent introduction of massive open online courses (MOOCs), which has attracted thousands of learners around the globe, has not yet yielded evidence-based research that would help educators better serve global learners (Beattie-Moss, 2013). MOOCs, however, have revealed the need to move towards instructional models oriented to peer-to-peer learning and peer-assessment (see, for example, Piech et al., 2013).

Even though research studies (Palloff & Pratt, 1999; Pelz, 2004), particularly those employing a sociocultural paradigm, have not neglected the topic of peer-to-peer learning, they have paid little attention to the role peers play in the learning experiences of *international* students taking fully online courses. Previous research (Shattuck, 2005; Thomson & Ku, 2005; Zhang & Kenny, 2010), however, indicates that international students may indeed experience significant difficulties when taking online courses designed for domestic consumption. These difficulties are linked to a number of factors where educational background and language-related aspects are most visible and discussed.

The mismatch between previous educational experience in the student's home culture and the requirements of the host institution embedded into the host culture may result in international students' confusion, frustration, unmet course expectations, and disappointment with the learning process and results (Pan, Tsai, Tsai, Tao, & Cornell, 2003; Sadykova & Dautermann, 2009; Shattuck, 2005). The American online classroom predominantly based on constructivist tenets and Socratic methods of knowledge acquisition, which values critical thinking and problem-solving skills (Greenholtz, 2003), may not be the same learning format many international students have been exposed to in their native countries (Wang, 2007; Zhang & Kenny, 2010). As a result international students may be unprepared to participate in discussions, group and individual projects on the level expected. For example, they may refrain from challenging and criticizing ideas (Thomson & Ku, 2005; Biesenbach-Lucas, 2003), they may prefer to use ‘powerless’ language such as disclaimers, hedges, and tag questions (June & Park, 2003), and they may misunderstand task sharing and decision making procedures employed by their 'native' classmates (McLoughlin, 1999). International students with limited previous exposure to a host culture may find it too overwhelming, challenging, and frustrating when course topics have little relevance to their native discourse systems and when their peers and instructors use cultural references that hinder learning the course content (Shattuck, 2005; Thomson & Ku, 2005).

To keep up with discussions, write papers, and do other class assignments, international students not only have to possess rich vocabulary, good command of grammar rules, and adequate academic writing skills, but also need to be aware of colloquialisms, set phrases, slang, culturally specific analogues, and metaphors (Bentley, Tinney, & Chia, 2005; Ciano, 2003; McBrien, 2005; Shattuck, 2005; Tan, Nabb, Aagard, & Kim, 2010; Zhang & Kenny, 2010). In the virtual learning environment, language issues are further complicated by the lack of visual cues and immediate feedback. The online classroom shows “great potential for misreading communicative strategies such as turn taking, criticizing, apologizing, recasting, switching registers, etc.” (Sadykova & Dautermann, 2009, p. 98). Inadequate language skills and lack of understanding of communication rules may lead to developing a fear of speaking (Shattuck, 2005).

In such a context, both 'native' and international peers, may end up playing the role of the more significant *knowledgeable others* (Vygotsky, 1978), by lending a helping hand and assisting their less experienced peers in navigating and succeeding in unfamiliar waters of the host educational institution. This study describes some of the roles that peers may play in the learning experiences of international students who are enrolled in fully online courses offered through a US university.

Method

The data for this paper comes from a larger two-year research study that examined the interplay of host and native cultures in an online learning environment and researched its effect on international students’ learning experiences. The research revealed that international students might experience conflicts of identity which do not just complicate their learning, but could also “stimulate individual growth and result in cognitive shifts such as the shift in epistemological beliefs” (Sadykova, 2013, p. 35). Peers were found to play one of the most important roles in how an international student might react to the conflicts of identity that emerge when host and native cultures meet in a multicultural online classroom. This study will investigate the peer-to-peer online interactions and examine the significance of online peers, specifically US classmates, in the learning experiences of their non-US counterparts.

The study was conducted within the sociocultural paradigm, particularly within the theoretical constructs put forward by Russian psychologist Lev Vygotsky and American scholars Ron Scollon and Suzanne Wang Scollon. The sociocultural theoretical framework emphasizes the importance of social and contextual factors and underlines the significance of culture in communication. This framework enabled the research to focus on the learning experiences of a specific student and to study the effect of the social environment and culture on interactions between peers in a classroom. Vygotsky's theory of learning as an essentially social process and his focus on the *mediating* role of a *more knowledgeable 'other'* in the development of a learner and her/his subsequent internalization of culture-specific *psychological tools* (i.e., signs, texts, formulae, or graphic organizers) (Vygotsky, 1978) guided all the stages of the study – from the research design to data interpretation. Informed by Scollon and Scollon's (2001) view of communication as *interpersonal* rather than intercultural, but affected by an idealogical position of culture, this study was able to avoid stereotyping and oversimplification in addition to investigating closely the peer-to-peer interactions in an online learning environment.

The research consisted of a two-stage, mixed methods study (see Figure 1). First, a cross-sectional survey was administered to international students who had taken at least one online course at a large research university situated in the northeastern region of the US. A questionnaire consisting of 36 items served as a survey instrument. The survey included mostly closed-ended questions related to participants’ demographic information, reasons to take an online course, and likes/dislikes of course activities. The survey also included 25 Likert-scale statements that participants needed to agree or disagree with, a space for optional comments, and finally a space for writing a pseudonym (a nickname) for those participants who were willing to be further interviewed.

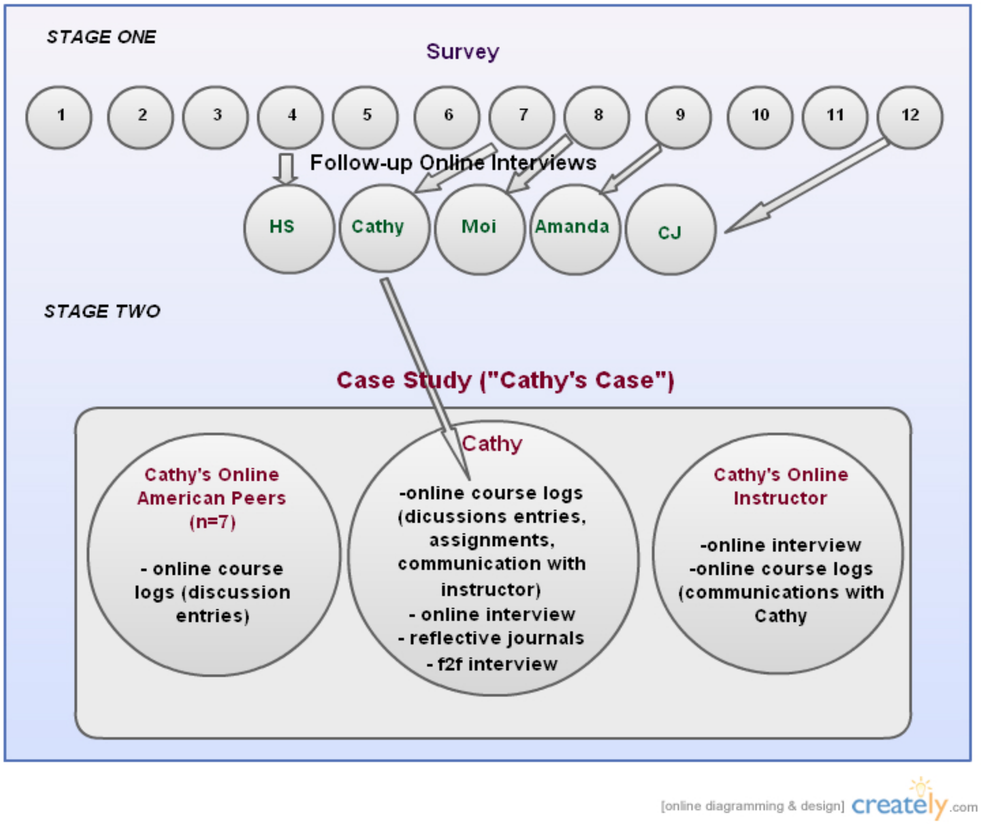


Figure 1. Research design.

To recruit the study participants, an invitation letter was sent through a university listserve distributed among all international students of the university where the study was conducted. A total of 12 international students (N = 12) from various graduate online courses volunteered to complete the anonymous questionnaire (12% response rate): five students from China, two students from Turkey, two students from Nepal, and one student from each of the following countries – India, Nigeria, and South Korea. Five of these international students indicated that they would like to be further interviewed. All five volunteers satisfied the following sampling criteria:

- their native country was other than the US;
- they indicated their native language was other than English;
- they took at least one online course in the university where the study was conducted;
- they were able to communicate in English as was evident from the online survey they had completed.

Upon signing informed consent forms, these five international students, who selected for themselves nicknames, Cathy, Amanda, CJ, HS, and Moi, participated in two rounds of online interviews.

The survey and follow-up interviews showed that Cathy, one of the study participants, might become a very good key informant for a case study. Cathy belonged to the largest group of international students who come to study in the US and thus she could represent a *typical case*. On the other hand her survey and follow-up interviews showed that at the moment of research she took her first US online course while residing in her native city of Shanghai, China, and she was planning to come to the US to study on campus. This made her an excellent candidate for purposeful *intensity sampling* as she "manifest[ed] the phenomenon intensely, but not extremely" (Patton, 1990, p. 182). Moreover, Cathy's online instructor happened to be a research advisor of the author of this study, which made the collection of data more feasible and convenient. Therefore, Cathy was contacted again and invited for additional online and face-to-face interviews after the course was over, to which she agreed. Her online instructor volunteered to help with collecting other data for Cathy's case study. At the end of the online course, Cathy's American classmates were asked to permit the instructor to forward the researcher their online posts. Seven of Cathy's colleagues agreed to do so. Cathy's online instructor also agreed to be interviewed. In addition, Cathy was asked to keep a reflective journal when she came to the U.S. to study on campus. This enabled the collection of rich data for Cathy's case that formed the core of the current study.

Qualitative data derived from online and face-to-face interviews, reflective journals, and online course logs (with an exception of logs belonging to Cathy's American peers) underwent content analysis, that is, "the process of identifying, coding, and categorizing the primary patterns in the data" (Patton, 1990, p. 381).

Besides raw numbers from the survey, quantitative methods of corpus-based linguistics were used to analyze and compare discussion posts of Cathy and her US peers. This analysis enabled close examination of the students' linguistic choices, the process that proved instrumental for studying interactions within an online course and for examining the linguistic manifestation of students' cultural affiliations.

Table 1 summarizes data sources, participants and their demographic data, as well as a method of data analysis for each of two research stages.

Table 1

Data Sources, Participants, Demographic Data, and Methods of Data Analysis

Research stage	Data source	Participants	Demographic data	Method of data analysis
Stage 1	Survey	12 international students who took a fully online course(s) in a US university	China – 5 participants Turkey – 2 participants Nepal – 2 participants India, Nigeria, and South Korea – 1 participants from each country	Quantitative (raw numbers for all close-ended questions) Qualitative (coding for themes of one open ended question item)
	Follow-up online interviews	5 international students who completed the survey	Amanda – China, female Cathy – China, female CJ – South Korea, female HS – China, male Moi – Nigeria, male	Qualitative (coding for themes)
Stage 2	Documents (online course logs)	a) 7 Cathy's online American peers b) Cathy c) Cathy's instructor	a) U.S.A. b) China c) U.S.A.	Quantitative (word frequencies) Qualitative (coding for themes)
	Online interview with Cathy's online instructor	Cathy's online instructor	U.S.A. female	Qualitative (coding for themes)
	Online interview with Cathy	Cathy	China, female	Qualitative (coding for themes)
	Face-to-face interview with Cathy	Cathy	China, female	Qualitative (coding for themes)
	Cathy's reflective journals	Cathy	China, female	Qualitative (coding for themes)

This study involved both qualitative and quantitative methods, but considering the research questions and the selected theoretical framework, qualitative methods took precedence over quantitative. When properly designed, qualitative inquiry enables the respondents to reveal "depth of emotion, the way they have organized their world, their thoughts about what is happening, their experiences, and their basic perceptions" (Patton, 2001, p. 21). The qualitative approach was selected as the leading method of data collection and analysis in this research because the aim of this study was to examine learning *experiences* of online international students, to learn what they *think* about online learning environments and about learning within a US academic discourse and with US peers and instructors. Moreover, due to the nature of the research questions, the study was planned as a naturalistic inquiry (i.e., the study of naturally occurring real-world situations) and with a holistic perspective that focuses "on complex interdependencies not meaningfully reduced to a few discrete variables and linear, cause-effect relationships" (Patton, 1990, p. 40), and therefore the domination of qualitative methods was inevitable.

The employment of a mixed research paradigm that involved both qualitative and quantitative methods of data collection and analysis enabled collecting rich data and served the purposes of data triangulation and validation of study findings. The mixed methods approach allows the researcher to neutralize biases inherent in a single approach (Creswell, 2003). Moreover such "methodological pluralism" is said to frequently result "in superior research (compared to monomethod research)" (Burke Johnson & Onwuegbuzie, 2004, p. 14), is currently supported by experts in research design (see, for example, Creswell, 2008 or Tashakkori & Teddlie, 2003), and has recently been actively employed by many researchers (Bryman, 2006).

All procedures involved in the participants' recruitment and selection (including necessary modifications to these procedures) were approved by the Institutional Review Board (IRB) of the university where the study was conducted. All study participants, excluding anonymous survey participants, granted their informed consents. All five students who participated in the survey and online interviews received a gift card of $50. Cathy also received an additional $50 after all data for her case were collected. The researcher did not meet or know personally before the study any of the international and American students who participated in the study.

As the case study was the most significant source of data, the research findings have limited generalizability to larger populations. A participant selection bias might have also served as a limiting factor. The research involved a self-selected group of participants who provided data in the English language mostly via the Internet (except for a face-to-face interview with Cathy). This might have attracted those students who had higher language proficiency levels and who were also more proficient in technologies than an average international student. The research was conducted by a single researcher and investigator triangulation was not used, which possibly limited analytic validity of the study.

Findings

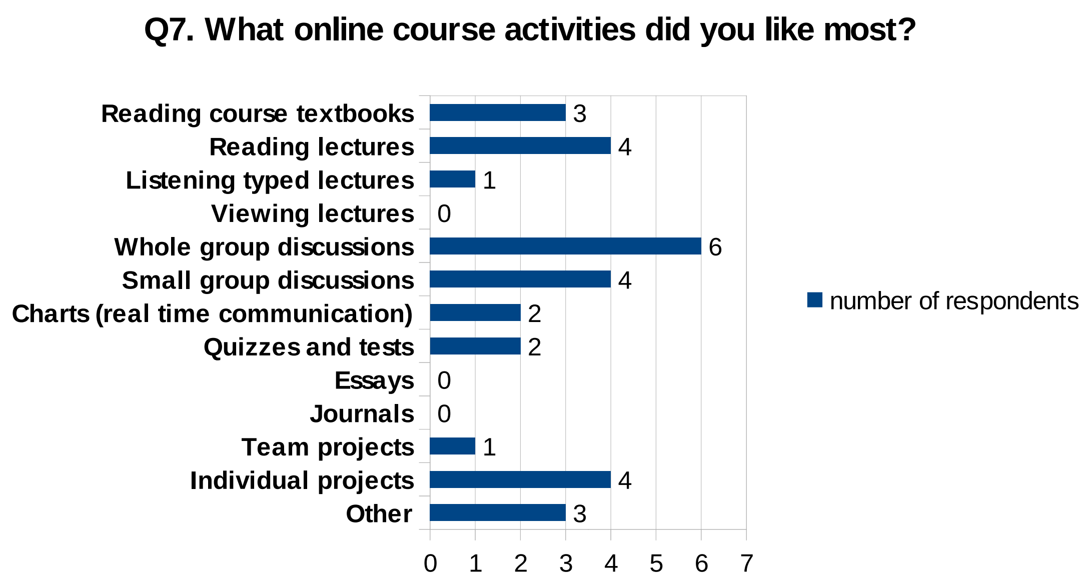
In this study three major themes cut through the research data related to peer-to-peer learning: a) the value of learning from/with peers, b) personal relationships as a key to learning, and c) peers as a cultural entity.

The Value of Learning From/With Peers

Survey and follow-ups.

The value of learning from and with peers was a recurrent theme that emerged during the entire process of data analysis beginning with the survey data. To gain an insight into students' preferences for course activities and to learn how group activities ranked in the other course requirements, three survey questions asked respondents to indicate their most liked, most disliked, and most difficult activities (Questions 7, 8, and 9 respectively). The results of the survey demonstrated that whole group discussions were favorite activities for 6 out of 13 respondents (Figure 2), but it was also the most disliked activity for three international students who completed the survey (Figure 3). Small group discussions were preferred at the same rate as reading lectures and individual projects (Figure 2). Four respondents stated they enjoyed discussing topics in small groups, while none of the respondents named this activity as most disliked or most difficult. Team projects, on the other hand, were selected as the most liked and as the most difficult activity only once by two different respondents (see Figure 2 and Figure 4 respectively).

Activities that do not generally involve interaction with peers also had their fair share in students' answers. Individual projects and reading lectures were among favorites for four respondents, while three respondents liked reading course texts (see Figure 2). Individual projects were also selected as the most disliked activity by two respondents and as the most difficult activity by four respondents (Figure 3 and Figure 4 respectively).


Q7. What online course activities did you like most?
Reading course textbooks
Reading lectures
Listening typed lectures
Viewing lectures
Whole group discussions
Small group discussions
Charts (real time communication)
Quizzes and tests
Essays
Journals
Team projects
Individual projects
Other
3
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1
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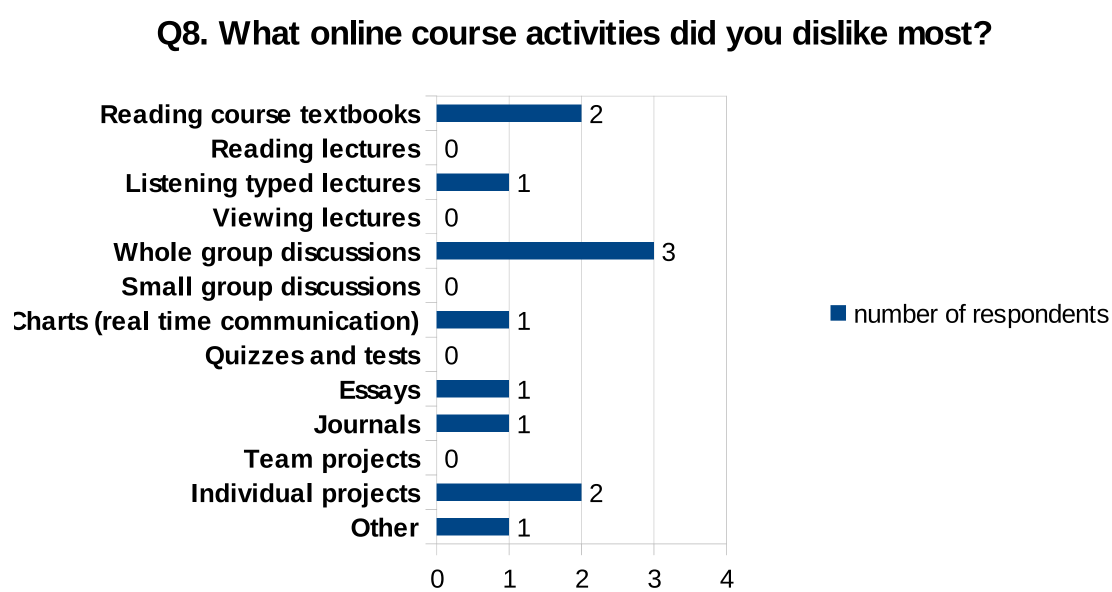
number of respondents


Q8. What online course activities did you dislike most?
Reading course textbooks
Reading lectures
Listening typed lectures
Viewing lectures
Whole group discussions
Small group discussions
Charts (real time communication)
Quizzes and tests
Essays
Journals
Team projects
Individual projects
Other
2
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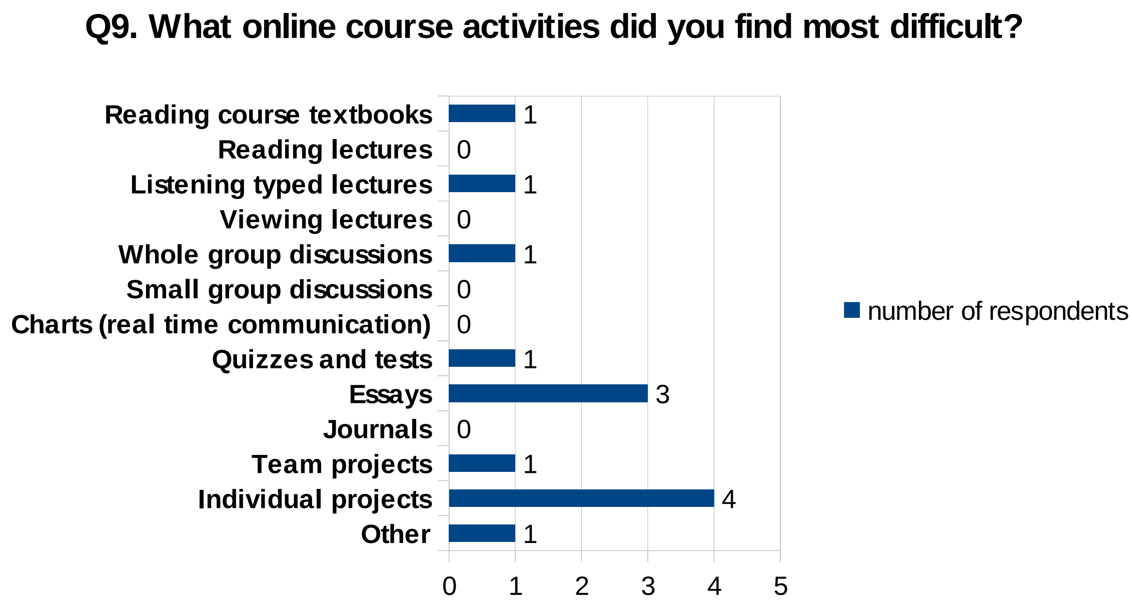
number of respondents


Q9. What online course activities did you find most difficult?
Reading course textbooks
Reading lectures
Listening typed lectures
Viewing lectures
Whole group discussions
Small group discussions
Charts (real time communication)
Quizzes and tests
Essays
Journals
Team projects
Individual projects
Other
1
0
1
0
1
0
0
1
3
0
1
4
1
0
1
2
3
4
5
number of respondents

She wrote, “two heads are better than one” (CJ, follow-up online interview). Amanda corroborated CJ's reason by stating, “it is hard to manage and think about a whole idea by oneself” (Amanda, follow-up online interview). Clearly, the lack of someone to turn to in order to discuss the project, share ideas, learn *how-to*’s, and get a push to avoid procrastination were regarded as factors that made learning more difficult for these international students.

Overall the results of the survey and interviews with the follow-up interviewees reveal that international students may value group activities for the ability to connect with their peers, learn from their experiences, and take advantage of their knowledge of the field of study. Group activities enable international students to compensate for the lack of *psychological tools* (Vygotsky, 1978), which are culture specific and therefore are not readily available to students who are new to a host culture. This is further confirmed by data derived from Cathy’s case study.

Cathy's case.

Cathy's responses in the survey, interviews, and her course transcripts show her *strong preference for learning with and from peers*. Her need and desire to learn from her classmates are evident in a number of discussion posts she addressed to her classmates throughout the course including this one: “I am very pleased to know you experienced classmates and hope that I can learn from you”[2] (Cathy, online course logs).

The following post, however, illustrates Cathy’s difficulties related to using communication strategies valued in her newly adopted learning community:

> I am partially satisfied with the quality of my posts on relevance and truism, but very disappointed with my interaction with my peers in class and my skills for moving the discussion forward. (Cathy, retrospective analysis, online course assignment)

Holding a strong belief in the value of learning from and with peers, Cathy understands that she needs to develop skills required to perform well in American-centric online discussions. Apparently, she has found that small group activities are more appropriate for her learning style and her learning needs. In the survey, she selected small group discussions, chats, and team projects as her favorite activities, and the only individual activity that she favored was reading textbooks. However, Cathy chose whole group discussions as her least favorite activity because she felt they tend to be “more general and superficial” than small group discussions.

When justifying her positive attitude to small group discussions, Cathy talked about their role in promoting “deep discussions” and encouraging interpersonal

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2 All participants' quotes have not been corrected for language accuracy.

communication. Team projects in her assessment were described as activities where "each team member can made best use of their personal strengths to co-labor under one task. . ." (Cathy, follow-up interview). Clearly Cathy placed high value on cooperation and collaboration and saw the benefits of uniting team efforts for producing the best possible learning outcome.

Cathy further reveals why some international students may find individual projects difficult and may prefer group projects:

> Since it is my first course taken outside China, and it is in my second language, I am not very familiar with something like the right format of an easy[3] and the criteria of good individual projects. By doing team projects, I learn from other team member and I grow out of it as well. (Cathy, follow-up interview)

Cathy's words here remind us that international students' learning experiences may be negatively affected by their lack of familiarity with the format of activities used in the US academic discourse. As outlined above, follow-up interview participants also pointed to this issue. Similar findings are reported in a number of studies that have explored learning experiences of international students studying on campus and online (Arkoudis & Tran, 2010; Krampetz, 2005; Thomson & Ku, 2005). In Vygotsky's terms this could be explained by the mismatch of psychological tools that exists between educational systems in the US and in other countries. Moreover, Cathy's previous educational experience did not provide her with strategies for applying those psychological tools in ways that are generally expected in the US academic discourse. For example, in her retrospective analysis of a team project, Cathy described her newly acquired skills working on a team project in a small group and pointed out the benefits of such an experience for her as a student: "... I learn a lot through this process regarding the media use and the team work" (Cathy, retrospective analysis, online course assignment).

Collaborative work, where group members share responsibilities as they develop a group product, seemed to be a new idea for Cathy. The skills for working collaboratively, however, are essential for successful group work in the US education setting. In Asian cultures such as Taiwanese, working cooperatively on a learning product, that is, not dividing work but rather doing it together, is more common as pointed out by Ingram and Hathorn (2004). Data indicated that Cathy first failed to do her part of the work, but her group mates were able to provide adequate scaffolding and demonstrated how to work in groups the 'American way'. Cathy's later posts demonstrated that she grasped the idea very well inasmuch as she readily informed her group mates of her progress, encouraged them to do their part, and thanked them for the work done.

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3 Cathy means "essay" here.

In the online interview Cathy's online instructor also noticed the importance of peers for Cathy's success in the course:

> The notion of working in groups for those who are new to online learning tends to be unsettling at first, especially for those unaccustomed to working in groups as part of instruction. Cathy, from China, fell behind early on as she was unclear about how the course worked, but quickly caught up with the help of her group members. (Cathy's online instructor, online interview)

Cathy's instructor's observations speak of the valuable help that Cathy was able to receive from her classmates. They also suggest that anyone with little experience in working with online team activities within a constructivist-based classroom needs to be provided with assistance and extra scaffolding to ensure that she/he understands the rules of working in an online team and collaborating on a group product. Such an activity might be unfamiliar to some international students, as indicated in Cathy's own posts, in the post of her instructor, and in related literature (Sadykova & Dautermann, 2009). Without the extra help of peers and/or the instructor, a student may fall behind and eventually drop out of the course. In Cathy's case such help was especially important at the beginning of the course. Cathy reported being overwhelmed by the amount of work she did not expect to have. She also blamed her shy nature stating that it prevented her from asking for help from her peers from the very beginning. The statement below illustrates this clearly.

> I think it was mainly because I was kind of shocked by the amount of assignment required by instructor... I had no idea about what it was like to do a good project. And it was a little bit difficult for me to finish all reading in time, given they are heavy in amount and they are in English rather than Chinese. Besides, I was sometimes shy to turn to my classmates for help, but I successfully adapted to learn to resort to others in the end. (Cathy, follow-up interview)

Clearly, it was Cathy's lack of previous experience working in US graduate courses that caused her initial disappointing performance. She did not expect to have such heavy reading requirements. Moreover, her previous educational experience (all in China and all face-to-face) did not provide her with adequate psychological tools for learning. It was Cathy's group mates who basically *played the role generally left to instructors.* They ensured that Cathy stayed afloat, caught up, and eventually succeeded in her educational journey through foreign bumpy roads with minimal road signs. Using Cathy's online instructor's words, American classmates took international students "under their wings and mentored them along" (Cathy's online instructor, online interview). However, it was the instructor who set up team projects that ensured that Cathy had those mentors to help her.

Summing up, data suggest that international students taking online courses in the US may find themselves in a class built on student-centered practices that encourage peer-to-peer interactions. International students may like taking advantage of class discussions, team projects, chats, and other collaborative activities. They appreciate such an opportunity and they value their classmates' readiness to share their knowledge and experience. Peers may successfully assume the role of a more knowledgeable other by contributing not only to the course content but to what is often more valuable for international students, that is, to the peers' understanding of the course activities, to project formats, academic writing and presentation conventions, and to the self-confidence of those who need to be reassured of their abilities.

While the study's findings show some of the benefits of a constructivist classroom for those international students who took part in this study, they cannot be widely generalized. It is worth pointing out that previous studies reported that international students may feel uncomfortable participating in discussions and team projects with American peers due to inadequate language skills (Ciano, 2003; Zhang & Kenny, 2010), uncertain or culturally inappropriate rules of communication (Shattuck, 2005; Pan, Tsai, Tsai, Tao, & Cornell, 2003), somewhat aggressive and critical forms of discussion (Thomson & Ku, 2005), or unfamiliar, unclear, or culturally unacceptable rules of working on a team (Chen, Hsu, & Caropreso, 2006; Shattuck, 2005). In some cases this may result in marginalization and isolation of international students (Shattuck, 2005). However, as we see in Cathy's case, this discomfort, which at the beginning could have hindered student's participation, may then be overcome and lead to a very fulfilling and rewarding learning experience. Peer assistance is very valuable in this process.

Personal Relationship as a Key to Learning: Cathy's Case

Cathy's discussion posts, messages to her group mates, reflective journals, and interview transcripts are full of sentences that emphasize the importance of a social factor in learning. She repeatedly stresses the necessity to establish interpersonal relationships with her classmates as can be seen in the statement that follows: "I need to talk more with my instructor and my classmates, building up interpersonal relationship to facilitate active communication" (Cathy, reflective journal).

The very fact that small-group activities are her favorite illustrates Cathy's desire to establish a closer relationship with others with whom she shares a learning space. Her classmates have become her family, where "I" is a part of "we" and where a success of one member is seen as a success of the whole group. This is reflected in her statement as follows: "...your words are so inspiring and encouraging. I am so proud of being a member of this family" (Cathy, online course logs).

Clearly, Cathy demonstrates her longing for *social presence*. Social presence, along with *teaching presence* and *cognitive presence*, constitute the elements of the community of inquiry (CoI) framework (Garrison, Anderson, & Archer, 2000; Garrison, 2011). The CoI framework has been widely used as a leading theoretical model to guide studies in online learning in higher education (Shea et al., 2010). Social presence is defined as "the ability of participant identify with a group, communicate purposefully in a trusting environment, and develop personal and affective relationships progressively by way of projecting their individual personalities" (Garrison, 2011, p. 23). In an online learning environment, social presence is "the degree to which a person is perceived as "real" in mediated communication" (Ganawardena & Zittle, 1997, p. 8); it is "about relationships, connecting with others despite physical separation" (Irwin & Berge, 2006). In the absence of face-to-face contact, such a relationship is not easy to develop and maintain. However, a classroom built on the constructivist ideas that promote a high level of interaction and engagement among peers does create conditions needed for such a relationship to develop (Lock, 2002).

Cathy's and her online classmates' engagement in the learning process and interest in each others' affairs is evident in the high frequency of pronouns they used referring to themselves and others when exchanging messages in the discussion forum. Table 2 demonstrates the results of comparative quantitative analysis of Cathy's and her American peers' usage of pronouns in the discussion forums and course assignments. The analysis was carried out with the assistance of the Simple Concordance Program freely available at http://www.textworld.com/. As seen in the table, personal pronouns (I, my, you, they, we, etc.), as well as possessive pronouns and determiners (me, mine, our, yours, etc.), were frequently utilized by Cathy and her American peers. Self-disclosure and open expression of emotions, which generally involve a high frequency of personal pronouns, are evidence of social presence (Garrison, 2011), just as a high frequency of possessive pronouns are believed to be indicative of community (Hughes, Ventura, & Dando, 2007). Thus, the frequent usage of pronouns by Cathy and her classmates indicates that social presence was indeed established in the course under analysis.

Table 2

Frequency of Pronouns in Cathy's and her American Peers' Online Discussion Posts

Pronouns	Cathy *N* = 16660, *Nfreq* = 2489	American students *N* = 70866, *Nfreq* = 5424
I/my/me/mine	2.27 (378)	2.92 (2075)
We/us/our/ours	1.55 (259)	1.25 (887)
They/their/them/themselves	1.0 (167)	1.49 (1055)

Note 1. Frequency is given in percent. Raw numbers are provided in brackets. *Note 2.* N is word count, i.e., overall number of words in corpus. Nfreq is word vocabulary, i.e., number of different words in the corpus.

Cathy's willingness and necessity to feel personally connected to her online peers is also well illustrated in a particularly close relationship, which may be classified as a friendship, with Jennie, one of the team members with whom Cathy worked throughout the whole online course and also did a pair project. Course transcripts and interviews revealed that both Jennie and Cathy interacted with each other on a regular basis and utilized not only discussion spaces set up in the online learning platform, but also a synchronous form of communication, *Skype*, which enabled them to carry out real-time conversations.

Thus, establishing a personal friendly relationship with classmates may become a matter of necessity for international students like Cathy. This aligns with research findings that demonstrate that "social interaction with people from the United States seemed to have a positive effect on international students by linking them to resources, increasing satisfaction levels, decreasing alienation, and enhancing the adaptation process" (Kim & Sedlasek, 1995, p. 6). However, being electronically mediated, online socialization is more complicated than face-to-face socialization (Garrison, 2011; Irwin & Berge, 2006), which might be particularly true for some international students who seek to build friendship with peers and learn their culture (Thomson & Ku, 2005).

Still, Cathy's data, and specifically her close interaction with one of her online classmates, supports previous findings that showed that an online classroom built on collaborative learning activities enables the development of social presence, that is, it does provide space for developing a personal relationship (Richardson & Swan, 2003; Rovai, 2002). On the other hand, it is important to keep in mind that because the development of a social presence in an online environment requires more effort, international students like Cathy may avoid online courses or minimize the number of courses they take at a time if given a choice (Tan, Nabb, Aagard, & Kim, 2010; Thomson & Ku, 2005). This might be more so for students from collectivistic high-context cultures than for their peers from individualistic low-context cultures: the need for "togetherness" is more prominent for those whose "I" is more often blended with "we" as we see it was for Cathy. These findings support a study conducted by Morse (2003) that reported that online students from high-context cultures (China, Singapore, Sri Lanka, and Thailand) lamented about not being able to form social relationships with counterparts, which was not the case with students from low-context cultures (the US, the UK, Australia, and New Zealand).

Peers as a Cultural Entity

For international students like Cathy establishing personal relationships may mean more than the availability of peers to help with academic matters. Data show that Cathy's high interest in making American friends was in many ways based on her desire to learn the culture of her peers. Her individual curiosity, as well as her professional interests (majoring in TESOL she would have been taught the importance of learning about the target culture) might be the two major sources of her willingness to learn the culture. For Cathy the very possibility to learn the host culture was the major point of attraction for studying on campus. She states:

> Being an international student, the biggest motivation for me is that you get into the culture, be assimilated into the culture. So when this aspect is concern, I'd rather say that you should be exposed to the culture by being on campus, being involved in f2f classroom. (Cathy, face-to-face interview)

In her interview she also suggested that a face-to-face learning context, unlike an online classroom, tends to stimulate and provoke conversations about so-called "low" culture, that is, everyday culture associated with common people's lives – their hobbies, food, and family. Data, however, demonstrate that Cathy used the online format often for learning cultural phenomena associated with the American educational system. The online course she took provided a comfortable platform for discussing cultural differences in the system of education: Course activities required students to make these cultural differences visible. Therefore Cathy felt it was appropriate to talk about her native culture, as well as directly ask her peers to share their cultural experiences with her. For example, after describing teaching and learning styles in China, she hoped to get similar knowledge from her peers when writing, "It would be great if any of you can explain a little and make some comparison re what I have mentioned above" (Cathy, online course logs).

Cathy's use of the online environment to discuss both her own and the host cultures became even more visible after online course transcripts underwent quantitative analysis with the help of the Concordance software. Table 3 shows the results of frequency counts for words *China/Chinese*, *U.S./US/USA*, and *America/American*.

Table 3

Results of Frequency Counts for Words China/Chinese, U.S./US/USA, *and* America/American

Word frequency count for culturally associated words	Cathy	American Students
China, Chinese	.5 (84)	.04 (27)
American, America	.12 (20)	.04 (28)
TOTAL	.8 (134)	.1 (76)

Note. Frequency is given in percent. Raw numbers in brackets.

The table demonstrates that both Cathy and her American peers talked about their cultures quite often: Cathy used these words 134 times (.8%) and her peers 76 times (.1%). However it was Cathy who took an initiative in these discussions and provoked her peers for discussions. The total numbers also show that Cathy was eight times more inclined to discuss the two cultures than her peers (.8% vs. .1%). Clearly, this demonstrates how important the question of culture is for Cathy and how much space her native Chinese culture takes up in her world view. Fortunately for her the course topics included the discussion of culture and Cathy took every opportunity to talk about her own culture, make inquiries about the US culture, and compare the two. Apparently, questions of culture were of less significance for Cathy's American peers, which arguably may be attributed to the high individualism of American mainstream culture.

Thus the study shows that for international students peer-to-peer learning may encompass learning each others' cultures. Such a culture exchange may be of no less importance for some international students than acquiring content knowledge and studying US academic writing, presentation conventions, and other tools of learning in the US. Moreover, data demonstrate that Cathy's online course provided ample opportunities for talking about cultural differences in the educational systems of two countries – US and China. Thus, while the online learning environment is currently dominated by Western cultures (Smith & Ayers, 2006), and might be perceived as much less suitable for promoting cultural understanding as compared to on-campus learning (Tan, Nabb, Aagard, & Kim, 2010), it is not inherently insensitive to the cultures of its inhabitants. Indeed, online courses may incorporate meaningful and relevant discussions that promote cultural awareness.

Conclusion and Implications

The study demonstrated that international students, who come from diverse cultural and educational backgrounds, may need a close relationship with peers they meet in the US online courses. This need is grounded in the inadequate command of psychological tools that an international student is required to use when functioning in the US academic discourse. The need to establish close ties with American peers could also be explained by students' high interest in learning the host culture in its broad sense. Thus, peers become invaluable mediators of knowledge for international students who seek peer assistance to compensate for the lack of culture-specific knowledge and skills and to satisfy their interest in the host culture. In the online context, students should receive peer assistance in collaborative activities set up by their instructors. While the survey participants did not show overwhelming approval of all collaborative activities, follow-up interviews with selected survey participants and in-depth analysis of Cathy's case data demonstrated important advantages of constructivist activities where American students are able to perform as more knowledgeable others and take international students "under their wings and [mentor] them along" (Cathy's online instructor, online interview). An important aspect of this finding is that it is the instructor's responsibility to establish beforehand peer support groups when designing collaborative course activities, and provision of this will help determine how international students are included in such a course.

Cathy's case data also demonstrated the significance of social relationships that students, especially those who come from collectivistic high-context cultures, may seek in any format of learning – online or traditional. Developing personal relationships with peers was reported to be highly desirable for ensuring peers' assistance and for satisfying students' interest in the host culture.

These findings bear several important implications for research and practice. First of all the current research revealed that an in-depth study of international students' learning experiences in the US online courses designed for in-home consumption may show that a highly interactive constructivist learner-centered classroom might *not* be "a lonely place for an international online learner whose cultural experiences are different than the dominant educational cultures" as described in Shattuck (2005, p. 175). This speaks to the need for further research that would include both large-scale surveys and in-depth case studies that would examine how exactly international students feel in online courses that place high value on communication. Why these students may actually prefer to be required to interact with their online peers is also worthwhile investigating. Moreover, the fact that studies of international students' learning experiences in online US courses may yield contradictory results highlights the value of the sociocultural framework that emphasizes contextual and individual factors in the study of cultural influence on learning experiences.

Practical implications of this research call for the design of online courses that enable learners to interact with each other in order to exchange knowledge related to their host cultures and to compensate for the lack of skills needed to successfully complete course assignments. This means that online courses that involve international students should strive to maximize social presence. As this study and other studies have shown, many international students would like to develop personal relationships with American peers and are highly interested in learning 'popular' American culture. To satisfy international (and some domestic) students' need for socializing and learning culture, instructors could be trained to design group and pair projects, to enhance asynchronous discussions with synchronous forms of communication, as well as to assign tasks that incorporate everyday culture into the course content. While instructors can not force students to become friends, they can maximize opportunities for such a relationship to develop when students participate in collaborative activities.

The question of culture in online classrooms gets a new turn with the recent epic hype that surrounds the development of massive open online courses (MOOCs) (Beattie-Moss, 2013) and the continuing growth of transnational academic mobility (Kim, 2009; Khabutdnova & Bayanova, 2013). Meanwhile, "bridging cultures in the context of computer-mediated learning environments could be as complex as the concept of culture itself" (Sadykova, 2013, p. 21). Therefore, educators should be aware of the needs that global learners bring to the classroom. This study, while based on a more traditional online learning format than MOOCs, pinpoints a highly important role that peers play in learning experiences of each other. Moreover, the research findings suggest that for peer-mediated knowledge acquisition to happen, course designers and facilitators must take leading roles in creating a learning environment conducive of productive and relationship-oriented peer-to-peer interactions.

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THE INTERNATIONAL REVIEW OF RESEARCH IN OPEN AND DISTANCE LEARNING

Ghosts, Stars, and Learning Online: Analysis of Interaction Patterns in Student Online Discussions

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Abstract

Discussions are commonly used in online teaching and have been shown to foster student learning and collaboration. This case study uses content analysis to explore the interaction patterns of student online discussions during a semester-long teacher preparation course using concepts from sociometry. Findings suggest that interaction patterns were influenced by the content of student posts. Online discussions in this case were found to be an equitable form of collaborative learning, enabling each student to have a voice. There were, however, indications that gendered *ways of knowing* may play a role in the content of interaction, if not in the patterns themselves.

Keywords : Sociometry; online discussions; teacher preparation; interaction patterns; higher education; gender

Introduction

Instruction in today's higher education classrooms has come a long way from the traditional lecture method, although it continues to be the dominant pedagogical approach (Barr & Tagg, 2000; Pollio, 1984;Welty, 2000). The literature in teaching and learning emphasizes that students learn better when interacting with new ideas in a social context and constructing meaning from their experiences than they do passively receiving and being tested on knowledge transmitted by experts (Astin, 1993; Brooks & Brooks, 1993). Dewey (1933) argued long ago that "learning is learning to think" (p. 78); in order to think one must be actively engaged in reflection. Vygotsky (1978) emphasizes the social context of thinking and learning by arguing that "learning awakens a variety of internal developmental processes that are able to operate only when the child is interacting with people and his environment and in cooperation with his peers" (p. 90). Although not children, there is support for the salience of the social context with adult students as well. Bruffee (1993), drawing on the work of Thomas Kuhn, Richard Rorty, and Clifford Geertz, argues that knowledge is socially constructed through interaction with peers.

Literature Review

The literature on effective teaching in higher education calls for students to spend more time learning through active engagement such as group discussions with their peers (Weimer, 2002; Fink, 2003). Pascarella and Terenzini (2005), in their seminal review of research on how college affects students, note that studies of innovative instructional approaches were largely absent from the body of research reviewed for the first volume of their work. Yet in the recently published second volume, they conclude that research evidence supports the effectiveness of instructional innovations such as collaborative and cooperative learning. The National Survey of Student Engagement (2007) found that academic success for adult learners is linked to social and academic engagement. Brookfield and Preskill (2005) argue that discussion can be used to further the goals of democracy in education by exposing inequitable power structures in the classroom that tend to silence students outside the dominant group. Given current demographic trends that show that non-traditional students are the fastest growing undergraduate population (Levine & Sun, 2003), such approaches are important for the academic success of these students. As a result of research such as Gow and Kember (1994) that found that faculty who relied on lecture and a transmission approach to teaching were more likely to negatively impact the learning approaches of their students, college faculty are increasingly shifting their roles from the "sage on the stage" to a "guide on the side" (King, 1993; Weimer, 2002).

Group Discussions

Group discussions are often used in online teaching and learning. Many studies have found that online group discussions facilitated student learning. Nicholson and Bond (2003) found that the reflective thinking of preservice teachers improved over the course of a 10-week field experience as they participated in online discussions. Other studies concluded that online discussions facilitate collaboration as well as encourage critical reflection (De Wever, Schellens, Valcke, & Van Keer, 2006; Hawkes & Romiszowski, 2001; Tutty & Klein, 2008;). Barnett, Keating, Harwood, and Saam (2002) found that preservice teachers began to explore their conceptions of inquiry and inquiry-based teaching through their online interactions using the Inquiry Learning Forum. Devlin-Scherer and Daly (2001) claim that online discussions improved the quality of both students and faculty in a teacher preparation course.

Levin (1999) analyzed the content and purpose of different types of electronic communication among preservice teachers. She concluded that web-based discussions “appeared to promote a reflective stance on personal, instructional, and critical issues by providing a community of peers who can be supportive, provide multiple perspectives, and give feedback to each other as they learn to teach” (p. 148). Schlagal, Trathen, and Blanton (1996) found that online discussions enabled joint construction of meaning among student teachers and their professors.

Given the growing use of group discussion both in face-to-face and online educational settings it is important to study what makes some discussions more effective learning experiences than others. Online discussions are unique in that they allow students time to reflect on their answers before posting. Likewise, students can take more time to understand and relate to what their peers have written because the posts remain accessible over time. Knowledgeable facilitation of online discussions by instructors has been found to be an important factor in successful online discussions (Andresen, 2009; Barnett, 2002; Collison, Elbaum, Haavind, & Tinker, 2000; Oliveira, Tinoca, & Pereira, 2011; Whipp, 2003).

Women’s Ways of Knowing

When studying adult learning, it is important to consider gender. One of the most influential models of adult cognitive development is Perry’s (1981) scheme of cognitive and ethical development. While the results have often been generalized to a wider population, the participants in the study were all male students at Harvard University. This study is focused on students in a teacher preparation program. According to the National Center for Education Statistics, in 2008, approximately 76% of all public school teachers were women. The majority of students in teacher preparation programs are also typically female (Commission on Teacher Credentialing, 2012). Research has shown that gender does influence learning in higher education (Astin, 1993). For example, studies have found that in math courses, beliefs about learning are more closely tied to female students’ success than for male students (Kloosterman & Stage, 1991; Leder, 1992). In addition, studies have found gender influences in student interaction in online courses (Jeong & Davidson-Shivers, 2006; Herring, 2003). Daugherty and Turner (2003) explored student popularity and group dynamics in a web-based environment and found that in a course with eight women and only three men, two of the men were ranked as the most popular students in the course, suggesting that gender may indeed play a role in online interactions. Guiller and Durndell (2006) found that women were more likely to express agreement in their online interactions, while men were more likely to express disagreement.The emphasis on beliefs and women's relation to knowing was first implied in Belenky, Clinchy et al.'s (1986) seminal study *Women's Ways of Knowing*. They found Perry's highly regarded (1981) scheme of cognitive and ethical development, based on research conducted on privileged male students, to be inadequate to explain their findings. Clinchy (2002) explains: "Perry's positions are defined mainly in terms of the nature of knowledge and truth...whereas we stress the women's relation to knowledge and truth, their conceptions of themselves as knowers" (p. 64). Their findings indicate that women's *ways of knowing*, or how they view the world of truth, knowledge, and authority, fit into five distinct perspectives: *silence*, *received knowing*, *subjectivism*, *procedural knowing*, and *constructed knowing*.

The silence perspective represents women who are not comfortable speaking or listening. Clinchy (2002), quoting Belenky (1996), describes the women of this perspective as lacking "the most basic tools for dialogue, the silenced feel voiceless and excluded from the community" (p. 394). Clinchy adds that the silence perspective doesn't even appear in theories of epistemological development, "for these theories are based on words—oral or written accounts—produced mainly by people with considerable formal education" (p. 65).

Received knowing is the second perspective of women's ways of knowing and is closely related to Perry's stage of dualism. Knowledge from this perspective is absolute; truth is external and is received from an authority figure. Clinchy (2002) sees this level frequently among her undergraduate students and sees her role as "to help students move beyond received knowing and on to more active, reflective modes of thinking" (Clinchy, 2002, p. 67).

The third perspective is subjectivism. Here, truth is now personal and internal like Perry's concept of multiplicity; "all opinions are equally valid, and everyone's opinions are right for them" (Clinchy, 2002, p. 69). According to Clinchy, women of a subjective perspective often are suspicious of information handed down by authorities. She points out that the openness of the subjectivist perspective is specious in that these women are not truly listening to the other points of view.

Procedural knowing follows subjectivism. Women who assume this perspective realize that not all opinions or answers are equally valid. "Knowing requires the application of procedures for comparing and contrasting and constructing interpretations, and the quality of the knowledge depends on the skill of the knower" (Clinchy, 2002, p. 73).

The final perspective in *Women's Ways of Knowing* is constructed knowing. It is the most complex perspective of the five and was represented by only a small number of the participants. Like Perry's stage of relativism, people at this stage believe that all knowledge is constructed and recognize their own part in the construction of knowledge.

Nearly 20 years after *Women's Ways of Knowing* was first published, Clinchy (2002) is not sure that epistemological development is universally linear. While advocating further research, she especially cautions that domain specificity may influence epistemological development within particular disciplines. Belenky et al.'s work on women's epistemological development is particularly important for teacher education because the overwhelming majority of teachers and teacher candidates are women. If preservice teachers are to be educated to teach diverse learners in the 21st century, something that requires constructed knowledge, attention must be paid to the teachers' epistemological perspectives.

Sociometry

Studies investigating student online interaction have used a wide variety of conceptual frameworks to guide the research. Henri's (1992) model is one of the first to look at the content of student posts. Her scheme of five dimensions includes participation, social, interactivity, cognitive skills, metacognitive skills. Another well-known model is Gunawardena, Lowe, and Anderson (1997) who focused on meaning negotiation and co-construction of knowledge. Other studies adapted models from cognitive psychology and other fields. Samuels-Peretz (2012) adapted Kitchener and King's (2002) model of reflective judgment to analyze student learning in online discussions. Warren and Rada (1999) used Bloom's taxonomy. Pilkington and Parker-Jones (1996) developed the DISCOUNT model, derived from transactional analysis, dialogue game theory, and rhetorical structural theory and looks at purpose of student posts.

This study seeks to explore the role of group dynamics in online student interaction. Warren and Rada (1999) argue that student to-student feedback can support learning. Lee (1999) found that pre-existing social dynamics influenced student interaction in online discussions. Likewise, Oliveira, Tinoca, and Pereira (2011) found that social aspects and relational contexts can influence collaboration in online discussions. Given such findings, it could be valuable to apply an approach to studying group dynamics in analyzing online discussions.

Moreno (1960) developed the concept of sociometry to study group dynamics and actions in social situations. In addition to enhancing our understanding of group processes, sociometry has given us tools for studying intergroup and interpersonal contexts (Evans, 1962), in particular, tools for collecting reliable data about groups. According to Evans, sociometry is particularly useful for studying classroom situations. Concepts used in such studies include: stars, students who are most frequently "liked" or nominated by others; isolates, students who are singled out negatively by peers; and ghosts, students who are ignored by their peers, neither chosen nor referred to.

Most studies that used sociometry to study interaction patterns and academic success were in elementary or middle school settings (Austin & Draper, 1984; Li, 1985; Wentzel & Asher, 1995). Only a few studies were found that used sociometry in a study of student interaction in higher education. Guldner and Stone-Winestock (1995) found that sociometric data on students and groups in their higher education students are significantly related to student learning. Daugherty and Turner (2003) conclude that sociometric measures can be a valuable tool for assessing online group dynamics among college students.Tools from sociometry can be helpful in uncovering student interaction patterns in online discussions. Who are the stars in an online discussion that enjoy multiple interactions? Who are the isolates and ghosts? Do stars get more out of a discussion because they interact more? Are ghosts at a disadvantage because they are not included in discussions? Such research would contribute to the knowledge base for online discussions. It could also be informative for instructors who use online discussion among their teaching and learning strategies.

This exploratory case study explores the following question: How might student interaction patterns in group discussion shed light on issues of teaching and learning? In particular, to what extent are there stars, ghosts, and isolates in an online discussion? In what way might frequency of interaction relate to the perceived quality of posts? What other patterns of interaction can be found in an online discussion and how might they relate to opportunities for socially constructed learning?

Method

This exploratory case study used content analysis as well as qualitative data analysis in order to analyze transcripts of online discussions. A case study design is particularly suited to questions of "how" or "why" and in situations over which the investigator has limited to no control, as in a classroom situation (Yin, 2003). The instructor of the course is also the researcher, making this an example of self-study research. Self-study is a type of practitioner inquiry in which university instructors make systematic inquiry into their own teaching practice (Dinkelman, 2003). Zeichner (1999) calls the emergence of self-study in teacher education "the single most significant development ever in the field of teacher education research" and notes that much self-study research explores the "nature and impact of teacher education activities" (p. 8). Self-study is closely related to action research in that it is a process of reflection and action that is designed to transform individual as well as collective experience; it is contextually rooted in one group at one particular time and place. Zeichner (1999) notes that much self-study research, such as the present study, explores the "nature and impact of teacher education activities" (p. 8).

Participants

Participants, who gave informed consent, included all registered students in a semester-long, undergraduate teacher preparation course at a private institution of higher education in the Northeast of the US. The participants were 10 White females, representing the typical student profile at this institution. It is also similar to national trends of students in teacher preparation programs who are predominantly White and female. Participants were in their junior of undergraduate studies pursuing a teaching license. The course focused on learning how to teach in elementary classrooms.

This case study draws on concepts from sociometry to study student interaction patterns.

While most sociometric studies, such as Daugherty and Turner (2003), use self-report data to determine group connections, this study focuses instead on the actual choices made during learning activities. The concepts of stars, ghosts, and isolates were used to analyze connections between participants and their ideas in each discussion. “Stars”, in this study, indicate students who were referred to either by name, or by ideas contained in their posts, most frequently in a discussion. “Isolates”, in this study, are students who were singled out for criticism or negative attention, either by name or by ideas contained in their posts. “Ghosts” indicate students whose posts are ignored by other participants and their posts in the discussion.

Procedure

Data collected included the transcripts for two online discussions for each of two groups, making a total of four online discussions. The discussions were conducted using a closed access learning management system. The discussions were required course assignments that each lasted for approximately 3-4 weeks and asked students to respond to a set of guiding questions for analyzing a case that dealt with ill-structured problems of practice in a typical elementary classroom. An ill-structured problem is one that has no single correct solution. There were only two online discussions in the course. The first case discussion focused on a teacher, Lee, who was trying to encourage one of her students, Rhonda, to read independently. The second discussion focused on a teacher who had twin immigrant girls in her class and was worried about the academic progress of one of them. To complete each discussion assignment, each student was required to post an analysis of the case based on the guiding questions, and then to respond to the posts of at least two group members.

Participants were divided into two groups of five students each, using purposive selection in order to ensure that they were comparable in terms of academic ability based on an ungraded, case discussion assignment that was conducted individually, on paper. This baseline case discussion was designed to be similar to the two online discussions and represented a typical ill-structured problem of practice in an elementary classroom.

Data Analysis

The literature review has shown that learning is a complex phenomenon that may be addressed and evaluated in a variety of ways. The analytic strategy that drove this study was theoretical (Yin, 2003). According to Yin, an analytic strategy in a case study assists the researcher in determining what data should be analyzed, drawing conclusions, eliminating other possible interpretations, and even in selecting data sources. The theoretical analytic strategy is drawn from sociometry and the idea of studying the process of group discussion rather than the outcomes or content. In other words, this study isn't looking at what the students had to say about the cases in the online discussion, nor is it looking at evidence of learning how to teach. Instead, this study explores how the group members interact with each other while completing the online discussion assignment. Given the nature and focus of the research question, a combination of quantitative and qualitative approaches to data analysis offered the best means to address this inquiry.

Quantitative data analysis.

In order to explore the question, to what extent are there stars, ghosts and isolates in online discussions, student interaction in each discussion was analyzed using content analysis (Neuendorf, 2002). One of the main differences between content analysis and qualitative data analysis is the emphasis on reliability (Neuendorf, 2002; Rourke, Anderson, Garrison, & Archer, 2001). Codes must be predetermined before analysis begins. Predetermined codes culled from the literature on sociometry were used in the coding process: stars, ghosts, and isolates. A percentage of interrater agreement was calculated based on a sample of the data that was coded by two raters. Interrater agreement was over 90%.

Descriptive statistics, mainly frequency counts, were used for analysis. The number of times each group member, or her idea, was mentioned in another group member's post was counted in order to determine stars, ghosts, and isolates. An idea was defined as a suggestion, recommendation, or insight, with the sentence being the unit of analysis.

Qualitative data analysis.

Qualitative analysis was used in order to explore the following questions: In what way might frequency of interaction relate to the perceived quality of posts? What other patterns of interaction can be found in an online discussion and how might they relate to opportunities for socially constructed learning? Data were read and reread to acquire a general sense of patterns and themes. Transcripts of the online discussions were coded in an iterative process. Coded data were analyzed with the aim of organizing codes into categories. Memos were written throughout the coding and interpretation process aiding in the identification of patterns, regularities, and themes.

Findings and Discussion

Question 1 : To what extent are there stars, ghosts, and isolates in the online discussions?

In the first case discussion the students offered a variety of analyses and ideas for the teacher, Lee. These ideas ranged from adding more structure to independent reading blocks and connecting to Rhonda's interests, to creative solutions such as asking Rhonda to help her younger siblings learn to read. In the second case discussion, students noted that the teacher was comparing one girl's academic success to the other, forgetting that children, even twins, develop at their own rates. They also suggested confidence building activities to encourage the shy sister to speak more.

Group 1 discussions.

As can be seen in Table 1, all Group 1 participants were involved in the first discussion. Heather and Mia were stars, frequently referred to by other posts. Heather was referred to four times by name and six times by idea only. Mia was referred to three times by name and four times by idea only. There were no ghosts or isolates; everyone was referred to by a group member's post at least once.

Table 1

Participant References in Group 1 Discussion 1

Student	Referred to by name	Referred to idea without name	Reference expressed support of idea	Reference expressed criticism of idea	Referred to neutrally
Heather	4	6	6	1	
Peggy	2	1	1		1
Nicole	1	0	1		
Mia	3	4	6	1	
Lisa	2	4	3	1	2

The second discussion for Group 1 also showed a variety of interaction. Again there were no ghosts or isolates; no one was ignored or singled out for criticism. As can be seen in Table 2, there were two stars in the discussion, and they were not the same stars from the first discussion. Peggy and Nicole accounted for most of the references. Peggy was referred to twice by name and eight times by idea. Nicole was referred to five times by name and nine times by idea.

Table 2

Participant References in Discussion 2

Student	Referred to by name	Referred to idea without name	Expressed support of idea	Expressed criticism of idea	Referred to neutrally
Heather	0	5	1	2	2
Peggy	2	8	4	3	0
Nicole	5	9	8	5	1
Mia	2	1	2		0
Lisa	1	1	1	1	

Group 2 discussions.

Group 2's discussions were also inclusive. Tables 3 and 4 show participant references in Group 2's first and second discussions. Lori and Ashley were stars in the first discussion, with five references to Lori and four to Ashley. The second discussion was even more active with three stars; Kelly and Lori were referred to five times each and Stacey was referred to four times. There were no isolates in either discussion, meaning there was no one singled out for a harsh, insensitive response. This is possibly due to student maturity and gendered concern for the feelings of others. As Guiller and Durndell (2006) found, women were more likely to express agreement than disagreement. There was, however, a ghost in the first discussion. Anne was not referred to by anyone in the first discussion.

Table 3

Participant References in Group 2 Discussion 1

Student	Referred to by name	Referred to idea without name	Expressed support of idea	Expressed criticism of idea	Referred to neutrally
Lori	5		5	0	
Stacey	1		1		
Kelly	2	1	2	1	
Anne	0				
Ashley	3	1	3		1

Table 4

Participant References in Group 2 Discussion 2

Student	Referred to by name	Referred to idea without name	Expressed support of idea	Expressed criticism of idea	Referred to neutrally
Kelly	2	3	5		
Anne	1	1	2		
Lori	1	3	4		
Stacey	2	1	3		
Ashley	1	1	2		

Question 2: In what way might frequency of interaction relate to the perceived quality of posts?

Group 1 discussions.

Although there were not ghosts or isolates in the first discussion, Nicole was only referred to once in her peers' posts. This could be because she posted all her responses at the same time. Her lack of presence in the discussion over time could have led the other participants to not see her as an active member of the discussion. In the second discussion, Nicole was referred to five times by others. Unlike the first discussion, Nicole posted her responses over time, making her an active participant in the second discussion. This supports the earlier conjecture that her low involvement in the first discussion's interactions may be attributed to her having posted all of her responses at the same time. The fact that there were no isolates in either of the discussions suggests that the group interacted in a constructive way without offering destructive critique. In addition, no one person dominated the discussions for the group. Stars in one discussion gave way to new stars in the other.

Group 2 discussions.

Anne was a ghost in the first discussion. Examination of Anne's posts in the first discussion revealed that she did not offer any new comments or suggestions to the conversation. Most responses that refer to other group members focused on a unique idea they introduced. Since Anne's original post was the last one posted, her ideas were not new. Everything she wrote, such as that Lee should continue to work with Rhonda and her parents, had already been discussed in other posts. In addition, all of Anne's responses expressed agreement with other ideas without adding anything new that might engender a response. In light of these findings it is not surprising that Anne was a ghost in the discussion. Anne's posts seemed more to serve the purpose of completing the assignment rather than contributing in a meaningful way to the discussion. The picture changed in the second discussion when Anne recommended self-esteem boosting ideas in her initial post. This was a new idea for the group and as a result Anne was referred to twice in the discussion, making her no longer a ghost in the discussion.

The analysis of interaction in the two groups shows the online discussions to be an inclusive mode of discourse that gave every student a voice. Every student was required to post, and every student did. The presence of the role of ghost or star related closely to the individual's contributions to the discussion. This suggests that the online discussions were not unduly influenced by external affective variables such as popularity and preexisting friendship. Had popularity been a factor, the interaction patterns would not have so closely aligned with the contribution of ideas to the discussion. Likewise, had friendships been a driving force, stars and ghosts would have remained similar in both discussions. Anne would not have been able to go from being a ghost in one discussion to being included multiple times in the second. There were no isolates in any discussion and the one ghost in one discussion was an active participant in the next discussion. This lack of a pattern favoring one star in a discussion or isolating one ghost supports the conclusion that contributions drove interaction in the discussion rather than popularity or friendship. If friendship or charisma had been the driving force of interaction a pattern of the same participants appearing as stars or ghosts would be expected.

Question 3 : What other patterns of interaction can be found in an online discussion and how might they relate to opportunities for socially constructed learning?

Referring to participants by name.

While analyzing the data to explore interaction patterns, some unanticipated themes emerged. An interesting theme in the discussions revolves around the use of names. For much of Group 1's first discussion, participants avoided using the names of other group members when referring to their ideas. Sometimes, as in the following example from Peggy's first response, the students used an anonymous term like "someone." Peggy wrote, "One suggestion was that peer pressure be applied as a method to get Rhonda interested" without naming Heather, who was the one who made that suggestion. Other students addressed ideas directly without referring to anyone at all as in the following quote from one of Heather's posts: "Though I recognize and sometimes think rhonda will grow out it. I, like lee's own sentiments, doubt if leaving rhonda alone during independent reading is such a good thing..." Heather was clearly responding to Lisa's suggestion that it may just be a phase Rhonda is going through, yet avoided mentioning Lisa at all.

It was not until Lisa joined the discussion that group members were mentioned by name. Lisa was the first to name whose idea she was responding to: "One idea presented by Peggy which involves incorporating Rhonda to read to her younger brother I think is a great way to develop this habit outside of the school setting." Nicole posted her first response after Lisa beginning, "I completely agree with you Heather." Peggy's and Mia's subsequent posts included names, but not for every reference. For the remainder of the semester, Group 1's online discussion posts frequently, though not always, mentioned members by name. Heather was the only group member that did not mention anyone by name during the entire first discussion.

In the second discussion, the participants continued to use names in their posts but only some of the time. Heather, Nicole, and Lisa, for example, each referred to a peer by name only once in the second discussion. There were far more references to ideas without naming the participant who suggested them. There were 10 named references altogether in the second discussion, but there were 23 unnamed references.

Three distinct patterns were found in the analysis of named references as opposed to unnamed references: direct responses to a post, ideas mentioned by more than one group member, and expressions of critique.

Direct response to another post.

The first naming pattern was when a participant seemed to be responding directly to a particular post, and the name was often, though inconsistently, omitted. A direct response to a post is indicated in WebCT by its use of threading. However, because the participants were not always aware of how their responses were threaded in WebCT, it is not enough to assume that a participant's post was a direct response to another post just on the basis of how it was threaded. The content of the post itself must imply that it is addressing a particular post rather than the whole discussion.

In the first discussion, Mia responded to Nicole's post on the use of reinforcements but did not use her name. Nicole wrote, "I think that reinforcement has been tried by Lee. Although it works for some students, it is not working for Rhonda." Mia's response clearly indicates that she was referring to Nicole's post even though she did not use Nicole's name: "I too feel that reinforcement may not be the best technique to use in order to get Rhonda to read." Mia did use Nicole's name when she later changed the topic to a different idea suggested by Nicole, further supporting that Nicole's name was omitted previously because it was a direct response. It is reasonable for participants to assume it would be clear to whom they are referring in a direct response to a particular post and would therefore omit the name. The omission of names in direct responses is frequent in these discussions, but there are cases where participants use names even in a direct response.

Ideas mentioned by more than one group member.

The second pattern of name use in the discussions was that when a participant was discussing an idea or comment mentioned by more than one participant, the names were often omitted. Peggy seemed to be speaking in a holistic sense when she wrote, "We seem to be mostly in agreement", and then, "I like the ideas of structuring Rhonda's reading time..." Also in the first discussion, Mia omitted names when she synthesized the responses she had read so far: "A couple of suggestions that seemed to run through several of the responses were to..." In the second discussion, however, she used names when she synthesized the responses so far. In the second discussion Lisa and Nicole both omitted names when referring to an idea discussed by more than one participant. It seems that some sort of group consciousness makes the need for names unnecessary when discussing ideas mentioned by the majority of group members. However, as Lisa's different use of names in summary posts in each discussion shows, this pattern is not consistent and there are a few examples of referring to individuals by name even for ideas discussed by many group members.

And critiques shall remain nameless.

The third and most consistent pattern was that when a participant was expressing some sort of critique of a peer's post, she always omitted the name. In the first discussion Peggy phrased a critique of Heather's suggestion to use peer pressure to encourage Rhonda to read without naming any names: "One suggestion was…I can understand your thought process, but I don't know if it will work…" Heather, in turn, omitted names when she disagreed with Mia and Lisa's suggestion that Rhonda may "grow out of" her disinterest in reading without naming names: "Though I recognize and sometimes think rhonda will grow out it. I, like Lee's own sentiments, doubt if leaving rhonda alone during independent reading is such a good thing because of the distraction she poses to other students."

In the second discussion, each member made at least one unnamed critiqued of a group member's idea. There was a total of seven unnamed references to a group member's post in the second discussion. Perhaps participants omitted names when critiquing ideas to keep the discussion polite. By not singling out a member by name, the critic created distance between her critique and the person whose idea with which she disagreed. By keeping critiques impersonal, participants may perceive them as less offensive, and perhaps less damaging to fragile egos. This behavior could also be an indication that participants, who are all women, are moving away from subjectivism, where all opinions are equally valid, toward a procedural way of knowing where there is an awareness that knowing requires a process of evaluation and interpretation (Belenky, Clinchy, Goldberger, & Tarule, 1997) but are not yet comfortable with the role of evaluating their peers' opinions.

Heather was unique in that she was the only person in the first discussion who did not mention a peer's name even once. At one point she even said "As was noted by some one (I forget who), it may be necessary to turn to other influences in Rhonda's life…" It is odd that Heather chose to omit the name and explain that she forgot it rather than just go back to the discussion and find the name of the person she was referring to. It could reflect laziness on Heather's part, or a simple lack of concern with the final form of her post. The text of the online discussion was easily accessible to her and would not have taken up much time. This could be an indication of the informal way participants viewed the online discussion assignments as opposed to the careful way they approached written assignments that were submitted.

Lisa, on the other hand, always mentioned names when referring to someone else's idea in the first discussion. In the second discussion both Heather and Lisa each mentioned only one other by name in her posts. All other references to peers' ideas were unnamed. While Heather's omission of names was fairly consistent, Lisa began referring to peers' ideas without naming them only in the second discussion. Each instance where Lisa omitted a name fit in with one of the patterns reported above. Of Lisa's seven unnamed ideas, four were in reference to a critique, and three referred to an idea shared by more than one participant. Of the three patterns of naming, direct response, group ownership, and critique, only expression of critique was consistently unnamed in both discussions.

Group 2's use of names in reference to each other's ideas varied somewhat from that of Group 1's. In the first discussion there were only two unnamed references to another group member's ideas. One of these references was a critique, fitting in with the most consistent pattern evident in Group 1's discussions. Stacey did not refer to Kelly by name when she disagreed with her suggestion that Lee not pressure Rhonda in regard to reading: "I don't know if easing pressure off of Rhoda and her mother in regards to the importance of reading is the best plan of action." On the other hand, because Stacey's post was a direct response to Kelly's, she could have assumed that it was clear to whom she was referring, fitting the pattern where names were omitted in direct responses to a post.

Limitations of Study

The main limitation of this study is the small number of participants. Because it is an exploratory self-study that focused on the learning of a single class in an authentic higher education setting, the number of participants was limited by the enrollment of students in that particular semester. However this limitation also served as a strength by allowing a more in depth exploration of the interactions involved.

The fact that the instructor is also the researcher may be perceived by some to be an additional limitation. However, objectivity and generalization were not goals of this exploratory study. Instead, student interaction patterns were studied from multiple perspectives to see what might be learned. In such studies, the researcher's insider status can be an asset. A major criticism of self-study research reflects a positivist epistemology noting self-study's lack of generalizability (Zeichner & Noffke, 2001). There are also issues of definition, methodology, and assumptions about the relationship between research and practice (Bullough & Pinnegar, 2001; Cochran-Smith & Lytle, 2004). In spite of such criticism, Cochran-Smith (2005) argues that such inquiry has "the potential to provide rich case studies and other close analyses of what teacher candidates learn, how they learn it, under what conditions, and how this learning is translated into professional practice" (p. 223).

Conclusions

Several conclusions arise from the examination of student interaction patterns in this study. Among this group of college students, interaction patterns showed the group discussions to be equitable and focused on content rather than popularity. Stars in one discussion were not necessarily stars in another. There were no isolates, and the only example of a ghost was limited to a particular context where the student hadn't contributed something new to the discussion. Online discussion in this case study appears to be an effective learning tool allowing all students to participate equitably. Additional research would be able to explore this more fully.

The findings of this case study support the findings of Daugherty and Turner (2003) suggesting that sociometric tools of analysis can provide insight into the social aspect of teaching and learning in higher education. Further research can replicate the design of this study with additional groups of students, for further insight into student interaction patterns. Given the research emphasizing the role of social dynamics in student interaction (Lee, 1999; Oliveira, Tinoca, & Pereira, 2011), sociometric analysis may be able to contribute to the literature.

The finding that students who did not contribute anything new to a discussion tended to be ignored, while those who offered new ideas and perspectives were referred to in subsequent posts, provides instructors with a valuable tool to support the learning of all students. By encouraging students to ensure their posts contribute to the discussion and by modeling how to do so, instructors can enable all students to be active participants in the discussion, thereby supporting student learning (Bain, 2004; Fink, 2003; Weimer, 2002).

It is interesting that every instance of a critique of an idea suggested by a participant was an unnamed reference. It seems that participants were uncomfortable critiquing their peers and avoided naming names in these cases. This aligns with literature that has found that women tend to perceive their roles as caring and empowerment of others which makes the expression of critique difficult (Belenky, Clinchy, Goldberger, Tarule, 1986). They have also been found to be generally more easily persuaded and tend toward consensus and closeness in conversations (Eagly, 1987; Guadagno & Cialdini, 2002; Tannen, 1990).

It could also be that participants viewed critiques as hurtful and tried to distance critique from the person. As individuals who chose to prepare for a career aligned with caregiving, they may be uncomfortable criticizing others' ideas. If expression of critique is more difficult for women, the option to critique namelessly in online discussion may encourage freer expression. Given similar findings by Guiller and Durndell (2006), further exploration of student interaction patterns and gender is recommended.

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THE INTERNATIONAL REVIEW OF RESEARCH IN OPEN AND DISTANCE LEARNING

University Faculty's Perspectives on the Roles of E-Instructors and Their Online Instruction Practice

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Abstract

Despite the rapid use of e-Learning in higher education, the beliefs of instructors about and their practices during online instruction have been seldom addressed. This study explores the role perceptions of e-instructors in higher education. In total, 106 instructors from 20 Taiwanese universities filled out a questionnaire. Analytical results indicate that "content expertise" and "instructional designer" are perceived by university faculty as the key components in e-instruction in higher education. A gap exists between ideal and practical roles of e-instructors in higher education. Role perceptions and role-based practices of e-instructors in higher education differ significantly in terms of gender and teaching experience. This study also provides suggestions for e-instructor training.

Keywords: Roles of e-instructor; online instruction; faculty's perceptions and practices; higher education

Introduction

Over the last decade, the number of colleges and universities offering e-Learning courses has increased dramatically, meaning that the number of faculty teaching online courses has also increased (Allen & Seaman, 2008; Aspden & Helm, 2004; Barker, 2003; Wallhaus, 2000; West, Waddoups, & Graham, 2007). As the number of online university courses is increasing rapidly, the awareness of the roles of e-instructors has also increased. Changes in the roles of e-instructors are particularly important when students engage in e-Learning (Barker, 2002; Denis, Watland, Pirotte, & Verday, 2004). Therefore, e-instructors now play a very important role in e-Learning success and face many new challenges in higher education (Davidson-Shivers, Salzaar, & Hamilton, 2005; Goold, Coldwell, & Craig, 2010; Hass & Senjo, 2004; Johnson, 2008; Keengwe & Kidd, 2010; McQuiggan, 2007; Morris, Xu, & Finnegan, 2005; Tao & Yeh, 2008).

Ryan, Scott, and Walsh (2010) proposed that e-instructors must be aware of issues associated with complex information. One primary challenge for e-instructors is to provide clear guidance during distance learning. In the conventional classroom, verbal and nonverbal communication delivers information and knowledge and helps students understand learning tasks. Changing communication modes requires e-instructors to adapt to e-Learning environments (Ryan, Scott, & Walsh, 2010). A large body of literature suggests that the roles of e-instructors may be more complex than those of traditional instructors (Baran, Correia, & Thompson, 2011; Barker, 2002; Bawane & Spector, 2009; Berge, 2001; Craig, Goold, Coldwell, & Mustard, 2008; Denis, Watland, Priotte, & Verday, 2004; Goodyear et al., 2001). Teacher beliefs typically encompass values, attitudes toward learning and learners, and conceptions of teacher roles and teaching practices. Therefore, information and knowledge about teacher beliefs are very important to improving instructional effectiveness (Farrell & Kun, 2008). However, most discussions of the relationship between teacher beliefs and teacher practices have focused on secondary and primary school teachers. Little attention has been paid to this relationship in the university or college context (Kane, Sandretto, & Heath, 2002). The online environment changes the fundamental nature of the interaction between the teacher, student, and content. Teachers are expected to adopt more facilitative approaches in online instruction; there is a strong need to require a re-examination of the roles teachers take and practice (Baran, Correia, & Thompson, 2011). Understanding what is lacking in online instruction is critical to help researchers and practitioners develop online programs and supports for e-instructors in higher education. Thus, this study attempts to answer the following questions : (1) Does a relationship exist between e-instructor beliefs about instructional roles and practices? (2) Do beliefs about the roles of e-instructors differ significantly? (3) Do online instructional practices of e-instructors differ significantly?

The New Faculty Roles in Online Instruction

As online instruction is becoming increasingly common, the importance of exploring challenges faced by e-instructors has increased dramatically. O'Neil (2006) argued that the role of an online instructor requires a paradigm shift in perceptions of instructional time and space, virtual management techniques, and ways of engaging students during e-Learning. Berge (2001) characterized the roles of e-instructors as (1) teaching, (2) socializing, (3) management, and (4) technology integrating. E-instructors are also expected to have the necessary technical, counseling, and facilitation skills to integrate technology and teaching to improve personal, active, and cooperative learning strategies. Ryan et al. (2000) proposed that the main role of online instructors is facilitator. E-instructors must facilitate the transition for students from the classroom to an online learning environment as well as guide students through the complexities of learning activities (Salmon, 2003). Goodyear, Salmon, Spector, Steeples, and Tickner (2001) demonstrated that the key roles of e-instructors are (a) process facilitator, (b) consultant/counselor, (c) assessor, (d) researcher, (e) content expert, (f) technician, (g) designer, and (h) manager/administrator. A process facilitator promotes a range of online activities that support student learning, particularly those associated with high-level thinking. A consultant/counselor advises or counsels students; an assessor grades student work and provides feedback; a researcher adds new knowledge to content areas; a technician makes technology decisions or choices to improve the e-Learning environment for learners; a designer designs learning tasks; and a manager must manage students to maintain successful online learning experiences. For example, e-instructors may promote online debates, identify controversial issues, and encourage discussion to generate additional evidence, and to summarize the discussion (Goodyear et al., 2001). Spector and de la Teja (2001) suggested that e-instructors must have the ability to manage learner time for reflection, keep discussions active, and organize discussions for use in curricula. Denis, Watland, Pirotte, and Verday (2004) defined the e-instructor profession via seven roles—content facilitator, metacognition facilitator, process facilitator, advisor/counselor, assessor, technologist, and resource provider. They considered these roles essential for delivering online courses. Bawane and Spector's (2009) study proposed the roles of e-instructor include professional, pedagogical, social, evaluator, administrator, technologist, advisor/counselor, and researcher. Similarly, Guasch, Alvarez, and Espasa (2010) reported that instructors play the multiple roles of design/planning, social, instructive, technological, and management in online environments. Notably, these roles and those proposed by Goodyear et al. (2001) are similar.

Moreover, Taiwan's e-Learning Service Certification program (Chen, 2009) identified 27 benchmarks considered essential to ensure excellence in online instruction. These benchmarks were distilled from the most popular strategies employed by colleges and universities, and they were divided into eight criteria, including (1) learner support, (2) faculty support, (3) curriculum development, (4) instructional design, (5) instructional process, (6) organizational support, (7) technology, and (8) assessment and evaluation. With respect to the quality of e-learning courses, the seven dimensions of e-instructors' beliefs about roles and practices are related to the eight criteria in Taiwan's e-Learning Service Certification program. Therefore, the professional development for e-instructors was designed in accordance to the criteria for the design of training actions in virtual learning environments. In terms of professional development, issues of pedagogical intent and the selection of appropriate teaching and learning technologies appear to be greater concerns in the arena of quality online learning.

Personal Background Characteristics

Many studies have identified differences in attitudes toward technology use based on gender, age, and education level (Ahadiat, 2005; Sieverding & Koch, 2009). Females, the elderly, and those with low education levels had poorer attitudes toward technology than males, the young, and the highly educated, respectively (Ahadiat, 2005). Several studies demonstrated that male teachers are typically more interested in technology use in the classroom than female teachers (Ahadiat, 2005; Vekiri, 2010). Additionally, female faculty typically use computers less and have more negative attitudes toward computer use than males (Crooks, Yang, & Duemer, 2003; Mitra, Lenzmeier, Steffensmeier, Avon, Qu, & Hazen, 2000; Zhou & Xu, 2007). Conversely, studies by Schifter (2002) and Fatt (2003) demonstrated that female teachers have significantly better attitudes toward technology than males. Furthermore, Meyer and Xu (2009) indicated that the teaching load remains consistent and a relatively strong relationship exists between teaching load and technology use by faculty.

According to Schifter (2002), faculty rank (i.e., lecturer, assistant professor, associate professor, and full professor) significantly impacts technology use. Status is important in academia as rights, privileges, and pay are commensurate with status. Lecturers are typically concerned about the compatibility of technology and instructional material. Further, administration exerted greater pressure on lecturers than status. These analytical results suggest that before hiring temporary teachers, lecturers, university managers, or program directors, a candidate’s technical and computer skills should be assessed in relation to the overall goals and expectations of a university. Zayim, Yildirim, and Saka (2006) also noted that faculty rank and computer use self-efficacy are the two most powerful predictors of technology adoption. They demonstrated that faculty members with a rank lower than professor and faculty whose self-efficacy is strong are most likely to be early technology adopters. Moreover, appropriate levels of technical and administrative support must be provided to all teachers (Schifter, 2002).

Research Methodology

Participants

Based on data from Taiwan’s Ministry of Education (MOE) (2008a), 68 universities offered 857 blended e-Learning courses via an e-Learning platform (e.g., WebCT or Moodle). This study randomly sampled roughly one-third of Taiwan’s e-instructor population. That is, this study surveyed 277 instructors from 20 universities in Taiwan with experience teaching online courses. All subjects were asked to answer a questionnaire. The questionnaire and cover letter were distributed to subjects by researchers via mail. Confidentiality was guaranteed. In total, 106 instructors completed the questionnaire. Seven questionnaires lacking some responses were eliminated, leaving 99 valid questionnaires, for a valid response rate of 39.6%. Briefly, the ratio of male faculty to female faculty was about 67% and the ratio of assistant professors to full professors was about 64% in Taiwan (MOE, 2008b). Similarly, most instructors in this study were male (63%). Roughly, 22% of respondents were full professors, 35% were associate professors, and 20% were assistant professors. Most instructors (82%) received little or some training support, while 25% of instructors received sufficient training and support for online instruction.

Instrument

Data were collected via the questionnaire. The questionnaire, consisting of three parts, included (a) demographic information, (b) perceptions of e-instructor's roles, and (c) practices of e-instructor's roles. The Perceptions and Practices of E-Instructors toward Online Instruction Questionnaire (PPEOIQ) (see Appendix) in this study was defined using seven dimensions, namely, (a) instructional design (e.g., "I can design assignments to enhance students' interactions"), (b) facilitating learning (e.g., "I can facilitate participants' discussion and help them focus on the related learning goals"), (c) learning assessment (e.g., "In order to match the course instructional goals, I can plan appropriate evaluation formats"), (d) technology use (e.g., "According to instructional goals, I can choose technology appropriately for my online course"), (e) administrative management (e.g., "I can meet with e-tutors regularly in order to ensure the online instruction well-quality", (f) content expertise (e.g., "I can prepare my instructional material in advance in order to deliver content to participants"), and (g) research development (e.g., "Based on instructional pedagogical theories, I can develop research issues related to the online instruction"). Responses to each item associated with each dimension were on a four-point Likert scale, ranging from 1 for "strongly disagree" to 4 for "strongly agree." Demographic information collected were gender, teaching field, and years of teaching experience. For perceptions of online instruction (45 items), participants were asked to indicate their belief on the importance rank order of online instruction roles of e-instructors. For online instruction practices (45 items), participants identified their practices, priorities, and online instruction roles of e-instructors.

Survey questions were created utilizing literature review research. A panel of experts (six e-learning experts with more than five years of experience) was asked to review the instrument for content and face validity. To enhance the validity of the instrument, the instrument was pilot tested with a group of 25 teachers with online teaching experience from one university. The value of the Cronbach's α for each dimension was high (0.72-0.89). The overall alpha reliability coefficients for the perceptions and practices of e-instructors toward the online instruction questionnaire (PPEOIQ) were 0.96 & 0.97.

The alpha reliability coefficients suggest that the questionnaire has acceptable internal consistency.

Design and Data Analysis

Data of the perceptions and the practices of e-instructor's roles were analyzed using descriptive statistics and sorted by the means. Pearson's correlation was performed between the perceptions and the practices of e-instructor's roles. T-test was conducted for gender on each dimension of the perceptions and the practices. One-way ANOVA was run for faculty rank, online instruction experience, training support, and teaching load on each dimension of the perceptions and the practices. LSD was performed as the post hoc analysis. Statistical tests were performed using an alpha of .05.

Results

Descriptive statistics show that the ranked importance for the seven e-instructor dimensions was (1) content expertise, (2) instructional design, (3) learning assessment, (4) administrative management, (5) facilitating learning, (6) technology use, and (7) research development (Table 1). In other words, participants believed that content expertise (M = 3.52), instructional design (M = 3.45), and learning assessment (M = 3.24) were the most important roles for e-instructors of online courses. Technology use (M = 3.15) and research development (M = 3.16) were the least important roles for e-instructors. Furthermore, analytical results show that the ranked order by the basis of the mean for practices for these seven e-instructor dimensions was (1) content expertise, (2) administration management, (3) instructional design, (4) technology use, (5) learning assessment, (6) research development, and (7) facilitating learning. Pearson's correlation coefficient provides strong evidence that the importance of an e-instructor's role and the actual e-instructor's role in online instruction practices were moderately correlated (r = .47–.70).

Table 1

Pearson's r between Perception and Practice of E-Instructors toward Online Instruction

Dimension	Perception			Practice			
	Mean	SD	Rank	Mean	SD	Rank	Pearson's *r*
Instructional design	3.45	.34	2	3.00	.49	3	.58**
Facilitating learning	3.19	.49	5	2.64	.63	7	.67**
Learning assessment	3.24	.41	3	2.85	.59	5	.60**
Technology use	3.15	.48	6	2.91	.61	4	.47**
Administration management	3.20	.49	4	3.05	.63	2	.61**
Content expertise	3.52	.44	1	3.22	.56	1	.66**
Research development	3.16	.50	7	2.80	.66	6	.70**
Total	3.28	.37		2.92	.49		.67**

** $p < 0.01$

Gender

Statistically significant differences existed between male and female e-instructors in their perceptions toward the roles of e-instructors (Table 2). Results of *t*-tests in all the seven dimensions (instructional design, facilitating learning, learning assessment, technology use, administration management, content expertise, and research development), the mean scores for perceptions of female e-instructors (3.61, 3.42, 3.41, 3.34, 3.44, 3.64, and 3.36 respectively) were significantly greater than those of males (3.34, 3.06, 3.15, 3.04, 3.08, 3.43, and 3.08 respectively).

Statistically significant differences existed between male and female e-instructors in their practice of e-Learning instruction (Table 2). Except for technology use, results of *t*-tests show the mean scores for practices of female e-instructors (3.25, 2.91, 3.06, 3.31, 3.39, and 3.01 respectively) were significantly greater than those of males (2.88, 2.48, 2.72, 2.92, 3.13, and 2.70 respectively) in instructional design, facilitating learning, learning assessment, administration management, content expertise, and research development.

Table 2

Perception and Practice between Male and Female E-Instructors toward Online Instruction

	Perception			Practice		
Dependent variables	Male (n=62) M(SD)	Female (n=35) M(SD)	t(95)	Male (n=62) M(SD)	Female (n=35) M(SD)	t(95)
Instructional design	3.34(.32)	3.61(.33)	3.96***	2.88 (.47)	3.25 (.43)	3.93***
Facilitating learning	3.06(.43)	3.42 (.50)	3.55***	2.48 (.53)	2.91 (.71)	3.38***
Learning assessment	3.15(.37)	3.41 (.44)	3.23***	2.72 (.55)	3.06 (.60)	2.80**
Technology use	3.04 (.47)	3.34 (.43)	3.09***	2.87 (.56)	3.01 (.70)	1.15
Administration management	3.08 (.46)	3.44 (.47)	3.64***	2.92 (.63)	3.31 (.56)	3.01***
Content expertise	3.43 (.43)	3.64 (.42)	2.30*	3.13 (.54)	3.39 (.56)	2.29*
Research development	3.08 (.44)	3.36 (.54)	2.59**	2.70 (.61)	3.01 (.71)	2.24*

* $p < .05$. ** $p < .01$. *** $p < .001$

Faculty Rank

Notably, no statistically significant difference existed between e-instructors' ranks of perceptions toward e-instructor roles and practices using one-way ANOVA. The results show that e-instructors with different ranks have the same perceptions and practices about the roles of e-instructor. In perception, full professor reported the highest mean scores on content expertise (M = 3.48), instructional design (M = 3.46), learning assessment (M = 3.30), administration management (M = 3.27), technology use (M = 3.14), facilitating learning (M = 3.22), and research development (M = 3.21), while assistant professor reported the highest mean scores on content expertise (M = 3.65), instructional design (M = 3.35), learning assessment (M = 3.15), technology use (M = 3.13), administration management (M = 3.12), facilitating learning (M = 3.08), and research development (M = 2.96).

In practice, full professor reported the highest mean scores on content expertise (M = 3.27), administration management (M = 3.16), instructional design (M = 3.08), technology use (M = 3.03), research development (M = 2.93), learning assessment (M = 2.88), and facilitating learning (M = 2.70), while assistant professor reported the highest mean scores on content expertise (M = 3.28), instructional design (M = 2.94), administration management (*M* = 2.88), technology use (*M* = 2.86), learning assessment (*M* = 2.70), research development (*M* = 2.56) , and facilitating learning (*M* = 2.49).

Online Instruction Experience

Regarding the perceptions of online instruction, a significant difference existed among e-instructors with different experiences in ‘Facilitating learning’ dimension (Table 3). Additionally, regarding the practices of online instruction, a significant difference existed among e-instructors with different experiences in ‘Facilitating learning dimension (Table 4) in one-way ANOVA and LSD as post hoc analysis method.

Table 3

Perceptions of Different Experiences of Online Instruction

Dependent variables	Less than 1 yr(n=18) M(SD)	1 to 2 yrs (n=15) M(SD)	2 to 3 yrs (n=17) M(SD)	3 to 4 yrs (n=20) M(SD)	> 4 years (n=27) M(SD)	F(5,91)	LSD
Instructional design	3.48 (.39)	3.51 (.35)	3.38 (.39)	3.52 (.30)	3.35 (.30)	0.96	
Facilitating learning	3.32 (.51)	3.42 (.42)	3.22 (.55)	3.25 (.44)	2.94 (.42)	2.56*	1>5;2>5; 4>5
Learning assessment	3.32 (.53)	3.33 (.42)	3.22 (.42)	3.28 (.33)	3.16 (.37)	0.55	
Technology use	3.26 (.66)	3.16 (.50)	3.17 (.42)	3.18 (.39)	3.08 (.49)	0.30	
Administration management	3.43 (.52)	3.19 (.52)	3.16 (.51)	3.28 (.48)	3.10 (.47)	0.97	
Content expertise	3.66 (.41)	3.60 (.36)	3.46 (.45)	3.53 (.42)	3.39 (.47)	1.00	
Research development	3.14 (.59)	3.22 (.39)	3.13 (.52)	3.21 (.51)	3.20 (.52)	0.15	

* $p < .05$; 1=less than one year; 2=one to two years; 3=two to three years; 4=three to four years; 5=more than four years

Table 4

Practice of Different Experiences of Online Instruction

Dependent variables	Less than 1 yr(n=18) M(SD)	1 to 2 yrs (n=15) M(SD)	2 to 3 yrs (n=17) M(SD)	3 to 4 yrs (n=20) M(SD)	> 4 years (n=27) M(SD)	F(5,91)	LSD
Instructional design	3.18 (.52)	3.14 (.45)	2.97 (.49)	3.10 (.55)	2.86 (.40)	1.48	
Facilitating learning	2.85 (.72)	2.88 (.58)	2.58 (.75)	2.76 (.70)	2.38 (.40)	2.29*	1>5; 2>5; 4>5
Learning assessment	2.98 (.59)	2.85 (.65)	2.74 (.67)	3.03 (.63)	2.78 (.39)	1.68	
Technology use	2.95 (.65)	2.95 (.57)	2.97 (.50)	2.98 (.68)	2.95 (.57)	2.14	
Administration management	3.24 (.67)	2.95 (.66)	3.01 (.69)	3.34 (.61)	2.95 (.50)	2.12	
Content expertise	3.41 (.65)	3.28 (.41)	3.21 (.50)	3.25 (.61)	3.16 (.52)	1.16	
Research development	2.84 (.68)	2.85 (.45)	2.81 (.68)	2.86 (.70)	2.83 (.69)	0.75	

*$p<.05$; 1=less than one year; 2=one to two years; 3=two to three years; 4=three to four years; 5=more than four years

Training Support

Regarding the perception of online instruction, no significant difference existed among e-instructors with different levels of training support in each dimension. However, regarding the practice of online instruction, significant differences existed for instructional design, learning assessment, and technology use among e-instructors with different levels of training support (Table 5) by the results of one-way ANOVA and LSD. The analytical result indicates that e-instructors who received enough training support performed better in the dimensions of instructional design, learning assessment, and technology use than e-instructors who receive some or little training support.

Table 5

Practices toward Online Instruction among Different Training Support

Dependent variables	Little (n=19) M(SD)	Some (n=53) M(SD)	Enough (n=25) M(SD)	F(2, 94)	LSD
Instructional design	2.88 (.37)	2.95 (.55)	3.24 (.34)	4.00*	3>1; 3>2
Facilitating learning	2.50 (.31)	2.61 (.72)	2.78 (.60)	1.20	
Learning assessment	2.63 (.37)	2.81 (.65)	3.09 (.52)	3.70*	3>1; 3>2
Technology use	2.59 (.47)	2.88 (.62)	3.26 (.53)	7.64**	3>1;3>2
Administration management	2.92 (.45)	3.02 (.67)	3.25 (.65)	1.76	
Content expertise	3.30 (.51)	3.13 (.61)	3.36 (.47)	1.68	
Research development	2.72 (.49)	2.72 (.72)	3.07 (.58)	2.67	

*p < .05. **p < .01; 1= Little; 2= Some; 3= Enough

Discussion

This study investigated (a) the relationships between e-instructors' beliefs about roles and practices about online instruction, and (b) differences in perceptions and practices of online instruction among different e-instructors (e.g., gender, rank, experience, and training). The major findings are summarized as follows.

E-instructors considered 'content expertise' and 'instruction designer' as the two most important roles of e-instructors. Meanwhile, e-instructors ranked content expertise and administration management as the top two highest places as they performed e-Learning instruction. Surprisingly, e-instructors ranked 'administrative manager' as the fourth most important role; they ranked 'administrative manager' as the second highest place in their practice of online instruction. The administrative manager role comprises carrying out the pedagogical tasks related with course management, including establishing rules and regulations, student registration, and recordkeeping (Baran, Correia, & Thompson, 2011; Guasch, Alvarez, & Espasa, 2010). This may indicate that e-instructors spent considerable time on administrative work while they taught online courses, due to the shortage of institution administrative supports (i.e., technical support for e-Learning platform or teaching assistant).

Moreover, e-instructors considered 'learning assessor' as the third most important role; they ranked 'learning assessor' as fifth place in their practice of online instruction. Furthermore, 'learning facilitator' was scored lowest for e-instructors perception, while they ranked it as the fifth most important role in their practice of online instruction. We are aware that today e-instructors face a growing demand from students to offer a more flexible, technology-enriched course delivery and they also face the pedagogical challenges to design innovative learning environments, which integrate technology enhancing students learning. In fact, it is the highest priority to redesign and rethink faculty multidimensional roles to be addressed in professional development programs to prepare to teach in online environments (Bawne & Spector, 2009; Guasch, Alvarez, & Espasa, 2010).

Experimental results also indicate that female e-instructors are statistically significantly higher than male e-instructors in their perceptions toward the roles of e-instructors and in their practices of e-learning instruction, except for technology use. This finding is in conflict with the finding obtained by Ahadiat (2005), but consistent with Schifter (2002) and Fatt (2003) indicating that female e-instructors may be more motivated and committed to online teaching. On the other hand, analytical results reveal that no significant differences existed between different e-instructor ranks, meaning that e-instructor position does not affect their perceptions of, and practices during, online teaching.

Further, experimental results indicate that perceptions and practices associated with facilitating learning by e-instructors with a half year to four years of experience in teaching online were significantly different than those of e-instructors with more than four years of experience. One can infer that e-instructors with more than four years of experience had more online facilitating experiences with students and paid relatively more attention to other aspects of online instruction, such as instructional design, than facilitating learning.

No significant differences existed in e-instructor perceptions among those with different training support. However, significant differences existed in their practices. E-instructors with sufficient training support rated instructional design, learning assessment, technology use, and research development practices higher than did those with little or only some training support. This analytical result is in agreement with those of Arinto (2013), Munoz Carril, Gonzalez Sanmamed, and Hernandez Selles (2013), and Spector and de la Teja (2001) revealing that faculty-perceptions at the onset of a transition process from traditional classroom instruction to online teaching reflected a need for comprehensive faculty training.

In general, in addition to the content expertise, the top three prioritized roles for e-instructors were administration management, instructional design, and technology use while e-instructors perform online instruction. Additionally, significant differences existed between genders and among different experience levels in online teaching and different amounts of training support. Although many studies have underscored the importance of a teacher's role in e-Learning, few empirical studies have investigated problems faced by teachers in their online roles. Based on the study of Nelson and Thompson (2005), faculty time, reward, workload, lack of administration support, cost, course quality, and equipment concerns are considered barriers to online teaching practices. Administrators must be aware of the fact that instructional and technical training and support are important influential factors in online teaching.

Conclusions

The study findings enhance our understanding of the relationships between e-instructor perceptions of the importance of their roles and practices in online instruction. Overall, analytical results indicate that strong correlations exist between e-instructor perceptions and practices in each role (i.e., instructional designer, facilitator, assessor, technology integrator, administrative manager, content expert, and researcher). Among the seven dimensions, e-instructors perceived content expert and instructional designer as the most important roles during online instruction. Furthermore, mean scores for perceptions were higher than mean scores for practices for all roles. Experimental results indicate that a gap still exists between perceptions and practices as they relate to online instruction.

When this study was carried out, training was another issue for those who have and have not taught online. Without sufficient training, most faculty would not attempt to teach online (Daily, 2000; Fish & Gill, 2009; Nelson & Thompson, 2005). In this study, e-instructors with sufficient training scored practices higher than those with little or no training. Thus, it is important to note that routine training programs (i.e., basic computer skills) are not sufficient for the professional development of e-instruction practitioners. Munoz Carril, Gonzalez Sanmamed, and Hernandez Selles (2013) also pointed out facilitating students participation is what faculty identify as their greater training need in virtual learning environments. Based on the research participants' descriptions of their course design practices, it is clear that professional development in e-learning is a complex process that requires continuous engagement in instructional design work, critical reflection, and facilitation. Thus, training in course design should be integrated in faculty development programs in e-Learning to promote teacher empowerment and with appropriate and effective administrative and technology supports.

For individual differences in the seven dimensions of e-Learning instruction practices, female e-instructors expressed significantly more positive value beliefs and practices than males. This notable finding runs counter to the stereotypical impression of gendered difference in technology usage in higher education. Future research may identify the underlying factors that influence the perceptions of online instruction and online instruction practices of female e-instructors, such that appropriate strategies or interventions can be designed to enhance online instruction quality. Additionally, why the perceptions and practices of e-instructors with different online instruction experiences varied warrants examination. Future work also needs to be undertaken on improving the training support to prepare teachers to teach online.

The information obtained through this research study is highly relevant at both a local and a global level. We also hope that our study contributes to enrich the knowledge available on the roles of the e-instructors performing online teaching, whichthey may need to carry out their responsibilities and tasks. The limitations of this study are the fact that the sample size was somewhat small and their generalizability may be limited.

Secondly, the data sources came from self-reported questionnaires. Alternative research methods like interviews could be combined with a survey in a future study.

Acknowledgement

This study was partially supported by the National Science Council, Taiwan, under grant numbers NSC 100-251-S-032-003-MY3.

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Appendix

The Perceptions and Practices of E-instructors toward Online Instruction Questionnaire (PPEOIQ)

Dimension	Item questions
(A) Instructional design (4 items)	a1. I can design assignments that stimulate students' critical thinking skills. a2. I can design assignments to enhance students' interactions. a3. I can develop diverse group activities to enhance students' collaborative group works. a4. I can develop learning objectives for lectures.
(B) Facilitating learning (8 items)	b1. I can design online social activities for participants to know each other quickly. b2. By asking questions, I can encourage participants to share their thoughts. b3. I can facilitate participants' discussion and help them focus on the related learning goals. b4. I can summarize and provide participants' viewpoints from discussion forums to enhance their deeper learning and reflections. b5. I can view and respond to questions (privately and publicly) submitted by participants. b6. I can facilitate participants to form an online learning community. b7. Using the LMS, I can monitor participants' collaborative group works. b8. I can understand online participants' expectations and needs.
(C) Learning assessment (6 items)	c1. I can set a clear policy on instructor responses and evaluation times. c2. I can provide feedback to participants' individually about their learning progress. c3. Within the course schedule, I can use the LMS tools to monitor participants' learning progress. c4. In order to match the course instructional goals, I can plan appropriate evaluation formats. c5. I can use devise strategies to evaluate participants' learning outcomes. c6. I can set a clear criteria rubric on assignments to students.
(D) Technology use (8 items)	d1. I can tell differences with traditional instructional media and online technology media. d2. I can understand the limitations and functionalities of technology, platform, and information infrastructure. d3. I am proficient in using e-learning multimedia and the LMS tools. d4. According to instructional goals, I can chose technology appropriately for my online course. d5. I can offer/update consistency in delivery of information across courses. d6. In order to ensure online participants' learning efficient, I can set a clear computer technology requirement guideline for them. d7. In order to solve online participants' technical questions, I can provide the technical support guidelines for them. d8. I can set a clear policy on respect copyright guidelines for online participants.
(E) Administration Management	e1. I can stay tune in with distance education office staffs regarding online course enrollment issues (such as course credit, dropout ratio.).

(6 items)	e2. I can provide the course syllabus for online participants to keep their learning path. e3. I can provide technical instructions clearly before participants have access to the LMS. e4. I can meet with e-tutor(s) regularly in order to ensure the online instruction well-quality. e5. In order to keep the LMS communication tools effectively, I can get good supports from e-learning technical staffs. e6. I can set a clear policy on online etiquette and content with course discussion board and synchronous tools.
(F) Content expertise (4 items)	f1. I can prepare my instructional material (handouts, presentation, etc) in advance in order to delivery content to participants. f2. I always update online learning resources to participants. f3. I can enhance my professional knowledge and skills about e-learning. f4. In order to reinforce my professional development, I am willing to join scholarship communities.
(G) Research development (4 items)	g1. I can evaluate the validity and currency of online learning materials. g2. After analyzing students' online learning activities, I can improve my instruction. g3. I can collect research information about online instruction in order to update my instruction material. g4. Based on instructional pedagogical theories, I can develop research issues related to the online instruction.

First Steps Towards a University Social Network on Personal Learning Environments



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Abstract

The evolution of the media and the Internet in education today is an unquestionable reality. At the university level, the use of Web 2.0 tools has become increasingly visible in the new resources that professors have been incorporating both into the classroom and into their research, reinforcing the methodological renewal that the implementation of the EHEA has demanded. The aim of this article is to introduce DIPRO 2.0, an educational social network for university professors to develop their training in the area of personal learning environments through collaborative learning and production of knowledge.
Keywords: Networks; university professor; university; Web; Internet; mass media; personal learning environments; Web 2.0 tools.

Introduction

Human beings are communicative by nature. From the time we become aware of our own existence we wish to communicate, to interact with our fellow humans, as we are social beings who seek contact, connection, and closeness. This search for communicative relationships also implies a desire to be informed. The need for knowledge as well as an awareness of what occurs both in our immediate surroundings and in the world is an inherent quality of humanity that has become increasingly prevalent as information and communication become more globalized.

The mass media have played an important role in this development to the point where they have become, as pointed out by Prado (2001), one of the features that characterize modern society; it is important to be aware that the reality that characterizes our lives at this time is one in which the mass media have seized control of our lives. As Marin (2006, p. 193) indicates,

> Information has been, is and will be one of the biggest tools in the world of communication. The reason for this reality is simple and straightforward: it helps us to change and/or improve our knowledge of our environment, in addition to the location and perception of the world of communication.

We share with Rodríguez Izquierdo (2005) and Malita (2011) the idea that today we live a technological reality that, on the one hand, has multiplied the channels by which individuals establish and maintain communicative relationships and, on the other hand, has modified the way in which we communicate. Information and communication technology (ICT) has become the basic pillar in the construction of new learning processes, overcoming teachers' and researchers' past worries of its slow incorporation into education (Lei & Morrow, 2010).

Today we find authors like Smeets (2004) who describe ICT as "powerful" given that it provides the individual and the community with a large number of opportunities to access information and, as a consequence, learning, making this process more effective (Chitiyo, 2011). More specifically, Tu et al. (2012, p. 13) speak of Web 2.0 technology as empowering learners to "create, share, and organize their personal learning environments in open network environments".

Today, it is inconceivable to speak of ICT as separate from the social, political, economic and educational dynamic, due to the rapid development of information technology and telematics. This article focuses on the area of education and the importance of ICT in the teaching-learning process. In this sense, a study by Cheung, Chiu, and Lee (2011) on student use of online social networking sites points out the importance of this phenomenon for the academic community since the use of these sites tends to increase motivation as well as a more active and collaborative approach to learning.

The incorporation of ICT to the university educational platform in general and to university classrooms in particular demands a new way of designing the teaching-learning process. The methodology presented from this new perspective should favor the continuous exchange of ideas, as well as collaborative work strategies. In this process, group interaction and exchange of experiences (Ortíz, 2006; Davoli, Monari, & Eklund, 2009) as well as the content shared among members of the university institution is a constant variable. With the European Higher Education Area (EHEA) now in place, the challenge that university communities have to face in this new panorama, which is by no means limited to the European educational community, is the presence of the Internet in all areas of its members' lives.

Salinas (2004) pointed out that ICT based learning had and has two approaches: one technological and the other methodological. The first is based on the idea of the sophistication of technological environments, oriented towards the building of knowledge, and the second combines the perspective of the student body, the technology used and the organization of the teaching-learning process. At present, one of the identity descriptors of higher education institutions is the search for quality in all its processes. In light of this, we consider that both approaches should be combined into one, given that the development of technology determines the growth and production of quality teaching and learning.

As a consequence, teachers must know "what ICT classrooms are like and what they should be like, their role in learning (in education), what ICT in society is like and what it should be like, and its role in education (and in learning)" (Gutiérrez, 2007, p. 152).

Web 2.0 Tools: Social Networks

Working with the Internet is a great adventure because of its rapid growth and the many tools incorporated into it. As indicated by Cabero (2006, p. 8), "the Internet has progressively changed from being a depositary of information to converting into a social instrument for the elaboration of knowledge". The Internet provides us with free, global communication, thus its flexibility will benefit an adaptable training that adjusts to the educational processes that occur, in this case, in university teaching. The growth of the Internet comes hand in hand with the design and redefinition of its tools which give it meaning as a communicative instrument. All these tools provide, in different measure, the possibility of communicating with others and/or keeping informed about events in the world. From the point of view of the communication of information, the use of the Internet for education has as its main advantages the speed with which the information is transmitted, the diversity of sources, and the overcoming of time and space barriers, among others. However, one must also consider the possible disadvantages, which must be kept in mind when including it in the teaching and research routine of university teachers and students. These include the difficulty some people have of accessing the

Internet (Rodríguez Izquierdo, 2005), a lack of knowledge of linguistic codes generated by some tools, for example, the case of emoticons used in Messenger.

Web 2.0 tools, as well as their medium the Internet, are growing at a vertiginous rate. Each year, new proposals arise that are incorporated into the already long list of Web 2.0 tools, for example, new ways of creating blogs, wikis, social markers, content syndicators, information managers, conceptual map generators, to mention just a few. At present, there are more than 3,000 digital tools at society's service (Marín & Reche, 2011a). Due to the speed with which this technology has evolved, both from Web 1.0 to Web 2.0 and within the vast number and variety of Web 2.0 tools, members of educational institutions have had to relearn both its work structure and its presentation or interface as well as attempting to diversify its contents or utilities as previous tools have either been brought up to date or have disappeared.

When we speak of Web 2.0 tools we must go beyond the simple idea of communication instruments. If we talk of blogs, for example, we must have in our minds the word 'dialogue', if we talk of wikis, the word 'collaboration', of podcasts, the phrase 'democracy of expression', and so on. Hence, Web 2.0 tools are more than simple work tools; they are generators of relationships, knowledge, attitudes, values, and new ways of teaching. "Web 2.0 has become synonymous with a more interactive, user-generated, and collaborative Internet instrument" (Tu et al, 2012, 13) which reflects a different way of seeing and understanding what happens around us. The role of this technology, as much in the area of education as in the social realm, is according to Tinmaz (2012, p. 235) "to provide a network of people who connect to each other wherever and whenever they need information." The study carried out by Holcomb and Beal (2010) points out that Web 2.0 tools are a vehicle for the students to develop their learning, basing this learning on the development of curiosity and creativity. Along these lines, teachers must integrate those Web 2.0 tools that they consider most useful into their daily class routine, but in order to do this, teachers need not only to be digitally prepared but also to attempt to incorporate them, given that they allow for

1. a reduction of costs and movement;
2. enabling and promotion of collaborative work through cooperative groups;
3. the expansion of information available to the student as well as its continual updating;
4. the facilitation of autonomy;
5. better control of the educational progress of students;
6. the promotion of a multi-channeled, multi-media education;
7. the encouragement of interaction with group members;

8. the facilitation of new content building;

9. enabling increased synchronous and asynchronous communication;

10. the increase of students' self-esteem as they advance;

11. flexibility (Ródriguez, Borges, González, Hernández, & Acosta, 2003; Cebrián, 2003; Cabero, 2006; Gallego & Alonso, 2007).

Using Web 2.0 tools in education today is not a new proposal, but rather a reality to the point where expressions such as Education 2.0 (Cabero, 2009) and University 2.0 (Hartman, Dziuben, & Broph-Ellison, 2007) are becoming increasingly more common. Of all the tools available, social networks are gaining great importance at a personal as well as a professional level. Speaking today of social networks implies a new way of understanding, seeing, and perceiving communication between individuals, which has and will have as many critics as supporters.

Before going into more depth in pinpointing the reasons that justify the use of social networks for education, we believe it necessary to offer a conceptual approximation of what we understand about social networks at a general level in order to delimit the term within the field of education.

The encyclopedia Wikipedia understands social networks as "social structures composed of a group of people who are connected by one or various types of relationships such as friendship, kinship, common interest or people who share knowledge". From this conceptualization we can determine the features that characterize it and that, in consequence, make it adaptable, versatile and attractive to the general public, and that offer the possibility of interaction with other people. Social networks help to avoid isolation, and encourage plurality; they are an open system under constant construction. The tools or components they usually include are designed for this; for example, the friends lists and wall space allow for communication with other users.

According to Boyd and Ellison (2007, p. 211) these sites are

> web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system. The nature and nomenclature of these connections may vary from site to site.

The connections formed on social networks "provide a context for the implementation of Connectivism" which "explains learning in terms of interactions on a network where the learners exchange their knowledge" (Tinmaz, 2012, p. 234). In this sense, social networks are important for maintaining connections among people in different areas while constructing or updating knowledge.

This idea is in line with that of Campos (2008) who maintains that social networks are built on collaboration structures which, together with the desire or need to share information, are reasons why, in our opinion, they can and should be brought to the educational field as a methodological resource that makes the teaching-learning process dynamic. In addition, there is the philosophy of the six degrees of separation created in 1929 by Frigyes Kstinthy, which maintains that people establish active relationships in a chain of up to six people, which increases in multiples of six, thus supporting the creation of social networks.

The objective of educational social networks is to facilitate teacher-student-institution communication, independently of the direction in which it occurs. Within the classroom, their aim is to encourage collaborative work among equals. Santamaría (2008) specifies the advantages of educational social networks as the following:

- "Creating a new dimension of socialization, making possible the visualization of the contents in a plural manner and, with the appropriate tool, being able to create community.

- Providing a base for thinking about an impressive tool for inclusive education.

- In primary and secondary centers, social networks are being used as a meeting place for the different participants in the teaching-learning process. They allow for the creation of work groups and social activity groups through parents, teachers and students, although their use is usually of a communicative nature, for which in many cases we would refer to them as social software rather than social networks.

- They serve as links to companies offering work. This is where professional networking comes into play (sites like Xing or LinkedIn) to make contact with professionals in a specific area or branch of knowledge.

- As an identity and personality on campus they offer students a safe and practical space to create bonds with other members of the community.

- They facilitate the task of immersion in a foreign language environment by means of networks or communities. Within these, students are obliged by necessity to read and write texts, with the resulting learning built into this practice.

- Sound Retrieval Systems (SRS) are being used to open up the organization of conferences, seminaries, workshops etc. so that participants can get to know each other and ask questions of interest to organizers, speakers and lecturers. In this way, very useful feedback is generated prior to the event. In addition, links related to the subject matter can be gathered and shared to expand the event.

- They can be useful in educational organizations as a tool to reduce gaps in knowledge and technology.

- We are inclined to advocate the creation of practical communities and learning networks as a means of dynamization and construction of a digital identity."

It is important to note that there are also disadvantages, such as the over-exposure of our privacy, the loss of control and ownership of the information that we upload to the network. But, over and above the advantages and disadvantages stated, why involve teachers in the creation of an educational social network for their classroom dynamic? Although it is a form of innovation, the reason goes beyond mere teaching innovation. It is the responsibility of the teacher to know the educational and social reality of the student body and it is evident that social networks are an important part of this reality. Therefore, we consider that the main reason for incorporating them into our teaching methodologies lies in the fact that students are dependent on them, they have incorporated them into their routines and, as a consequence, they have become normalized.

In studies carried out by Marín and Reche (2011b, 2012) and Marín and Maldonado (2011) it was found that the university students consulted had reduced their knowledge of Web 2.0 tools mainly to Tuenti, Facebook, Messenger, and YouTube, as well as virtual platforms for online learning in the case studied concerning Moodle. However, we should indicate that although the results showed that the students were familiar with this platform, their knowledge of it was scarce or limited, as they only used it at specific times when the teacher asked. These studies show that the knowledge today's university students have of social networks is fundamental. Faced with this outlook, teachers must not stay on the sidelines. In consequence, we consider it necessary to incorporate the use of social networks into the teaching methodologies used in higher education classrooms in order to improve the teaching-learning process.

The role of the university professor today, after the introduction of the EHEA, has shifted to that of guide and adviser to the students, and, for this reason, it is necessary to be in touch with the reality that students live and work in to make the course content more accessible. This reality implies searching the Web 2.0 tools that students do and do not know and developing a methodology that is not only original, creative, and innovative but also close to their world, in pursuit of the search, construction, and development of a collective intelligence.

Social networks have been incorporated gradually into the field of primary and secondary education with little difficulty. Edmodo, EduTwitter, Socialgo, So.cl, Ning, Gnoss, Grouply, and Twiducate are often used as additional resources together with the traditional textbook. Given the immense popularity of social networking sites among teenagers, Callaghan and Bower (2012, p. 3) saw an opportunity to "transfer motivation and associated information and communication literacies into an educational context." Their study found that the use of social networking sites in the classroom encouraged self-directed learning and increased motivation and engagement. In addition, students had no difficulty transferring their personal use of social media to the context of the classroom. The study also highlighted the importance of the role of the teacher in implementing the use of SNS into the classroom. This is in line with the shift in the role of the university professor to that of guide to complement the more autonomous role of the student. This shift is also highlighted in an article by Fonseca (2011) describing a series of technology training workshops in Colombia called EduCamps designed as a forum for teachers to explore ways of implementing ICT in the classroom. The role of teacher in these workshops is "distributed among all the participants in the workshop" (p. 72). It is this idea of the teacher as learner that is highlighted in the use of social networks in university teaching methodology, as is the case of Redes Sociales Educativas (Educational Social Networks) (http://eduredes.ning.com/?xg_source=badge). These help not only students but also teachers, who find themselves facing a great software repository of work that will help them to begin incorporating innovations into the dynamic of the subject material.

Teachers are aware of the value of social networks, which includes autonomy, diversity, openness, and connectedness. However, many hesitate to incorporate this element of online learning into their teaching methodologies due to lack of knowledge (Tu et al., 2012), which is why it is important to create sites where teachers can find and share information, increasing their knowledge and confidence in the use of social media for educational purposes.

First Steps towards a University Social Network.

DIPRO 2.0

The proposal described here was developed within the framework of a R&D project approved by the Spanish Ministry of Science and Innovation (key: EDU2009-08893) in their 2010 session, called DIPRO 2.0 "Design, production and evaluation of a learning environment 2.0, for the training of university professors in the educational use of Information and Communication Technologies (ICT)".

Among the activities considered in the project is the creation and setting up of a social network in which participation is not limited to members of the research group, but also includes teachers interested in Web 2.0 tools, particularly in PLEs.

In general terms, this project has four aims:

a) Develop, along with professionals of different areas of educational technology (TE), basic topics around the most important areas in which university professors should be trained in order to use ICT for teaching.

b) Create a telematic training environment using Web 2.0 architecture, with a goal to training university professors in the acquisition of different capacities and competencies for using ICT in their professional activity.

c) Validate the telematic training environment, both in terms of the structure of the content and of the various communication tools (blogs, wikis, etc.) created.

d) Organize a virtual community of university professors concerned with the educational use of PLE.

In relation to achieving aims a) and d) it should be pointed out that the project includes the creation of materials that can be consulted at http://tecnologiaedu.us.es/portal/ and http://dipro20.ning.com/. In order to achieve aim b), and as a result of c), a repository of learning material was created, that can be accessed through the following link: http://tecnologiaedu.us.es/dipro2/. A personal learning environment (linked to aim a) was also created and is available at http://tecnologiaedu.us.es/portal/.

These aims are developed based on the following core concepts: possibilities that the networks offer for learning, teaching requirements that the materials created for training in PLE should fulfill, opportunities that PLE offer from a training point of view when designed from the perspective of 2.0, and the training of university professors in ICT.

To this end, the following steps were followed:

1. design and creation of the beta version,

2. evaluation of the beta version by the members of the research team,

3. creation of the alpha version,

4. evaluation of the telematic environment produced.

DIPRO was built using two basic technologies: as a LMS the Moodle platform was used as well as a service based on the standard OSID (Open Service Interface Definitions) of OKI (The Open Knowledge Initiative), which allows the creation of a SOA-type architecture (ServiceOrientedArchitecture). By integrating OKI, it is possible for Moodle to include in its activity modules Wordpress and Mediawiki, as if they were elements that belonged to the platform created. Teaching materials are included in the different courses created within Moodle. Each course has static resources, including files, links and directories, and collaborative activities, for example, forums and chat rooms, as well as interactive tests and activities.

With respect to PLE, which the DIPRO 2.0 network is centred on, the user has access to 14 teaching units on different topics, covering a diverse range of areas all related to ICT. These units are as follows:

1. types of training that incorporate ICT: face-to-face teaching, e-learning, b-learning and m-learning;
2. use of technologies in university teaching;
3. general criteria for the integration, design and development of ICT in university teaching;
4. multimedia resources for university teaching (I): interactive whiteboard and computerized group presentations;
5. multimedia resources for university teaching (II): hypermedia and multimedia;
6. internet audiovisual resources;
7. videoconferencing as a teaching tool;
8. telematic tools for communication;
9. Web 2.0 environments in university training – Web 2.0 tools;
10. student-centred teaching methodologies and strategies for individual and group online learning;
11. virtual tutorial;
12. webquest and university training;
13. general requirements for the evaluation of ICT for university teaching; and
14. the use of ICT as an instrument for student evaluation.

The design of the materials for these PLE-based units stems from the premise that they should all have the same structure and be made up of the following elements: materials guides, learning tools, taxonomies, concept maps, and e-activities.

The guide offers a general overview of the materials and activities, and includes information about unit and module, competencies and capacities achieved after completion of all activities, presentation of activities, and explanation of different materials that can be used during activities. The learning tools offered in each module are of different types: PDF, videos, multimedia presentations, websites, courses, and others. The activities were prepared taking as a reference Bloom's taxonomy for the digital era and a description of the activity, level of difficulty, approximate completion time, self-check list, and rubric are included.

In addition, a series of tools or gadgets, such as YouTube, Google calendar, Skype, Google docs, Google reader, Google Groups, Blogger, Picasa, Slideshare, Dropbox, Flicker, Delicious, Twitter, Facebook, Diigo, Wordpress, Messenger, Myspace, Mahara, Vimeo, Gloster, Google sites, Wordles, Tagxedo, Scoopit, Prezi, Evernote, Edmoto, Wikisspaces, Voicethread, and Animoto, is provided. This selection was made based on the suggestions of the experts who evaluated the environment, of the members of the research team, and an analysis of the *Top 100 tools for learning* of the Centre for Learning & Performance Technologies (http://c4lpt.co.uk/top100tools/).

For the overall design, a constructivist approach was used as a starting point, in which students can build their own knowledge based on their needs and interests and according to their own learning rhythm and interaction with the environment.

DIPRO Social Network

The main idea around the social network is, as previously stated, the collaborative production of knowledge, the motivation of teachers towards the search for active information, the stimulation of the learning process itself and, in consequence, self-education, overcoming the fear of openly asking other participants questions, given that some teachers are reluctant to show the possible learning gaps they may have about a specific subject (in this case PLEs), the stimulation of divergent, analytical, and critical thinking, and the attractive presentation of information. In short, the DIPRO 2.0 network was conceived as a repository of information about personal learning environments which would allow its users to overcome the obstacles pointed out by Meyer (2011), namely lack of time and training.

We consider that implementing a social network implies an act of achievement on the part of the professors given that it grows out of their particular will and initiative to create content and spaces to meet with students and with other colleagues. It implies making known the innovative actions that as educational practitioners they are carrying out in their classrooms, which means overexposure to the critical masses; nevertheless we believe that this is the strong point of incorporating social networks into education, it implies a continuous act of knowledge building in so far as it is a social construct. Aliaga takes this point further by stating that (2011, p. 54)

> in a social network each student is the owner of his/her own image, that is, s/he does not work on a prototype, model or platform designed by the professor, but rather can create, upload his/her own images, put a personal style on the account or personal web page.

However, we did encounter the disadvantage that a large number of professors are not aware of the educational potential of social networks and therefore, creative learning situations cannot be developed using this resource (Camacho, 2010); and, furthermore, social networks are perceived by students almost exclusively as an instrument of leisure (Vázquez-Martínez, 2011).

These issues are addressed by Handley, Wilson, Peterson, Brown, and Ptzaszynksi (2007, p. 2): «we need to provide our students with lasting collaborations and intellectual management tools that will be useful/will serve them in their learning process for life». With social networks, a sense of community is promoted, a feeling of belonging to a group that watches out for the individual, so that the individual learning process achieves its maximum expression.

Another aspect to consider is the centralization of the themes of the social network. Why use PLE in this case? The answer, in our view, is simple and, as previously mentioned, the students that fill the university classrooms are digital, they are multitaskers, and as a result their workspace is the digital universe with all the tools found in it. They use several tools (blogs, wikis, repositories, etc.) at the same time to produce an assignment, all of them combining to make up a particular PLE. For these reasons, professors should be familiar with this element and capable, after adequate training, of creating their own and encouraging their students to use it.

The use of PLE in higher education depends on the overcoming of certain disadvantages or weaknesses and the acceptance of the advantages or strengths that their use entails. Barroso, Cabero, and Vázquez (2012) point out as strengths that they are inexpensive, student-centred, and open to interaction, exchange, and connection as well as the almost unlimited variety and functionality of the tools, among others. These same authors cite as weaknesses their complexity, possible problems with security of information, and lack of a centralized management system. The intention of the PLE of the DIPRO 2.0 network is for both professors and students to relate directly to the new media-focused structure of the knowledge society, where, unlike other historic moments more centred on and preoccupied with data capture and retention, today the preoccupation is centred on what we might consider the 6 H, that is, how to find information, how to filter it and select it, how to organize it, how to generate new information from the mix and remix of what already exists, how to share it with classmates and colleagues using different devices, and how to interact with others to build and confirm new meaning.

We could say that we have attempted to create a «Personal Knowledge Network» (PKN), overcoming the separations and disputes established between PLE and LMS, and seeking instead to combine and integrate both which would allow us to speak of «e.PLE» or «p-Learning». As Salinas states, (2009, p. 210) personal learning environments

> are presented as a hinge system where the virtual institutional environment associated with formal learning where we distribute courses, can be integrated with the more informal environment offered by social networks and virtual learning communities to build a Personal Knowledge Network PKN.

For this project, the inclusion of PLE in formal educational activity is associated with «Personal Knowledge Management» (PKM).

The origins of DIPRO can be found in the now extinct network Grouply. This medium was chosen because it is versatile, free, and has an interface that is pleasing to users. In this first attempt the network had 162 members. Nevertheless, the disappearance of the network from the market forced a reconsideration of the creation space of the network, which was one of the aims of the project. The second network used, also free, was Elgg and with it the number of participants increased slightly to 176.

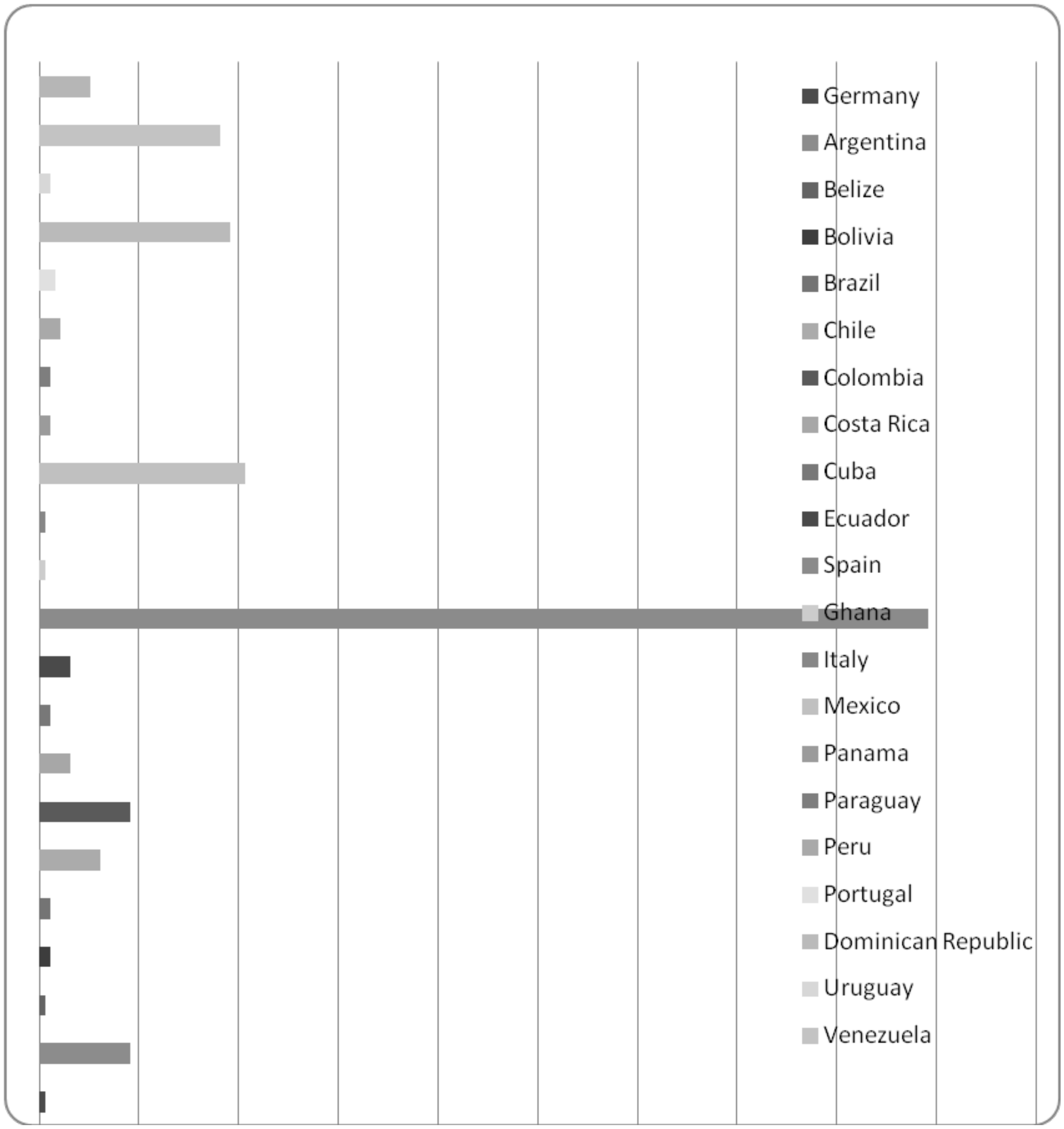
The final DIPRO 2.0 social network was created with the Web 2.0 tool called Ning. This educational network is characterized, as the previous ones, by its versatility and pleasing interface, as well as by its highly intuitive functioning, and the possibility to invite others to participate. The methodology presented from this new perspective aims to promote the continuous exchange of ideas as well as collaborative work strategies (Ortiz, 2006), where group interaction and sharing of experiences form the basis of DIPRO 2.0. The research conducted by Baltaci-Goktalay and Ozaditek (2010) showed that 32.5% of the students consulted claimed they used social networks in their classroom dynamic, specifying in particular the use of Facebook. For this reason we believe it could be of great help in facing the changes that the introduction of the new curriculum has brought, such as the development of new classroom methodologies where Web 2.0 tools have a strong presence. We propose, therefore, a new scenario of mediated learning that is interactive, cooperative, and collaborative, although the collaborative should take precedence over the cooperative. In this sense Cabero (2003) indicates that they should be expressed symmetrically and reciprocally, should be based on the responsibility of the individual and the group that constitutes the network, to produce knowledge, and not be a mere transmitter of information. Along these lines, Wolton (2000, p. 37) considers that «equality of access to knowledge is not equality in the presence of knowledge». Therefore, the network should be equipped with rich and valuable resources, so that from a pedagogical point of view we may speak not only of social networks, albeit educational, but of virtual learning communities, and this is what DIPRO 2.0 is.

The educational social network DIPRO 2.0 was created with the Web 2.0 tool Ning and is characterized by its versatility, being free to use, and having a pleasant interface for users, a highly intuitive function, and the possibility to invite others to participate.

Figure 1. Gate of DIPRO 2.0 (see http://dipro20.ning.com/).

The network DIPRO 2.0 (see Figure 1) had, at the moment of writing, 387 national and international members from different fields by invitation given that, at present, it is being evaluated by international experts from different areas of expertise.

The present distribution of the participants in terms of gender is 184 men and 203 women. Regarding the countries of origin, as shown in Graph 1, the country with the greatest presence is Spain with 178 subscribers, followed by Mexico with 38. On the opposite end of the scale are Germany, Belize, Italy, and Ghana with only one participant. It is important to point out that only 10 participants did not indicate place of origin.



Graph 1. Distribution of participants by country of origin.

Regarding country of origin and gender, the members of the network are distributed as shown in Table 1; as can be observed, Spain with 90 women and Venezuela with 26 are the countries with the greatest presence of women as compared to Germany, Ghana, Bolivia, and Peru where there are no women participants.

Table 1

Distribution of Participants

Country	Men	Women
Germany	1	0
Argentina	5	3
Belize	0	1
Bolivia	2	0
Brazil	0	2
Chile	6	6
Colombia	9	9
Costa Rica	2	4
Cuba	1	1
Ecuador	5	1
Spain	88	90
Ghana	1	0
Italy	0	1
Mexico	25	16
Panama	1	1
Paraguay	1	1
Peru	4	0
Portugal	1	2
Dominican Republic	20	18
Venezuela	10	26
Uruguay	0	2

With respect to men, again it is Spain that has the greatest presence (88) as compared to Brazil, Belize, Italy, and Uruguay where there was no participation.

The main objective of DIPRO 2.0 is to be a place of reflection and help for PLEs. It aims to be a space where university teachers can find information, help or advice on this subject matter in order to incorporate it into their work as researchers or teachers. The way this works can be seen at http://tecnologiaedu.us.es/diproinfor/difusion/videos.

With regard to the network, the structure of the collaborative area is distributed into discussion forum, events, photos, videos, archives, chat, and blog, with clearly differentiated functions that we can organize into two main focus points: the area in which information is shared directly (events, photos, videos, archives, blog) and the development of common knowledge through the presentation, confrontation and discussion of ideas (discussion forums, chat rooms), all of these focused on the topic of PLE.

Additional possibilities include creating alerts and marking and creating tags. In Figure 2, an example of an event is shown in which a participant communicates to the rest of the community the holding of a conference, one of the objectives of this option. Each recipient can grade the information supplied and communicate to other members if they will attend, may attend, or will not attend. A total of 10 events have been posted which the network itself has catalogued and distributed into five congresses, two conferences, two academic events, and one workshop.

Figure 2. DIPRO 2.0 events.

In the same way, the video option allows participants to get to know elements considered important. It also allows the grading of a video after viewing and the posting of comments about it that can be sent to the rest of the members or only the person who posted the video, depending on the wishes and interests of the reader. Figure 3 shows examples of available videos and the option of adding videos to include new elements.

Figure 3. DIPRO 2.0's videos.

Of the 29 videos posted to the network, the one most viewed by members, with 112 visits, is a description and definition of PLEs by Dr. Castañeda of the University of Murcia (Spain).

So as not to make the presentation of elements too detailed, we will focus on one of the main tools which gives rise to the most participation: the forum, where members can create a topic and the rest of the participants can express their ideas through a process of reflection and analysis or contribute other documents such as videos, PDF documents, or URL addresses, that corroborate, reinforce, or refute other documents analyzed and other approaches put forward.

Although we consider the contributions described below important, it is necessary to point out that this is one of the least used tools given that only four forums have been created with a very diverse participation in addition to the unequal participation of the members.

García Aretio (2003, p. 172) understands that, "in a community people form groups to interact socially, establish common bonds and share certain interests, beliefs, expectations, values and activities that establish the limits and distinguishing identity of the group and all, at least for some time." In addition, Salinas (2003, p. 36) clarifies that we find ourselves before a virtual community

> when a real community uses telematics to maintain and increase communication. The fact that interaction between people can be carried out physically but be intertwined through telematic networks is what leads us to talk about virtual communities, which can be considered personal communities, in as much as they are communities of people based on individual interests, common ground shared and the values of their people.

For Cabero (2006, p. 7) making reference to a virtual community is making reference to "communities of people who share some values and common interests and who communicate through the different tools offered by telematic networks, whether they be synchronous or asynchronous". Combining the aforementioned, we can ask, what are our interests? What are our values? What are our activities? The answer is clear and simple: They are nothing more than facilitating the training of university faculty, deepening our own knowledge, going into an exercise of conscious introspection in our daily teaching routine, weaving a tight social fabric of ICT professionals through telematic networks, in which everyone generously contributes their knowledge, localized resources, and research into this fascinating branch of didactic and pedagogic science to locate the best practices. The contribution of Cabero (2007) is also interesting when he indicates that an efficient virtual community must have clearly defined objectives and goals known by all its members, quality of information and relevant content, clear operational rules and knowledge of these by its members, and the existence of a positive behavior system. We understand that all the efficiency requirements stated can be found in the network DIPRO 2.0. For Paloff and Pratt (1999) the requirements of a virtual learning community are: active interaction, collaborative learning, social construction of meanings, the sharing of resources, and the exchange of supportive messages between students (in our case between the teachers themselves). Garrison, Anderson, and Archer (2000) define social presence as the capacity of individuals to cast themselves socially and emotionally into a research community, and by Arbaugh's (2004) judgment it is comprised of three components: affection (expressions of emotion, feeling and state of mind), interaction (indications that the student is following the discursive thread, the expression of thanks, additions to posted material), and cohesion (the calling of other members by their name, the inclusion of closing messages).

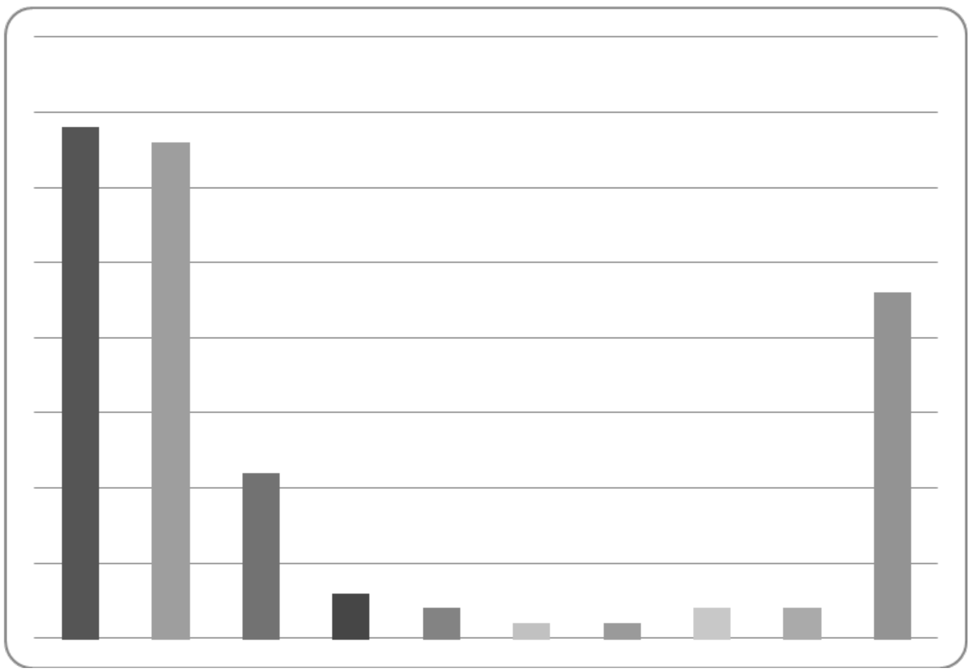
It is from this asynchronous discursive line that the elaboration of objectives and work hypotheses are obtained: the pre-elaboration, verification, and conformation of theories; the consensual and collaborative conceptualization of terms all contributed and made visible to other participating members.

However, at the same time, this delocalized discourse temporarily allows for the flexibility of the act of communication and the delocalization of information, increasing the possibility of reflecting on the content and the praxis itself, eliminating the necessity of being physically present, putting researchers from different parts of the world in contact, with different areas of experience and a broad knowledge and experience that supports, allows, and facilitates the social construction of knowledge. As an example of this, in Figure 4 four contributions relative to collaborative work and social networks are shown.

Figure 4. Examples of contributions to the forum.

We should also indicate that this tool provides information about recent messages and those most commented on. This allows us to center our attention on those elements that the community has selected as most relevant, or those that for different reasons have not been visited until that moment, all the more since the number of open categories is important, as in this case, in which we find at the moment 23 categories and which, as is to be expected by the vitality shown by the DIPRO 2.0 virtual community, will increase exponentially.

Following in this line of communication, 10 blogs have been created in which the greatest participation was in the topic referring strictly to PLEs (PLE: keys to online educational ecosystems) with 34 contributions. Graph 2 shows the distribution of participation for the 10 blogs created.



Graph 2. Themes of the blogs.

Initial Conclusions

Valverde (2007, p. 53) indicates that, "just as ICT satisfies real educational needs, its curricular integration and good practice are generalized." In this way, the use of Web 2.0 promotes an education and training that responds to the demands manifested by society. As mentioned, the Internet is one of the tools that are currently contributing the most to helping individuals in the construction of their teaching-learning processes, in establishing relationships with other individuals, in discovering other realities, and so on.

In the educational field we agree with Holcomb and Beal (2010), that the rapid growth of the Internet in general and of Web 2.0 tools in particular implies that teachers should be conscious of their limitations with them.

The creation of educational social networks has been growing over the last few years, although at a university level these have been linked to another type of tool such as blogs and wikis. At present, we have passed from an education that based the teaching-learning process on 'teaching by telling' to one that currently focuses on 'learning by doing'. According to the comment of Castañeda and Gutiérrez (2010) concerning networks, it would consist of good learning through good social networks. These new circumstances propose that university teachers, those who have to take on their new role, present new methodological necessities and they need new tools to help them along this road. And on this road we find educational social networks. The network DIPRO 2.0 has been conceived as a repository of information for PLEs which will allow for the overcoming of obstacles as pointed out by Meyer (2011), namely lack of time and training. From our point of view and after the experience developed through the project and the DIPRO 2.0 network, we consider that professors in general want to communicate about PLE, they want to share their experiences with and knowledge of this tool and how they have worked with it. Nevertheless, their limitations or gaps in knowledge remain in the background, not showing the need to increase their knowledge in this particular area, either due to fear, or lack of self-confidence, or because they think it is a sign of weakness to have gaps in their knowledge of the subject.

On the other hand, the main handicap that we were able to detect is maintaining the active participation of the participants. If we examine the data, at the time of writing this manuscript there were 387 members; however, the active participation of the members was only 28.94%. Therefore, we believe that it should be more dynamic and encourage greater participation. Although we also believe that active participation in a social network, whatever the content, can be exhausting for professors, especially if they are fully involved in the various forums that are created within them and develop a continuous feedback that could occupy all of their time. Nevertheless, we consider this to be an initiative that with the willingness of the professors to participate could broaden the methodological horizons that we are developing today, since the presentation of classroom innovation through PLE is a way for the educational community to gradually introduce them in their classroom dynamics, so that both parties–professors and students–will benefit.

University education, which ultimately seeks to encourage Internet teaching, lies in the promotion of creativity and flexibility of training environments by higher education professionals to bring this social reality closer to the university, always remembering that ICT is in continual evolution and growth. However, as Flores (2009) indicates, the changes affect not only the way in which things are done but also the content that is given. Therefore, we put forward the suggestion that a social network can be transformed into a learning community, into a rich environment of not only technological elements but also training elements, which, through the participation and interaction of its members, grows and helps its members to grow.

To conclude, it should be indicated that both the training environment and the PLE were evaluated by experts in ICT on four dimensions: 1. Technical and aesthetic aspects,

2. Ease of navigation and movement around the environment, 3. Guide/tutorial of the program, 4. Quality of environment to create a "Personal learning environment". The instrument used was a Likert-type scale with six possible answers (from 1 = *very negative/strongly disagree*, to 6 = *very positive/strongly agree*). The response can be considered highly favourable since all of the dimensions received a score of 5 (agree/positive) or 6 (strongly agree/very positive). This leads us to believe that the environments created may be of interest and be beneficial for training university professors in ICT. As a limitation of the study we should explain that we have not yet carried out a study of the degree of satisfaction of the users of the DIPRO network, although we are in the process of developing a questionnaire for this purpose. We understand that the analysis of the results obtained will allow us to develop and strengthen both the strong points indicated by the users, and those that are susceptible to improvement. An analysis of the results of the participation of the users will also foster a greater sense of belonging and responsibility as well as a more active use of the network and participation in the activities.

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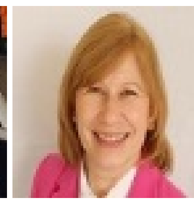
Factors Driving Learner Success in Online Professional Development

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Abstract

This study examined factors that contributed to the success of online learners in an online professional development course. Research instruments included an online survey and learners' activity logs in an online professional development course for 512 in-service teachers. The findings showed that there were several factors affecting online learners' success in online professional development. In addition, there were also significant differences between successful and unsuccessful online learners in terms of course login frequency and learning activities viewed.

Keywords*:* Online learners; in-service teachers; online professional development; learners' success; online training; OPD

Introduction

Professional development refers to the process of learning and keeping up-to-date in one's area of expertise both for personal development and for career advancement. Those who engage in professional development are interested in increasing their own skills/knowledge, enhancing their ability to do their work, and lifelong learning. Professional development includes

> all the natural learning experiences and those conscious and planned activities which are intended to be of direct or indirect benefit to the individual, group or school and which contribute through these to the quality of education in the classroom. (Day, 1999, p. 4)

In teacher education, professional development generally refers to ongoing learning opportunities available to teachers and other education personnel. In the United States, the need for professional development of school staff came to the forefront in the 1960's (Murphy-Latta, 2008). With schools today facing numerous complex challenges – from working with an increasingly diverse population of students, to meeting rigorous academic standards and goals, to integrating new technology in the classroom – authorities continue to stress the need for teachers to be able to enhance and build on their instructional knowledge. Under these challenges, the education and professional development of teachers is considered as the central component of educational improvement (Hawley & Valli, 1999).

It is reported that the ongoing, job-embedded, professional growth of teachers will lead to high achieving schools (Kelleher, 2003). Essentially, professional development has been adopted as a policy solution to improving the number of highly qualified teachers as well as helping all students to achieve high academic standards (Colbert, Brown, Choi, & Thomas, 2008).

Online Professional Development (OPD)

Online teacher professional development (OPD) is popular due to the need for professional development that can fit teachers' busy schedules and that provides access, as well as ongoing support, to important resources not otherwise affordable or even available locally (Dede et. al, 2009). OPD provides flexibility by allowing participants, irrespective of location, to manage educational pursuits with work and personal responsibilities (Stanford-Bowers, 2008). In addition, OPD can be offered in various forms: distance learning classrooms enabling individuals to participate in a class via video conferencing with the goal of making the online experience as close as possible to an in-class experience; an online asynchronous course negating the need for all the participants of a course to be available at the same time and allowing participants to complete course requirements according to their individual schedule; and self-paced online courses allowing each participant to work through a series of resources and activities at his or her own pace (Russell, Carey, Kleiman, & Venale, 2009).

Because of its advantages, OPD has received rapid attention recently. Indeed, according to the findings of the Speak Up 2012 survey, "From Chalkboards to Tablets: The Digital Conversion of the K-12 Classroom" as reported in Cavanagh (2013), the percentages of teachers and principals participating in online classes, webinars, and virtual professional learning communities rose significantly during the time period of 2008-2013. In addition, the number of principals who reported they support professional growth through some form of social networking more than tripled, from 8% in 2008 to 25% today.

Given the importance of professional development for teachers and the increasingly popular trend of online professional development for teachers, this study seeks to examine what factors drive learners' success in that online training environment.

Literature Review

Online education literature is often characterized by its focus on "how to" teach online and how to optimally utilize the various features available in most instructional platforms, generally based on authors' experiences teaching in this setting or on instructors' feedback. There is less evidence of student-oriented analysis such as online student behaviors, performances, attitudes, or preferences (Beaudoin, Kutz, & Eden, 2009). Sharing similar viewpoints, Coates (2006) maintains that, despite the proliferation of studies into online education in the past decade and widespread levels of adoption, most research has focused on financial, technical, and administrative aspects of these learning systems. In particular, Coates notes, there are very few published works on online student engagement.

The Characteristics of Successful Online Learners

Palloff and Pratt (2001) listed the characteristics of successful online learners. According to the researchers, successful learners are seen as volunteers seeking further education, having higher expectations, being more self-disciplined, older, enjoying learning for its own sake, demonstrating good thinking skills, able to work independently with limited structure, and recognizing the value of interacting with other online peers.

Boyd (2004) reviewed current literature and research in online learners and described characteristics of successful online students. The researcher considered four sets of factors: 1) the technical factors, which pertain to the student's access to the technology through which an online course is delivered; 2) the environmental factors, which have to do with the student's personal learning environment; 3) the personal factors, which have to do with the character traits of the students themselves; and 4) various learning characteristics, which successful online students tend to exhibit and possess. In terms of technical issues, a successful online student must possess appropriate technology and the skills to use that technology effectively. Regarding environmental factors, students must have an appropriate management of time and space, as well as support from significant others. As far as personal factors are concerned, the students must possess a healthy balance between autonomy and interactivity, self-motivation and self-discipline, and a high level of integrity. Finally, the students must possess various learning characteristics such as a more independent learning style that tends toward a more self-directed learning orientation, as well as better-than-average reading and writing skills.

Recently, Beaudoin, Kutz, and Eden (2009) administered a 58-item survey to 318 respondents in four cohorts: Western (mostly the U.S.), Japan, Mexico, and Israel. One of the research problems of the study was to find out the items critical to learner success in e-learning. The questionnaire listed 10 items generally considered to be critical elements for successful online learning and then asked respondents to add two additional ones of their own. It should be noted that as participants were from different countries, it is possible that they had different responses because of their respective cultures. As a result, the researchers reported their findings according to cohorts.

The majority of the participants indicated that success of online learners ultimately depended more on self-determination than on institutional support. Except for the Mexican respondents, the strongest determinants for success among these online learners were related to learner attributes such as self-motivation, followed by time management, then capacity to learn with limited support. This result would indicate that, for most of these students, online learning success emanates from the learner, rather than from characteristics related to the learning environment such as courses. The least critical items to the respondents were: ability to cope with unstructured settings, familiarity with technology, and relationships with other online learners.

In agreement with findings by Beaudoin et. al (2009), Sun (2014) reported results obtained from qualitative and quantitative data that online learning success came from learners. The participants in Sun commented that self-motivation, self-directed learning, and self-regulation of learning were the key factors in online learning success. The factor of self-regulation of learning includes skills such as setting goals, orienting action accordingly, planning, monitoring, asking for help when needed, trying out different strategies, and reflecting (Guichon, 2009; Hurd, 2006; Wang, 2010).

Learner self-efficacy is critical in online learning (Cho & Jonassen, 2009; Cho, Shen, & Laffey, 2010) and can be a key factor in this challenging learning environment (Hodges, 2008). A significant, moderate, and positive relationship between online technological self-efficacy and online academic achievement was found in McGhee (2010). Womble (2008) found a significant and positive correlation between e-learning self-efficacy and e-learner satisfaction. In addition, computer self-efficacy was a significant predictor of online learners' satisfaction and their intention to take future online courses (Lim, 2001).

Successful Learners in OPD

Specifically, in the case of professional development and OPD, the vast majority of research has focused on design features that increase engagement and course quality, and on the subsequent effect that professional development and OPD have on teacher knowledge and practice (O'Dwyer et. al, 2010; Treacy, Kleiman, & Peterson, 2002; Yang & Liu, 2004). As mentioned above, in an effort to increase access and convenience and to improve cost efficiency, there has been growing interest in OPD (Dede, 2006; Ginsburg, Gray, & Levin, 2004). In recent years, there have been urges to rigorously examine the impacts of OPD (Dede, Ketelhut, Whitehouse, Breit, & McCloskey, 2009). A main concern raised by Stes, De Maeyer, Gijbels, and Van Petegem (2012) was that most research in professional development lacks robust analyses of the characteristics of participants who complete such professional development programs successfully.

A search of the literature related to factors driving learner success in OPD is limited by the scarcity of scholarship on the topic. The study by Rienties, Brouwer, and Lygo-Baker (2013) examined how successful participants differed from unsuccessful participants. The study involved 73 participants. The researchers explored whether the 40 participants who successfully completed the OPD module had different teacher beliefs, intentions, and Technological Pedagogical Content Knowledge scores at the start of the course than the 33 participants who dropped out. Findings showed that participants who failed the training program had significantly higher scores on teacher beliefs towards training students for jobs in comparison with academics who completed the OPD program successfully. Additionally, the amount of time spent in the web-videoconference system during the training program was a noticeable difference. Successful participants on average spent 4 hours and 59 minutes attending and/or watching the web-videoconferencing sessions in Adobe Connect while unsuccessful counterparts only spent 2 hours and 18 minutes.

Significant differences were also found in passing rates across institutions and disciplines. The number of successful participants was significantly higher in particular institutions. Academics from particular specialty areas were more likely to drop out. However as not all institutions and disciplines had a sufficiently large sample size, more research is needed to generalize the conclusion that institutional and disciplinary differences influence learner success. In terms of technological competencies, the researchers did not find any indication that the technological pedagogical content knowledge appeared to affect the retention of participants on the OPD program. Indeed, previous experience with technology did not seem to impact upon engagement and retention.

Methodology

Data for this study were collected from two different sources for the triangulation purpose to increase the reliability and validity of the findings. Those sources included an online survey and learners' activity logs in an online professional development course for 512 in-service teachers. Heiervang and Goodman (2011) held that online surveys may have advantages in terms of the speed and cost of data collection as well as data quality. However, they may be biased by low and selective participation. To minimize the disadvantages of the online survey, we used learners' activity logs as an existing data source. According to Shultz, Hoffman, and Reiter-Palmon (2005), existing data are objective and relatively easy to transfer and store, but they are also not always a perfect fit between what the researchers are trying to measure and the purposes for which the data were collected. To reduce the drawbacks of those sources of data, the triangulation process was used. According to Maxwell (2005), the triangulation process of collecting information from different sources using a variety of methods reduced the risk that conclusions would reflect systematic biases and allowed a broader understanding of the study's issues. The comparison of data gathered supported the triangulation process and therefore enhanced internal validity. Efforts to control any threats to theoretical validity were also conducted by collecting and drawing attention to any discrepant data or alternative explanations.

Data Collection Procedures

In 2013, we hosted an open online professional training course in computer-assisted language learning (CALL) for 512 in-service language teachers from 23 countries. This six week long course was the first course of our professional development course series whose goal was to improve language teachers' technology competences. At the end of the training course, 153 learners who completed the course with the total grade of at least 80 out of 100 were granted a certificate of successful completion in our CALL course. We had access to these 153 learners' email addresses to contact them and invite them to participate in this study. Within a month of three times of sending emails asking for their participation, 142 (93%) responded to our online survey.

The online survey had three questions. The first question asked about participants' age range. We took the age ranges popularly used by the Gallop Poll as follows for our study.

Table 1

Age Range

1	Under 12 years old
2	12-17 years old
3	18-24 years old
4	25-34 years old
5	35-44 years old
6	45-54 years old
7	55-64 years old
8	65-74 years old
9	75 years or older

The second question asked the participants to select factors that they thought were the most important factors to drive their successful completion of the course. Based on studies conducted by Boyd (2004) and Beaudoin, Kurtz, and Eden (2009), we created a list of factors considered critical to being successful online learners as shown below.

- Ability to self-manage my time
- Often checking email
- Ability to learn with limited support
- Relationships with online instructors
- Reliable internet connection
- Course login frequency
- Confidence to be able to achieve the learning goals
- Good hardware especially computers
- Ability to express my ideas
- Ability to cope with non-structured settings
- Relationships with other online learners
- Familiarity with technology
- Self- discipline

These factors were presented as a list which research participants simply ticked.

The last question was an open-ended question asking the participants to provide any other important factors that were not available in the list. They could also make comments on those factors.

The second data source was learners' activity logs in the CALL course. The lead researcher was granted an access permit to get access to the online learning management system as an administrator to download the activity logs of all 525 learners in the CALL course. These logs kept a record of all the activities each learner performed during the course. We sorted them into two lists of activity logs. One list had 153 activity logs of 153 learners who completed the course with the total grade of at least 80 out of 100. The other list had 153 activity logs of 153 learners who had the lowest grades. Those learners who dropped out were not included in this study.

A reliability test was conducted for the total data to identify whether the grades on the lists had acceptable internal consistency. The grade list was tested using Cronbach's alpha. The resulting alpha value was .88 which according to George and Mallery (2009) indicates good internal consistency reliability. One independent-samples *t*-test was run to identify whether there were any significant differences in terms of course login frequency between the two groups of participants with highest grades and lowest grades. An Excel-based calculation was used to identify what learning activities learners in each group viewed the most. Below is a sample of one learner's activity log in the online course.

Time	IP address	User full name	Action	Information
Mon 15 July 2013, 04:54 AM	123.19.37.91	Lan Le	forum view forum	General Discussion Forum
Mon 15 July 2013, 04:54 AM	123.19.37.91	Lan Le	course view	Introduction to Computer-Assisted Language Learning
Mon 15 July 2013, 04:54 AM	123.19.37.91	Lan Le	forum view forum	Bulletin Board
Mon 15 July 2013, 04:54 AM	123.19.37.91	Lan Le	course view	Introduction to Computer-Assisted Language Learning
Mon 8 July 2013, 02:50 PM	123.19.43.32	Lan Le	forum view forum	General Discussion Forum
Mon 8 July 2013, 02:50 PM	123.19.43.32	Lan Le	course view	Introduction to Computer-Assisted Language Learning
Mon 8 July 2013, 02:50 PM	123.19.43.32	Lan Le	forum view forum	Bulletin Board
Mon 8 July 2013, 02:50 PM	123.19.43.32	Lan Le	forum view discussion	Validating your final grade
Mon 8 July 2013, 02:49 PM	123.19.43.32	Lan Le	course view	Introduction to Computer-Assisted Language Learning
Tue 2 July 2013, 05:25 AM	123.19.40.126	Lan Le	course view	Introduction to Computer-Assisted Language Learning
Tue 2 July 2013, 05:25 AM	123.19.40.126	Lan Le	course view	Introduction to Computer-Assisted Language Learning
Tue 2 July 2013, 05:24 AM	123.19.40.126	Lan Le	forum view forum	General Discussion Forum
Tue 2 July 2013, 05:24 AM	123.19.40.126	Lan Le	course view	Introduction to Computer-Assisted Language Learning
Tue 2 July 2013, 05:23 AM	123.19.40.126	Lan Le	forum view discussion	Validating your final grade
Tue 2 July 2013, 05:22 AM	123.19.40.126	Lan Le	course view	Introduction to Computer-Assisted Language Learning
Mon 1 July 2013, 02:58 PM	123.19.44.149	Lan Le	page view	Resources
Mon 1 July 2013, 02:57 PM	123.19.44.149	Lan Le	course view	Introduction to Computer-Assisted Language Learning
Mon 1 July 2013, 02:11 PM	123.19.34.3	Lan Le	page view	Articles
Mon 1 July 2013, 02:11 PM	123.19.34.3	Lan Le	course view	Introduction to Computer-Assisted Language Learning
Mon 1 July 2013, 02:11 PM	123.19.34.3	Lan Le	forum view forum	General Discussion Forum
Mon 1 July 2013, 02:11 PM	123.19.34.3	Lan Le	course view	Introduction to Computer-Assisted Language Learning
Mon 1 July 2013, 08:21 AM	123.19.44.235	Lan Le	forum view discussion	Message from Dr. T
Mon 1 July 2013, 08:20 AM	123.19.44.235	Lan Le	forum view forum	General Discussion Forum
Mon 1 July 2013, 08:20 AM	123.19.44.235	Lan Le	course view	Introduction to Computer-Assisted Language Learning
Mon 1 July 2013, 04:32 AM	123.19.34.85	Lan Le	forum view discussion	Farewell and Thank you!
Mon 1 July 2013, 04:31 AM	123.19.34.85	Lan Le	forum view forum	General Discussion Forum
Mon 1 July 2013, 04:31 AM	123.19.34.85	Lan Le	course view	Introduction to Computer-Assisted Language Learning

Figure 1. Screenshot of a learner's login activity.

Findings

Online Survey Results

The first question in the online survey asked about the age range of online learners who completed the online professional training course with the total grade of at least 80 out of 100. The most common age range reported in this online survey was 25-34 as shown in Figure 2. Seventy-six out of 93 online learners, accounting for 70.7%, who finished the online professional training course with the total grade of at least 80 out of 100 identified themselves in the 25-34 age range. The 35-44 age range was the second most common (n = 12). The third most common age range was 18-24 (n = 5).

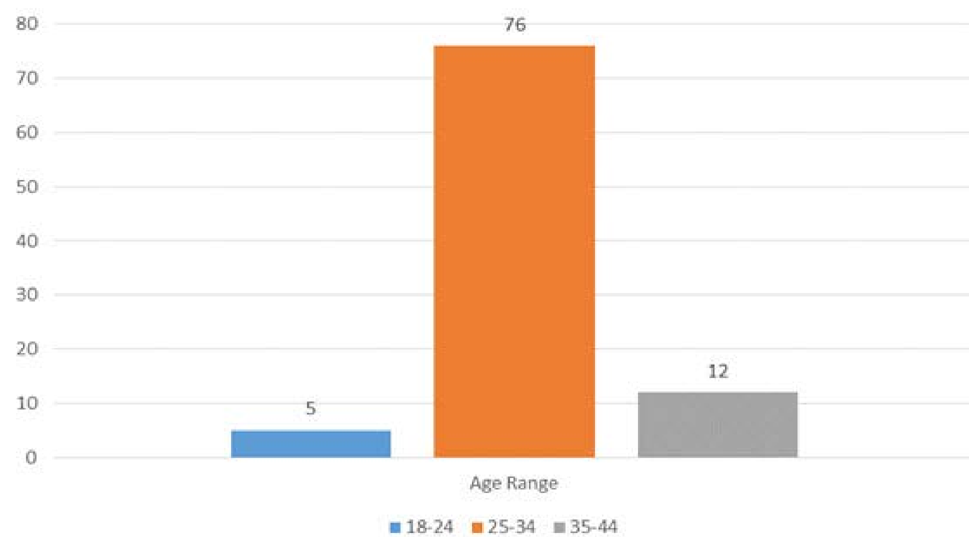

Figure 2. Online learners' age ranges.

The second and third questions asked the participants to select factors they considered the most important leading to their successful completion of the online professional training course. In the second question, participants were provided with a list of 13 factors for them to select. In the third question, participants were given an option to provide factors they thought important to their success in the online professional training that were not mentioned in the second question. We used two common techniques in qualitative research to identify themes emerging from participants' responses to the open-ended question. The first technique is "word repetition". Words that are frequently repeated are often considered as being salient in the minds of respondents. D'Andrade (1995) observed that the simplest and most direct indication of schematic organization in naturalistic discourse is the repetition of associative linkages.

The second technique is "Key-Word-In-Context" (KWIC). KWIC is based on a simple rule: If you want to understand a certain concept, look at how it is used in the context. Simply put, in this technique, researchers identify key words and then systematically find the corpus of text to look for all the connections and relationships of the words or phrases in the context.

As shown in Figure 3, "*Self-discipline*" was considered the most decisive factor leading to success in online professional training (90/93 respondents). The second factor was "*School administrators' expectation*" (89/93 respondents). This factor was not included in our list of important factors leading to successful online learners found in studies by Boyd (2004) and Beaudoin, Kurtz, and Eden (2009), but emerged from our open-ended question. The third critical factor was the "*Ability to learn with limited support*" (87/93 respondents). On the other pole of decisive factors, "*Relationship with online instructors*" was the least important factor leading to success in online professional training (30/93 respondents).

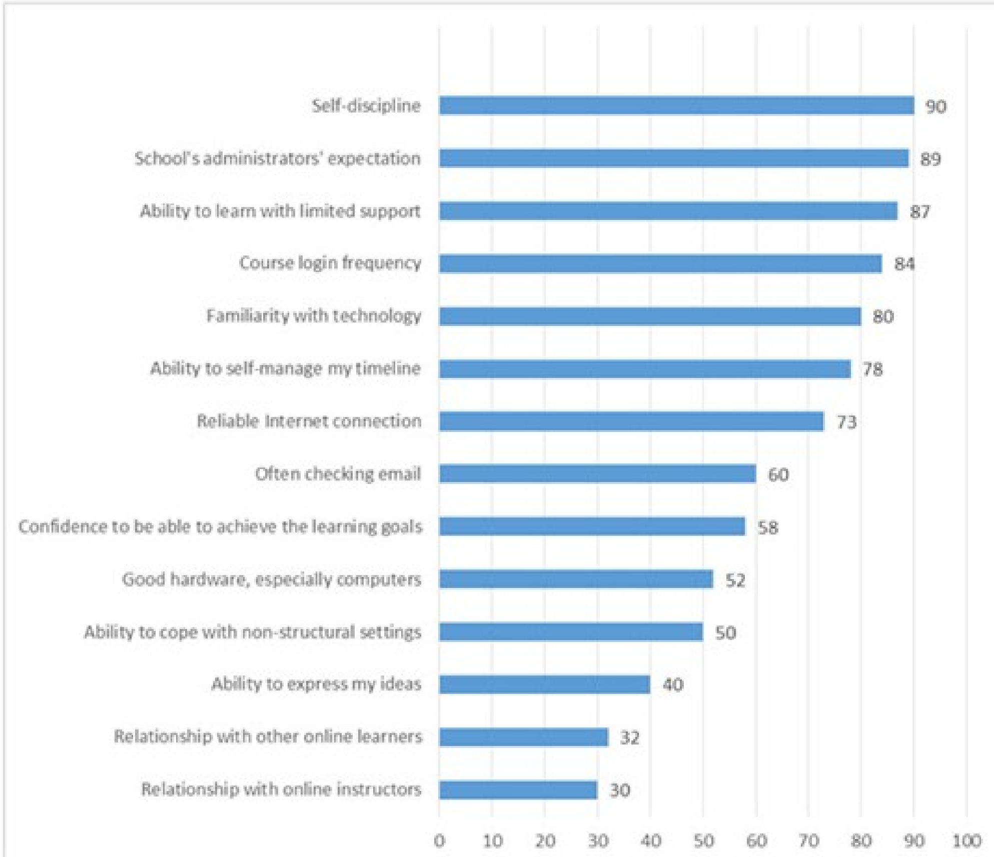

Figure 3. Factors leading to successful completion of the online professional training course.

Learners' Login Analysis

Learners' login frequency.

The online professional training course lasted over 42 days (six weeks). In many cases, based on the interludes within a day, we could assume that learners logged into the course several times per day. However, this counting method may not be completely accurate because many interludes were not obvious. Therefore, we decided to count all of the login attempts in one day as one login attempt/unit. For example as shown in the login log below, one learner may have logged into the online course three times or four times on Monday, July 01, 2013, but we counted it as only one login attempt/unit.

Mon 1 July 2013, 02:57 PM	123.19.44.149	Lan Le	course view	Introduction to Computer-Assisted Language Learning
Mon 1 July 2013, 02:11 PM	123.19.34.3	Lan Le	page view	Articles
Mon 1 July 2013, 02:11 PM	123.19.34.3	Lan Le	course view	Introduction to Computer-Assisted Language Learning
Mon 1 July 2013, 02:11 PM	123.19.34.3	Lan Le	forum view forum	General Discussion Forum
Mon 1 July 2013, 02:11 PM	123.19.34.3	Lan Le	course view	Introduction to Computer-Assisted Language Learning
Mon 1 July 2013, 08:21 AM	123.19.44.235	Lan Le	forum view discussion	Message from Dr. T
Mon 1 July 2013, 08:20 AM	123.19.44.235	Lan Le	forum view forum	General Discussion Forum
Mon 1 July 2013, 08:20 AM	123.19.44.235	Lan Le	course view	Introduction to Computer-Assisted Language Learning
Mon 1 July 2013, 04:32 AM	123.19.34.85	Lan Le	forum view discussion	Farewell and Thank you!
Mon 1 July 2013, 04:31 AM	123.19.34.85	Lan Le	forum view forum	General Discussion Forum
Mon 1 July 2013, 04:31 AM	123.19.34.85	Lan Le	course view	Introduction to Computer-Assisted Language Learning

Figure 4. Screenshot of a learner's login activity.

An independent-samples *t*-test was conducted to compare 153 learners with 80 and above grades (Group A) and 153 learners with the lowest grades (Group B) in terms of how often they logged into their online professional training course. The result from the t-test showed that there was a significant difference in the login frequency for Group A (n = 153, M = 38.76, SD = 5.13) and Group B (n = 153, M = 15.21, SD = 5.13); t (1) =25.60, p = 0.001. These results suggested that learners in Group A logged into the course far more often than their peers in Group B. On average, during a 42 day (six week) period of the course, a learner in group A made 39 login attempts while a learner in Group B made 15 login attempts.

Learning activities viewed by learners.

The format of the online training course in this study had seven sections, among which were one general section and six module sections for six weeks. In the general section, there was a bulletin board where the instructor and/or course coordinators posted course announcements and/or course updates. Learners could view the bulletin board but could not post there. The second component in the general section was a discussion forum that had several sub-forums such as "General Discussion Forum", "Questions for Weekly Lectures", "Technical Problems". The third component was "Virtual Office Hours" where online learners could enter to have live online interactions with the instructor and/or course coordinators, similar to traditional office hours. The fourth component was an artificial intelligence online chat forum where online learners could chat 24/7 with a robot about any topic they were interested in. The fifth component in this section was a "Course Orientation Video Clip" where the instructor provided basic instructions about how to navigate and complete the course successfully. The last component was learners' gradebook where they could check their weekly grades. Following the general section were six sections or weekly modules for six weeks. Each weekly module had an approximately 20-minute video-based lecture. The second learning activity in each weekly module was "Learning Resources" where learners found reading articles and web-based tools related to the topic of the week. The third learning activity was "Weekly Assignment" where learners did and submitted their assignments.

To identify learning activities viewed by learners in the two groups, the researchers gave each learning activity a specific code. For example, the learning activity "Bulletin Board" was coded as A while "General Discussion Forum" was coded as B. All those learning activities were input into a Microsoft Excel sheet to calculate the total number for each learning activity. As shown in Figure 5, except the three learning activities "Questions for Weekly Lectures, Technical Problems, and Virtual Office Hours", learners in Group A participated in learning activities quite equally. The most-viewed activity was "Learning Resources". The least frequently viewed activity was "Technical Problems". Differently, for learners in Group B, "Technical Problems" and "Questions for Weekly Lectures" were only two learning activities learners in this group most frequently viewed. The viewing rates of other activities were very low compared with the viewing rates by learners in Group A. Statistically, there was a significant difference between learners in Group A and learners in Group B in terms of learning activity viewed by Group A (M = 4938.64, SD = 1969.91) and Group B (M = 1571.72.30, SD = 1977.13); $t(1)$ =3.76, p = 0.0013.

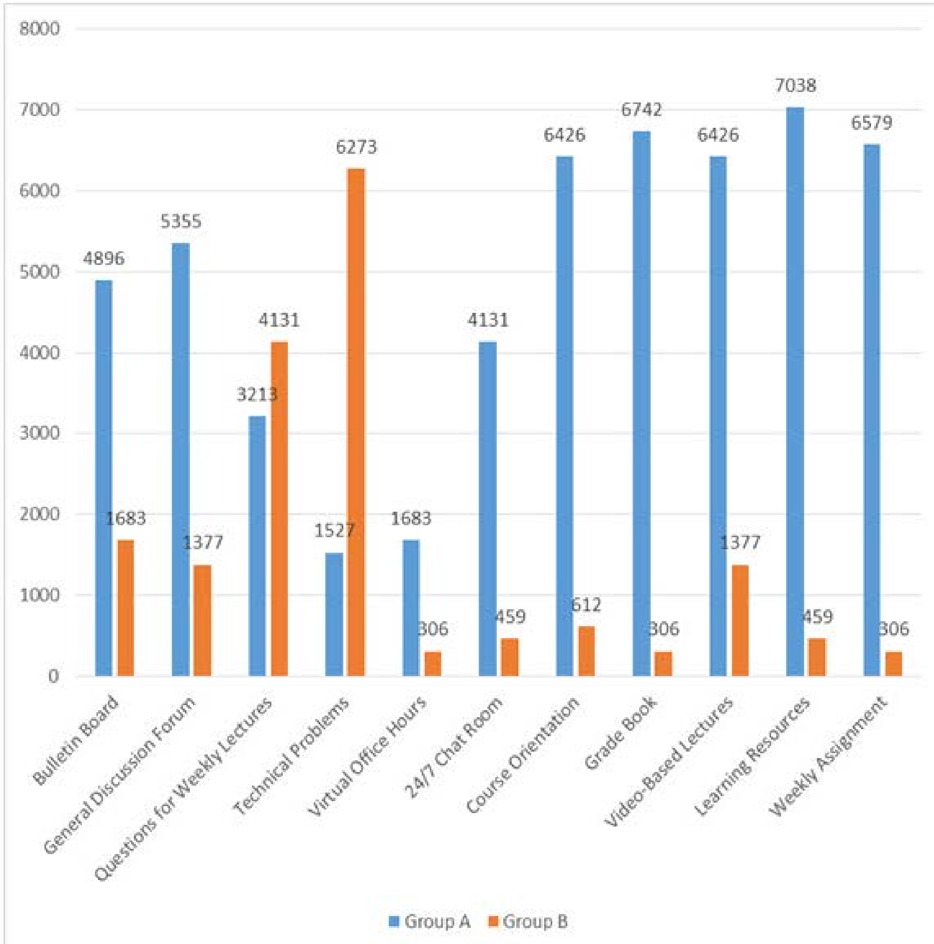

Figure 5. Learning activities viewed by learners in Group A and Group B.

Discussion and Implication

The combined findings in the online survey and learners' login analysis presented an overview of what factors lead to successful completion in an online professional development course. First of all, successful online learners in an online professional development course are in the age range of 25-34. They need to have "*Self-discipline*". This factor was actually in line with what previous researchers (Boyd, 2004; Beaudoin, Kutz, & Eden, 2009) found in their studies. Second, they understand that they need to complete the course because it is their school administrators' expectation. It is interesting that this factor was not found in any previous studies about the influence of school administrators' expectation on in-service teachers' performances in online professional development. Cavanagh (2013) reported that more and more principals participate in online tools for professional growth. This, in turn, might bring about positive effects on teachers' professional development. They also need to be able to learn with limited support. This probably explained why the only two learning activities learners in Group A less frequently viewed in the online course were "*Technical Problems*" and "*Virtual Office Hours*" as shown in the learners' login data analysis. They could manage to find the answer or solution to their problem by themselves through participating more often in forums or viewing the lectures. "*Course login frequency*" is another factor leading to success. This finding in the online survey was confirmed by the data shown in the learners' login log indicating that learners in Group A logged into the online course three times more than their peers in Group B. Literally, learners in Group A logged into their course almost every day and viewed every learning activity quite equally, except "*Technical Problems*". There is no finding in the literature to confirm this result, but a quite similar finding in a study by Rienties, Brouwer, and Lygo-Baker (2013) validated this phenomenon. In their study, they found that successful participants in an OPD module on average spent 4 hours and 59 minutes attending and/or watching the web-videoconferencing sessions while unsuccessful counterparts only spent 2 hours and 18 minutes. Another factor that online learners need to have to be successful in OPD is "*Familiarity with technology*". This factor is clearly illustrated in the learners' login data. While learners in Group A viewed the "*Technical Problem*" forum less often, learners in Group B viewed "*Technical Problems*" much more frequently.

Significance of the Study

The study triangulated the perceptions of participants and their actual activities in an OPD course. Therefore, the profile of successful OPD learners is not simply imagined and created by learners. In addition, the study validates previous findings regarding characteristics of online learners and contributes to the scarcity of scholarship on the topic. The findings of this study have several implications for school administrators, OPD organizers and trainers, and in-service teachers in OPD. First of all, the "*school administrator's expectation*" factor provides an implication for school districts to consider communicating a clear message to in-service teachers about their expectations when teachers pursue OPD. For instance, participants in OPD should submit a report or statement and/or certificate of OPD completion to their school administrators after the training. Second, not everyone can successfully take online learning in general and OPD for in-service teachers in particular. Before offering an OPD for in-service teachers, OPD organizers and trainers need to be aware that OPD participants need to have certain personal characteristics and skills such as "*Self-discipline*" and "*Familiarity with technology*". In other words, before conducting online professional development training, OPD organizers or trainers may create a checklist for in-service teachers to identify if they are suitable for OPD.

Limitations of the Study

The study focused on selected factors of successful online learners as reported in previous research. It is not possible to include all factors that might affect learners' success in the OPD setting. In addition, as answers to the factor survey were anonymous, the researchers did not take cultural perspectives into consideration. It is not known if school administrators’ expectation affects participants' performance across countries or just in particular cultures. As reported in Beaudoin, Kutz, and Eden (2009), participants from Mexico had different opinions regarding school administrators´ expectation from respondents from the other countries.

Recommendation for Further Research

Taking the limitations of the study into consideration, future research can validate other factors, including the newly found factor in this study, school administrators' expectations. Furthermore, it is a good idea to examine the factor across cultures.

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THE INTERNATIONAL REVIEW OF RESEARCH IN OPEN AND DISTANCE LEARNING

Exploring the Moderating Role of Perceived Flexibility Advantages in Mobile Learning Continuance Intention (MLCI)




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Abstract

The primary purpose of this study was to explore the key factors that could affect mobile learning continuance intention (MLCI), and examine the moderating effect of perceived flexibility advantages (PFA) on the relationship between key mobile learning elements and continuance intention. Five hundred undergraduate students who had previously adopted mobile devices to learn English took part in this study. Partial least squares (PLS) analysis was utilized to test the hypotheses in this study. It has been found that the perceived usefulness of mobile technology, subjective norm, and self-management of learning could be closely linked to mobile learning continuance intention. With particular respect to the moderating role of perceived flexibility advantages, it has been demonstrated that PFA could moderate the relationship between perceived usefulness of mobile technology and mobile learning continuance intention, as well as the association between subjective norm and mobile learning continuance intention, whereas PFA did not moderate the link between self-management of learning and mobile learning continuance intention.This report has further added to the body of knowledge in the field of mobile learning through empirical examination.

Keywords: Mobile learning continuance intention; perceived flexibility advantages

Introduction

Due to the swift proliferation of mobile technology (Liaw, Hatala, & Huang, 2009; Wang, Wu, & Wang, 2009), the use of mobile devices, like notebook computers, and mobile phones, as learning tools has offered people the flexibility and convenience to acquire new knowledge anytime and anywhere (Chen, 2010; Sarica & Cavus, 2009; Kukulska-Hulme, 2007; Yukselturk & Yildirim, 2008). In light of this, growing attention has been paid to the critical roles of perceived flexibility advantages in mobile and online learning. For example, Marks, Sibley, and Arbaugh (2005) have indicated that perceived flexibility advantages could have a positive influence on online learning outcome. Evans (2008) has revealed that a learner's perceived flexibility advantages could be closely associated with mobile learning acceptance. Although several researchers have highly focused on online and mobile learning studies, relatively little effort has been devoted to examining the link between perceived flexibility advantages and mobile learning outcome. More specifically, the relationship between perceived flexibility advantages and mobile learning outcome has not yet been fully investigated in previous studies.

In addition, because customers' continued use of information technology products and services could be viewed as a central indicator to determine the entire success of products and services, it has been shown that there is a growing interest in investigating users' continuance intention to adopt information technology products, mobile services, and e-learning programs (Lin, 2012). However, limited studies have been conducted to examine the moderators of continuance intention (Lin, 2011). With specific regard to the influence of perceived flexibility advantages on mobile learning outcome, it has been found that there is still a dearth of studies probing into the moderating effect of perceived flexibility advantages on mobile learning continuance intention, which refers to students' continuance intention to use mobile technology to acquire new knowledge. Accordingly, this issue should be worthy of further investigations, and the primary purpose of this study was to explore the key factors that could affect mobile learning continuance intention, and examine the moderating effect of perceived flexibility advantages on the relationship between key mobile learning elements and continuance intention.

Literature Review and Hypothesis Development

The Definition of Mobile Learning

It has been shown that although there is no universal agreement as to the definition of mobile learning (m-learning), relevant discussions on m-learning are mainly centered on learning flexibility and educational applications of mobile technology (El-Hussein & Cronje, 2010; Park, 2011; Wang et al., 2009). For instance, an early report by Wang et al. (2009) has revealed that "M-learning refers to the delivery of learning to students anytime and anywhere through the use of wireless Internet and mobile devices, including mobile phones, personal digital assistants (PDAs), smart phones and digital audio players" (p. 93). Another recent review by Park (2011) has suggested that "mobile learning refers to the use of mobile or wireless devices for the purpose of learning while on the move" (p. 79). Consequently, based on previous suggestions, mobile learning, in this study, could be broadly described as learning activities through the use of mobile technology.

Perceived Usefulness of Mobile Technology (PUMT)

In prior information technology (IT) research, it has been shown that a person's perception of usefulness toward IT could be closely connected with his or her technology acceptance (Davis, 1989; Roca & Gagné, 2008). According to the technology acceptance model (TAM) proposed by Davis (1989), a person's perceived usefulness of certain IT is described as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p. 320). Several online learning studies have indicated a positive link between learners' perceived usefulness and continuance intention (Lee, 2006; Lee, 2010; Roca & Gagné, 2008; Saade & Bahli, 2005). In the mobile learning context, a learner's perceived usefulness of mobile technology (PUMT) is described as the degree to which a learner believes that using mobile devices would enhance his or her English learning performance. It is possible that a learner with higher perceived usefulness of mobile technology would have a more positive MLCI. Hence, this study proposes the following hypothesis.

H1: Perceived usefulness of mobile technology could have a positive influence on mobile learning continuance intention.

Self-Management of Learning (SML)

The self-management of learning (SML), which refers to "the extent to which an individual feels he or she is self-disciplined and can engage in autonomous learning" (Wang et al., 2009, p. 101), has several synonyms such as autonomous, self-directed, self-regulated, and independent learning (Regan, 2003). SML has received much attention in prior research mainly because it could have a positive impact on learning outcomes (Ommundsen, Haugen, & Lund, 2005). An early review by Chen (2002) has revealed that learners' self-management of learning could be closely associated with their academic performance. Another English learning study by Weschler and Pitts (2000) showed that it could be suitable and beneficial to suggest that English learners with higher levels of self-directed-learning capabilities use electronic dictionaries. This could be because such learners would like to have more autonomous and independent learning opportunities. Wang et al. (2009) indicated that SML could be positively associated with learners' behavioral intention to engage in mobile learning. In mobile learning domains, it is likely that learners with higher SML could have more positive MLCI. Consequently, this study proposes the following hypothesis.

H2: Self-management of learning could have a positive influence on mobile learning continuance intention.

Subjective Norm (SN)

It has been found that advice, suggestions, and viewpoints from critical people such as supervisors, intimate friends, or family members could have a pivotal influence on our decision making process and outcomes (Aggelidis & Chatzoglou, 2009). According to Ajzen (1991), the subjective norm (SN), which is described as "the perceived social pressure to perform or not to perform the behavior" (p. 188), could play a key role in determining people's acceptance and usage of new IT (Aggelidis & Chatzoglou, 2009; Schepers & Wetzels, 2007; Venkatesh & Davis, 2000; Wang et al., 2009). Nevertheless, some IT studies have revealed that SN has no impact on people's behavioral intention (Hsu & Lin, 2008; Yuen & Ma, 2008) and IT system usage (Van Raaij & Schepers, 2008). With specific regard to the effect of SN on continuance intention, it is shown that the positive relationship between SN and continuance intention has been well documented in previous reports (Chen et al., 2012; Lee, 2010). Similarly, in the context of mobile learning, it is possible that mobile learning continuance intention could fall under the sway of subjective norm. Thus, this study proposes the following hypothesis.

H3: Subjective norm could have a positive influence on mobile learning continuance intention.

Perceived Flexibility Advantages (PFA)

Previous studies have revealed that learners' perceptions of the flexibility advantages of online learning could positively affect their intention to adopt online learning courses in the future (Hamzaee, 2005; Hollis & Madill, 2006; McGorry, 2003). Arbaugh (2000) proposed that online learning, which gives learners "a high degree of flexibility in when and where they participate in Internet-based courses" (p. 35), is very desirable to some learners. In other words, the time and place flexibility advantages of online learning are very attractive to learners, probably because flexibility advantages allow them to manage working, learning, and personal activities more conveniently and flexibly (Arbaugh, 2000; Kung, 2002; Marks et al., 2005; Sullivan, 2001). In mobile learning environments, it has been shown that the perceived flexibility advantages, which refer to the time and place flexibility advantages of learning English through mobile devices, could be closely connected with learners' mobile learning continuance intention, perceived usefulness of mobile technology, and self-management of learning. For instance, Evans (2008) has suggested that students highly emphasize the key effect of flexibility advantages in their behavioral intention to adopt mobile learning. An early report by López-Nicolás et al. (2008) has revealed that there is a positive association between perceived flexibility advantages and the perceived usefulness of mobile technology. Another recent language learning review by Gardner and Miller (2011) has indicated that learners' management of self-access language learning could fall under the sway of learning flexibility.

With particular respect to the link between perceived flexibility advantages and mobile learning effectiveness and efficiency, although there is a growing interest in mobile learning studies, little empirical work has been conducted on the moderating effect of perceived flexibility advantages on mobile learning continuance intention (MLCI). Based on the suggestions of previous reports, accordingly, this study proposes the following hypotheses.

H4: PFA could moderate the relationship between perceived usefulness of mobile technology and mobile learning continuance intention.

H5: PFA could moderate the relationship between subjective norm and mobile learning continuance intention.

H6: PFA could moderate the relationship between self-management of learning and mobile learning continuance intention.

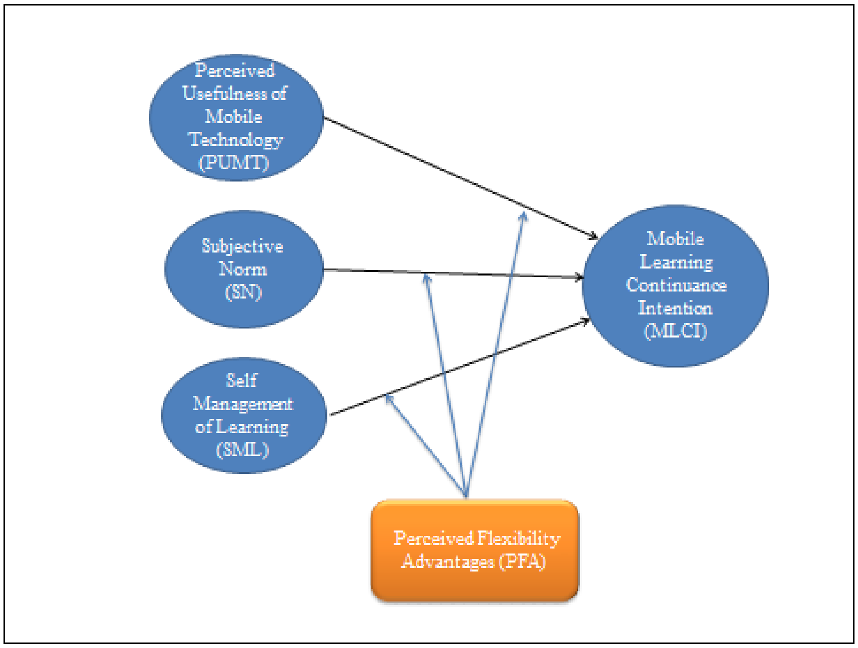

Figure 1. Theoretical framework of the study.

Research Methodology

Data Collection

The data were collected via a pencil and paper survey. Five hundred undergraduate students who had previously adopted mobile devices to learn English took part in this study. Except for four incomplete surveys, the other 496 surveys were usable. As shown in Table 1, there were 245 and 247 male and female participants respectively. Only 23 participants were English major students. In terms of the academic level of participants, it was found that the sophomore group was the largest group, and the freshman group was the second largest group. Finally, it was revealed that most participants in this study were business majors.

Table 1

Profile of Participants

Demographic variable	Items	Frequency	Percentage of respondents
Gender	Male	245	49
	Female	247	50
	Missing data	4	1
Academic level	Freshman	156	31
	Sophomore	188	38
	Junior	64	13
	Senior	68	14
	Missing data	20	4
English major	Yes	23	5
	No	473	95
College major	Business	263	53
	Engineering	42	8
	Social Sciences	138	28
	Sciences	53	11

Instrumentation

A 7-point Likert scale was used to measure the level of agreement of each construct. Items which measured learners'perceived usefulness of mobile technology, subjective norm, and mobile learning continuance intention were adopted from Davis (1989), Venkatesh and Davis (2000), as well as Roca et al. (2006), respectively. Four items which measured perceived flexibility advantages were chosen from Huang et al. (2012) and Marks et al. (2005). In addition, four items which measured self-management of learning were selected from Wang et al. (2009).

Data Analysis and Results

Partial least squares (PLS) analysis was utilized to test the hypotheses in this study. The PLS analysis, one of the structural equation modeling (SEM) techniques, was more suitable not only to analyze the relationship between predictors and outcome variables (Fornell & Bookstein, 1982), but also to give readers a clear picture of variances explained by predictor variables in this study (Barclay, Higgins, & Thompson, 1995). First, with respect to the reliability and internal consistency of measuring scales, according to Table 2, it was found that the factor loading of each variable was all above .70, and the composite reliability (CR) of each construct exceeded .90 (Fornell & Larcker, 1981). Hence, it was demonstrated that all scales indicated an adequate internal consistency.

Moreover, according to Table 3, it was shown that the convergent and discriminant validity were all satisfactory not only because the average variance extracted (AVE) for each construct was higher than the suggested value of 0.5 (Fornell & Larcker, 1981), but also because the square root of AVE values on the diagonal were greater than the off-diagonal correlation values (Fornell & Larcker, 1981). As this study further examined path coefficients of the structural model and hypotheses, it was found that hypothesis 1, 2, and 3 were all supported by the study results, which indicated that the perceived usefulness of mobile technology, subjective norm, and self-management of learning explained a total of 41.8 % of variance in mobile learning continuance intention (see Figure 2).

Finally, in order to determine the moderating effect of perceived flexibility advantages on the relationship between key mobile learning elements and continuance intention, based on the median score of perceived flexibility advantages = 4.75, 496 participants were divided into two groups: high flexibility advantages group (n = 236), and low flexibility advantages group (n = 260). The PLS analysis was subsequently carried out to explore the path structures for both models (see Figure 3 and 4). Additionally, the analysis of path coefficient comparison, which was suggested by Keil, Tan, Wei, and Saarinen (2000), was conducted to examine the moderating effect of flexibility advantages in this study. As shown in Table 4, it was demonstrated that except hypothesis 6, hypothesis 4 and 5 were supported by the study findings, which revealed that the perceived flexibility advantages moderated the relationship between perceived usefulness of mobile technology and mobile learning continuance intention, as well as the link between subjective norm and mobile learning continuance intention.

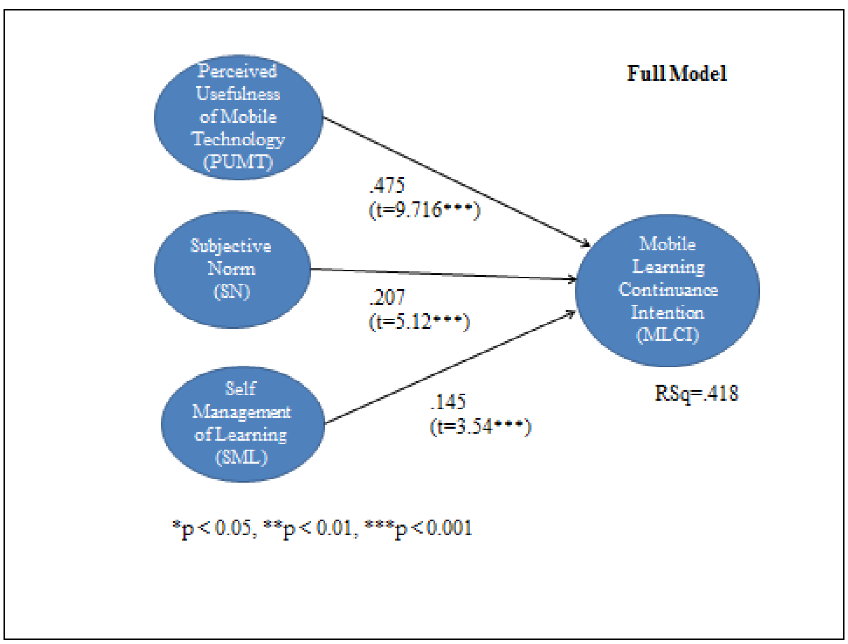

Figure 2. PLS solution for full data set.

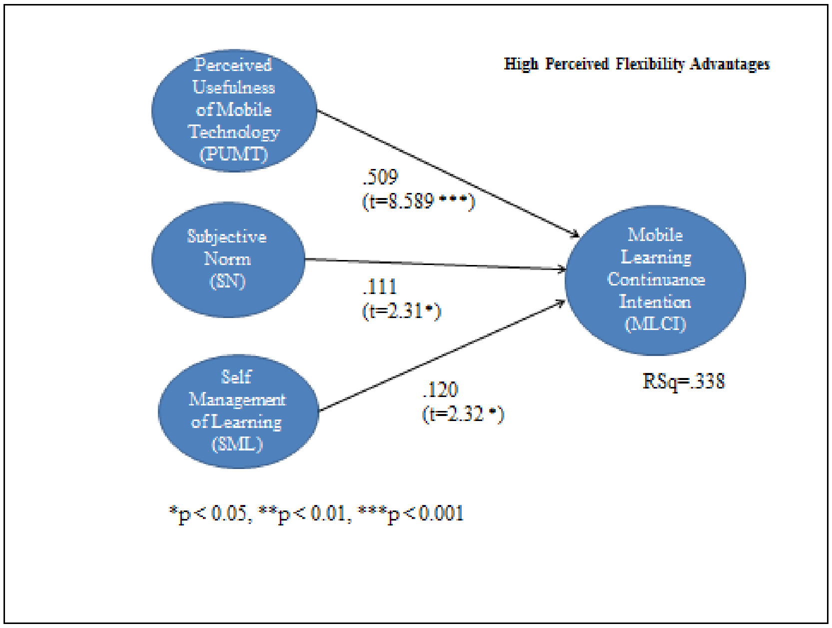

Figure 3. PLS solution for high perceived flexibility advantages group.

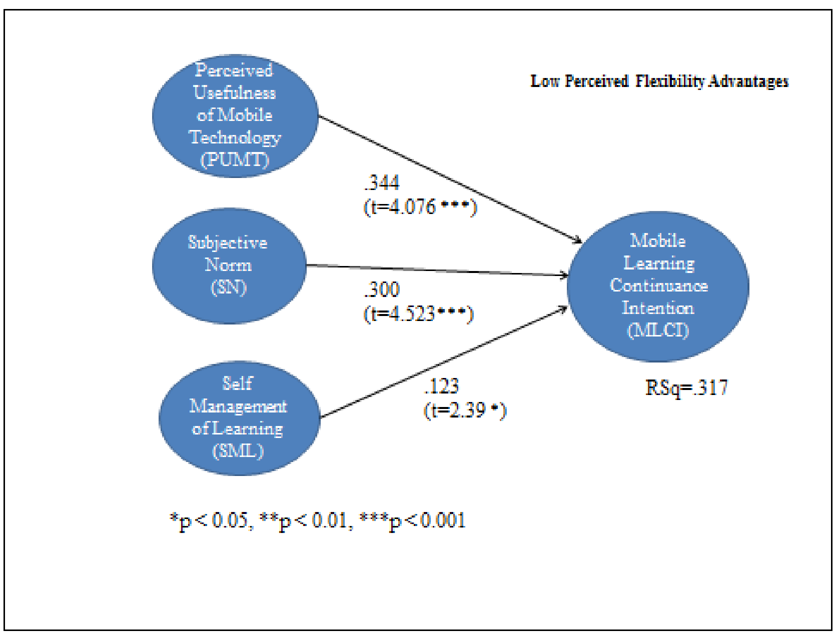

Figure 4. PLS solution for low perceived flexibility advantages group.

Table 2

Confirmatory Factor Analysis of Each Model

Item	PUMT			SML			SN			MLCI		
	FM	H	L	FM	H	L	FM	H	L	FM	H	L
PUMT1	.89	.86	.88									
PUMT2	.92	.90	.92									
PUMT3	.88	.85	.87									
PUMT4	.88	.85	.87									
SML1				.88	.86	.91						
SML2				.90	.90	.89						
SML3				.86	.87	.77						
SML4				.87	.90	.80						
SN1							.88	.90	.84			
SN2							.93	.93	.93			
SN3							.82	.92	.90			
MLCI1										.91	.91	.88
MLCI2										.91	.90	.88
MLCI3										.88	.86	.86
CR	.94	.92	.93	.93	.93	.90	.93	.93	.92	.92	.92	.90
AVE	.80	.75	.78	.77	.77	.71	.83	.83	.79	.81	.79	.76
Cronbach's Alpha	.91	.88	.90	.90	.90	.86	.90	.90	.87	.88	.87	.84

Note. PFA, perceived flexibility advantages; FM, full model; H, high perceived flexibility advantage group; L, low perceived flexibility advantage group; PUMT, perceived usefulness of mobile technology; SML, self-management of learning; SN, subjective norm; MLCI, mobile learning continuance intention; CR, Composite Reliability; AVE, Average Variance Extracted

Table 3

The Correlations of Each Latent Variable among Different Models

Full Model	PUMT	SML	SN	MLCI
Perceived Usefulness (PUMT)	.80			
Self-Management of Learning (SML)	.27	.77		
Subjective Norm (SN)	.37	.29	.83	
Mobile Learning Continuance Intention (MLCI)	.59	.33	.42	.81
PFA-HIGH	PUMT	SML	SN	MLCI
Perceived Usefulness (PUMT)	.75			
Self-Management of Learning (SML)	.20	.77		
Subjective Norm (SN)	.19	.19	.83	
Mobile Learning Continuance Intention (MLCI)	.55	.24	.23	.79
PFA-LOW	PUMT	SML	SN	MLCI
Perceived Usefulness (PUMT)	.78			
Self-Management of Learning (SML)	.11	.71		
Subjective Norm (SN)	.33	.19	.79	
Mobile Learning Continuance Intention (MLCI)	.45	.22	.44	.76

Note. Diagonal elements are the square root of Average Variance Extracted; PUMT, perceived usefulness of mobile technology; PFA, perceived flexibility advantages; MLCI, mobile learning continuance intention; SML, self-management of learning; SN, subjective norm

Table 4

Statistical Comparison of Each Path

Hypothesis	Path	HIGH PFA (N=236)		LOW PFA (N=260)		Comparison
		Path coefficient	Standard error	Path coefficient	Standard error	
H4	PUMT→MLCI	.509	.059	.344	.084	25.08***
H5	SN→MLCI	.111	.048	.300	.066	-36.16***
H6	SML→MLCI	.120	.051	.123	.051	-.65

Note. PUMT, perceived usefulness of mobile technology; PFA, perceived flexibility advantages; MLCI, mobile learning continuance intention; SML, self-management of learning; SN, subjective norm

*p < 0.05, **p < 0.01, ***p < 0.001.

Discussion and Implications

The primary purpose of this study was to explore the key factors that could affect MLCI, and further examine the moderating effect of perceived flexibility advantages on the relationship between key mobile learning elements and continuance intention. First, it has been found that hypothesis 1, 2, and 3 are supported by study findings. The study results are congruent with previous research which indicates that the perceived usefulness of mobile technology (PUMT), subjective norm (SN), and self-management of learning (SML) could be closely linked to mobile learning continuance intention (Lee, 2010; Roca & Gagné, 2008; Wang et al., 2009). It is implied that more attention should be paid to whether the functions and services of mobile devices are suitable for mobile learning, mainly because perceived usefulness of mobile technology could play the most important part in determining learners' mobile learning continuance intention. Moreover, in order to minimize the possible interruption to mobile learning, it is important that more efforts should be made not only to facilitate learners to have better self-management of learning, but also to properly give them recommendations for future mobile learning.

Third, it has been demonstrated that hypothesis 4 and 5 are supported by study results. The findings are in line with early reviews (Evans, 2008; López-Nicolás et al., 2008), which suggest that perceived flexibility advantages could moderate the relationship between perceived usefulness of mobile technology and mobile learning continuance intention, as well as the association between subjective norm and mobile learning continuance intention. That is, learners with higher perceived flexibility advantages are more likely to have stronger relationship between perceived usefulness of mobile technology and mobile learning continuance intention than those with lower perceived flexibility advantages, whereas learners with higher perceived flexibility advantages are more likely to have weaker relationship between subjective norm and mobile learning continuance intention than those with lower perceived flexibility advantages. It is hinted that with respect to learners with lower perceived flexibility advantages, subjective norm should deserve more attention, mainly because critical insights from key people could be more important to them in affecting their mobile learning continuance intention. On the contrary, with specific regard to learners with higher perceived flexibility advantages, perceived usefulness of mobile technology should merit first consideration, mainly because it could play a relatively more important role in facilitating their mobile learning continuance intention.

Last but not least, it has been shown that hypothesis 6 is not supported by study findings. The study result is not consistent with previous research (Gardner & Miller, 2011), which reveals that perceived flexibility advantages did not moderate the relationship between self-management of learning and mobile learning continuance intention. In other words, learners with different levels of perceived flexibility advantages could still have a similar relationship between self-management of learning and mobile learning continuance intention. Nevertheless, it is suggested that more studies are needed in order to verify the role of perceived flexibility advantages in self-management of learning and mobile learning studies.

Limitations and Conclusions

There are some limitations and restrictions in this study that should be further addressed. First, findings and implications drawn from this study should be applied with caution, mainly due to the limited data available. Moreover, it is necessary that suppliers of mobile technology, one of the important stakeholders, should be further incorporated into future mobile learning studies in order to gain insights from different stakeholders. Third, due to age differences, it is possible that mobile learning effectiveness and efficiency could be subject to change. Accordingly, more studies should be conducted to investigate the role of the age variable in subsequent mobile learning studies.

In conclusion, this report has further added to the body of knowledge in the field of mobile learning through empirical examination. As mobile learning has gradually become a key learning channel in our lives, it is critical that the researchers and practitioners should concentrate not only on the use of mobile technology, but also on the continued use of mobile technology in learning.

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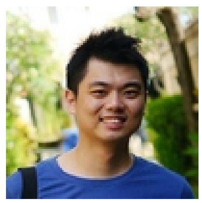
Coping with the Challenges of Open Online Education in Chinese Societies in the Mobile Era: NTHU OCW as a Case Study

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Abstract

In an era witnessing the rapid development of information technology, mobile devices have brought revolutionary changes to learning. A single conventional media platform is not enough for the various mobile devices. Technology-enriched educational environments supported by different devices are important research issues nowadays. To capture the rapid growth of mobile users in Chinese societies, OpenCourseWare (OCW) needs to move their learning models toward the mobile sphere. Therefore, this study reports the three years of empirical experience in implementing the upgraded National Tsing Hua University OCW platform and analyzes how users access the platform with various devices. The results indicate a responsive web design and cloud-computing provide great accessibility to meet the diversity of various mobile devices from Chinese users throughout the world, including 466,429 visits with 264 different mobile devices from 146 territories. Moreover, the proposed solutions make the workflow of OCW production more efficient. The study further discussed the importance of both tablets and smartphones. Moreover, to expand the reach of open educational resources (OER) in Chinese societies, the critical issues of fair use and sustainability of OER should be of concern. The findings of the study provide valuable references for web engineers and educators to explore cross-device online learning using PCs and mobile devices.

Keywords: Mobile learning; OpenCourseWare; online courses; Chinese society; cross-device learning

Introduction

In Western societies, OpenCourseWare (OCW), which was pioneered by Massachusetts Institute of Technology, has shared more than 2,000 courses in English over the past decade (MIT OCW, 2012). Several studies discussed the issues of open educational resources (OER) and OCW in English (d'Oliveira, et al., 2010; OpenCourseWare, 2006; Klebl et al., 2010). However, Chinese users might have language and culture barriers in learning English with OCW. Moreover, few studies focus on the OCW issue in Chinese societies. In an era witnessing the rapid development of information technology, mobile devices have brought revolutionary changes in network information exchange and profoundly influence people's work and life. In China and Taiwan, 74.5% and 44.32% of the Internet population access the Internet via mobile devices (CNNIC, 2013; TWNIC, 2013). The use of mobile devices could provide greater and easier access to OER anywhere and anytime (Ally & Samaka, 2013; Chaiprasurt & Esichaikul, 2013; Valk, Rashid, & Elder, 2010). To capture the growth of mobile learners in Chinese societies, OCW needs to move their learning models toward the mobile sphere. However, the conventional OCW was designed for desktops and might not display well on mobile devices. However, the single media platform is not enough in the current era of information explosion for various mobile devices. The emergence of various innovative mobile technologies, such as smart phones and tablets, has brought lots of design issues and challenges associated with physical and functional limitations (Fallahkhair et al., 2004; Naismith et al., 2005). Developers have to face restrictions in the mobile phone hardware and the devices' specifications (Chaisatien & Tokuda, 2009; Kaltofen, Milrad, & Kurti, 2010). To adapt to the capabilities of mobile devices, the digital contents and layout on the OCW need to be redesigned. To date, there has been a lack of research shedding light on these issues. Therefore, these issues are worthy of our investigation.

In the past decade, to expand the delivery of the Chinese OCW around the world, National Tsing Hua University (NTHU), one of the prestigious universities in Taiwan, launched the initial version of the OCW platform based on the open source course management system, Moodle. NTHU OCW features provide top quality higher level Chinese courses delivered by faculty members who have received outstanding teaching awards. Each course contains the lecture videos and some materials, such as course syllabus or lecture slides, in the whole semester freely and openly. In 2010, NTHU started to redesign the platform to target mobile learners. Meanwhile, cloud computing is a newly proposed service model that improves the traditional client-server architecture and aims to ease the workload to guarantee quality of service (Armbrust, et al., 2010; Dikaiakos, 2009; Buyya, 2008). Therefore, the purposes of this study are to document the valuable experiences of redesigning the NTHU OCW platform based on cloud computing and understand how the platform could extend the reach of OCW across various devices to the global Chinese community. The research questions are as follows:

1) What are the challenges of implementing the OCW platform for various mobile devices? What are the solutions? How did NTHU OCW redesign and upgrade its platform based on those solutions? Can the redesigned platform make the publishing flow more efficiently?

2) Who can benefit from NTHU OCW after the cloud-based OCW platform is in operation? What mobile devices do they use to access the learning contents and where are they from?

Literature Review

Mobile Learning

Thanks to advances in wireless and mobile technologies, it is possible to extend the learning environment far beyond classroom walls and school schedules through the use of mobile devices (Liu, 2007; Traxler, 2007). Mobile technologies have dramatically increased portability in the learning process and constructed a seamlessly integrated learning environment (Joiner, Stanton, & Luckin, 2003; Kraut et al., 2002). Various studies have found using mobile technology can enable learners to become active participants. Students with mobile devices can directly explore knowledge and share their experiences with others. They can learn on their own terms and may therefore tend to devote themselves to study (Looi et al., 2010; Roschelle, 2003; Squire & Klopfer, 2007; Wang et al., 2013). Moreover, mobile learning has been recognized as an effective learning approach (Hung, et al., 2013; Rogers & Price, 2009; Valk, Rashid, & Elder, 2010).

The emergence of innovative mobile technologies has brought up a wide variety of learning activities. Each technology has distinct characteristics and affordances that facilitate different types of learning. For example, those devices have different affordances such as internet connectivity, screen size, portability, and storage and operation systems, which allow learners to reach the distinct format of content in different user-behaviors (Fallahkhair et al., 2004; Naismith et al., 2005; Pemberton et al., 2004). Moreover, mobile devices do not always benefit learning because of various drawbacks, including a small screen, limited input options, and low computational power. We need to rely on an appropriate design to overcome these pitfalls and embrace a broader spectrum of mobile learning practice designs (Ting, 2012). Therefore, we should supply the same content with different qualities at a time to serve the various needs of the target users in different situations to choose or switch their devices to learn OCW.

OCW and OER on Mobile Devices

The idea of open educational resources (OER) was born of technological advances enabling the creation, organization, and dissemination of high-quality openly licensed online educational materials for people everywhere to share, use, and reuse knowledge more easily (Atkins et al., 2007; OLCOS Roadmap, 2007; The William and Flora Hewlett Foundation, 2013). The goal of OpenCourseWare (OCW), pioneered by Massachusetts Institute of Technology (MIT), is to create a global Web to offer open educational resources (OER) over the past decade. OCW nowadays differs from conventional web-based learning because it's a new and revolutionary method of sharing the contents freely to all audiences (Kim et al., 2006). With the growing functionality of mobile devices, mobile learning offers greater choice to allow teachers to deliver learning materials (Fozdar & Kumar, 2007).

The investigations discovered learners' demand for using mobile devices enhanced OCW learning (Bateman, Lane, & Moon, 2012; Gomez, et al., 2012). OCW is a great supplement for mobile learners. The use of mobile technology provides OCW learners with an opportunity to reach OER beyond their routine classroom environments in their own time and at their own pace (Baird, Esterhuizen, & Beer, 2010). There are many different kinds of video formats for people to choose from. Various devices are held by users to view those digital contents. They come across problems to find qualified information for their devices (Tracey, 2009).

Previous mobile learning research with regard to OCW and OER have examined how learning materials are designed and delivered for the new generation of learners (Ally, 2005; Patten, Sanchez, & Tangney, 2006; Sharples, Taylor, & Vavoula, 2007). Kukulska-Hulme (2007) discussed mobile usability in educational contexts and emphasized the importance of usability which should be tracked over a longer period. Traxler (2007) examined this relationship in the context of mobile learning and provided information on how mobile technology can be used in informal learning. Fozdar and Kumar (2007) indicated that the use of mobile technology can help in student retention in open and distance learning and allow educational organizations to reach more learners. Mobile devices lend learning to new methods of delivery (Peters, 2007).

Some other research studies have adopted mobile devices to OCW or OER learning: To make sure OERs are truly open and accessible, Rolfe and Griffin (2012) released OERs in multiple formats. Tecnológico de Monterrey in Mexico, with other Mexican higher education institutions, was creating an Internet repository of OER and mobile resources for the instruction and development of educational researchers (Mortera, 2010). Kinshuk and Jesse (2013) presented the mobile authoring tool, MAAIMS, for OER in standardized learning content and demonstrated authoring of authentic learning examples with mobile sensors and location-awareness. Fukuhara, Yamawaki, and Kageyama (2010) introduced the social learning service, "iUniv", where formal academic contents are used in informal learning situations. Users can access contents with various terminals like iPone, iPad, and smartphone. DeWaard, et al. (2011) explored how the massive open online course (MOOC) format developed by connectivist researchers and used Mobi-MOOC to understand the chaos, emergence, and complexity in education. However, few studies have discussed the challenges and considerations from the view of implementing the OCW platform for various mobile devices. This study examined holistic design issues in terms of platform development, interface design, and multimedia courseware production.

Cross-Platform and Responsive Web Design

During the educational process, different types of technologies are used to enhance the learning capabilities of students (Kert, 2013). Due to the market of mobile operating systems for smartphones being fragmented – such as Google's Android, Apple's iOS, Microsoft's Windows Phone and RIM's Blackberry – and all the operating system platforms differing significantly from each other, the multiple mobile devices also differ in development procedures. However, current development methods for mobile applications are mostly based on the Software Development Kits (SDKs) released by the native platform (Kaltofen, Milrad, & Kurti, 2010). Application developers might be forced to choose to support only specific devices or required to develop the application for each platform separately to reach a large audience of users (Heitkötter, Hanschke, & Majchrzak, 2013).

Cross-platform development approaches emerged to address this challenge by allowing developers to implement their apps in one step for a range of platforms, avoiding repetition and increasing productivity. On the one hand, these approaches need to offer suitable generality in order to allow provision of apps for several platforms. On the other hand, they still have to enable developers to capitalize on the specific advantages and possibilities of smartphones.

Heitkötter, Hanschke, and Majchrzak (2013) classified general approaches to cross-platform development of mobile applications and analysed existing cross-platform solutions based on Web technologies like HTML, CSS, and JavaScript. As these differ in their general architecture and their capabilities, it is not obvious which to prefer. We will outline criteria that are important when making a decision as well as evaluate popular approaches to mobile Web apps, such as PhoneGap and Titanium Mobile, according to these criteria (Heitkötter, Hanschke, & Majchrzak, 2013).

To address these challenges, numerous tools have been created to aid developers in building cross-platform applications. Dhillon (2012) evaluated the features and performance and discussed the development history of existing and future cross-platform development tools. He compared these tools by benchmarking several tools (Table 1). The result indicated that Mobile Web apps offer a quick and simple entrance into cross-platform development. In summary, the maturity of cross-platform approaches reveals that native development is not necessary when implementing mobile applications.

Table 1

Tools for Cross-Platfrom Application Development (Dhillon, 2012)

CPDT	BlackBerry OS	BlackBerry 10	iOS	Android	Windows Phone 7	Bada
Mibile Web	V	V	V	V	V	V
Adobe PhoneGap	V		V	V	V	V
Appcelerator Titanium		Beta	V	V		
Rhomobile Rhodes	V		3.0+	1.6+	V	
Adobe Air		V	V	V		
MoSync			V	V	V	

As more devices become able to access the Internet, website designers are finding it harder to predict user context (Gardner, 2011). The World Wide Web Consortium (2005) recognized mobile device variety would slow mobile web growth. The cross-platform approach may prove to be the most efficient method due to its low entry barriers owing to usage of Web technologies such as HTML5, CSS, and JavaScript, which are standardized, popular, and well-supported (Heitkötter, Hanschke, & Majchrzak, 2013). To cope with the highly differentiated capabilities and limitations of mobile devices, the solutions could be deploying multiple versions of their content or rely on adaptation techniques (W3C Working Group, 2005). Responsive web design is a term given to a set of adaptation techniques that allow designers to create a single website that can adapt the layout to viewing contexts across various devices (Marcotte, 2011; WebDesignShock, 2011). J-Query is one of the programing languages including the lightweight cross-browser JavaScript library for responsive web design and can enhance the effective usage of different mobile applications to support different types of browsers (McCormick & De Volder, 2004). J-Query emphasizes interaction between JavaScript and HTML and was used by more than 27% of the most visited websites; jQuery is the most popular JavaScript library currently in use (Na, 2011). Kert (2013) demonstrated the remarkable advantages of J-Query, such as support for different browsers, and indicated J-Query could support and enrich the pedagogical proficiency of courses via different kinds of mobile devices. Therefore, this study adopts web technologies such as jQuery, CSS3, and HTML5 to add the necessary functional, aesthetic, and multimedia tools for mobile user behavior on the Web.

Cloud Computing

Makdin, a cross-device learning platform, may lead to duplication in the transformation of different formats of video for various devices. To resolve this problem, cloud computing supports resource management, time scheduling, and format converting. The term *cloud* originates from accessing storage elements and software services on the Internet (Knorr & Gruman, 2008). Cloud computing is defined as a technology using the Internet as a medium, which is the concept that has evolved to distributed computing, grid computing, or classical high performance computing (Vaquero, Lindner, Rodero-Merino, & Caceres, 2009; Yoon & Kim, 2010). Cloud computing provides the foundation for the integration of platform and technology which can be used as a huge workspace, repository, platform, and infrastructure (Kim, Song, & Yoon, 2011). The cloud services invocation from the handset enables mobile applications that are not limited by storage space and processing power (Paniagua, Srirama, & Flores, 2011).

Cloud computing provides services at the infrastructural level (IaaS) or platform level (PaaS) or at the software level (SaaS). These kinds of applications access the shared pool of computing resources provided by the cloud on demand, and thus are able to handle tasks that require data-intensive processing. Studies indicate that the development of cloud-based computing can support mobile devices to enhance learning experiences for fostering flexibility and seamless data access (Johnson, Levine, Smith, & Stone, 2010; van't Hooft, 2008). Cloud computing and its flexibility have been identified as possible powerful components to provide people with the opportunities to distribute content and facilitate sharing, networking, communication, and the production and publishing of OER (Kop & Carroll, 2011; Wheeler & Waggener, 2009) .

Method

This study was conducted in a natural setting with the NTHU OCW production team from 2010 to 2013, including two phases: (1) system design and implementation and (2) data collection and analysis.

In the first phase, the researchers participated in the production team to explore how to redesign and make the system compatible with different mobile devices. The investigation of the system design and implementation was conducted from 2010 to 2012. The initial platform NTHU OCW was launched in 2008 based on the open source course management system Moodle. In 2010, to engage more learners and extend the reach and impact of NTHU OCW, NTHU adopted a cloud-based platform aiming to support various specialized technologies which tend to be used in different learning settings in various ways. The production team included one faculty, two programmers, one technical assistant, and 15 course developers. All participants needed to discuss and identify the problems and issues related to the platform based on actual student needs and explore how to design the OER to be displayed on different mobile devices. Both quantitative and qualitative methods were employed in this study. The qualitative data were derived from observations, semi-structured interviews, and journal entries. All members of the OCW production team were interviewed and their preparation timeline as well as how well they cooperated with one another were observed. A journal was kept while making the instructional materials.

In the second phase, to understand who and how the potential users come to visit the upgraded NTHU OCW platform, Google Analytics (GA), a kind of web analytics approach for measuring Web site effectiveness, and the web site click-through logs were adopted to collect web usage data from Jan 1, 2012 to Aug 31, 2013 (Figure 1) and the operation systems of the handheld devices at the users' side. Google Analytics set out to collect data about user interactions across websites based on web site click-through logs and analytics. Variables included page URL, user location, and source (referring link). Data were exported as comma-separated values text files which were opened in SPSS for processing. The quantitative data collected via GA can help us measure site effectiveness and understand web site performance. In this phase, data was gathered from web matric as the observation is more likely to be authentic as the user is less aware of the observation. The observation does not interrupt the users when they are learning. Sources for web matric data are log files of servers and applications which can be obtained without disturbing the user. Examples of the outcome of such analysis are statistics of the objective information, for example the number of times it has been read or downloaded, or about the users, for example the information they clicked, downloaded, and so on. Therefore, the reliability of the research was considered acceptable.

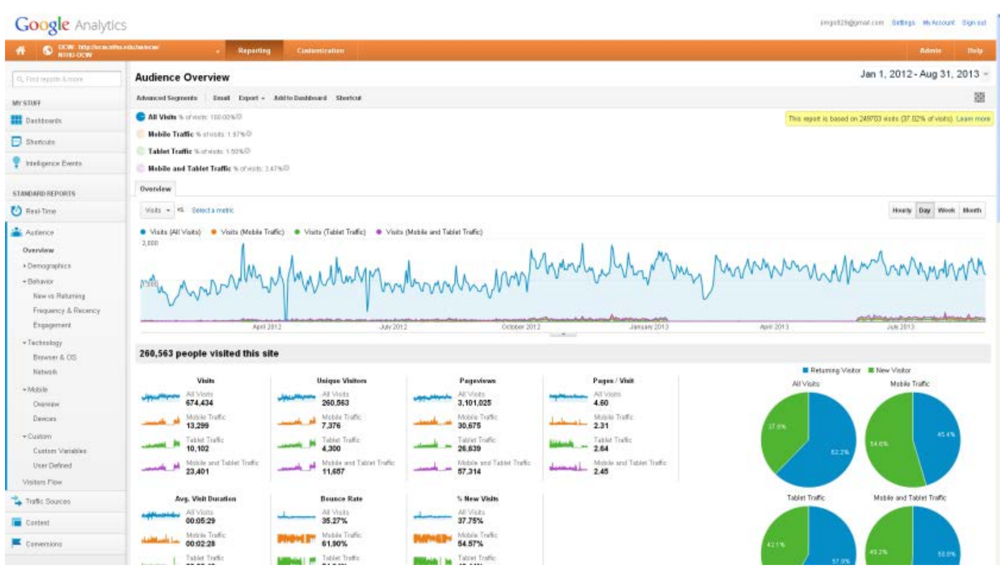

Figure 1. Google Analytics

Results and Analysis

Main Challenges and Solutions when Redesigning the OCW Platform

The data collected from the interviews indicated the production team faced several challenges in redesigning the platform. The challenges included the following: (1) screen size, (2) navigation, (3) material format, (4) network, and (5) storage (Table 2). These five challenges are related and could be discussed as two aspects: the limitation of screen size and the mobile network connectivity. In terms of screen size, the content designed for desktops is not suitable for small and diverse screen displays. For this reason, the menu bar and the items on the webpage designed for desktops with a mouse are difficult to use on the screen of mobile devices. Therefore, the content, layout, and structure should be redesigned to be simple and auto-adjustable. In terms of mobile network connectivity, those learning with mobile devices might not have a stable and high-speed network connection. The platform should deliver videos in streaming media format in case of interruption of the internet connection. Moreover, videos should be provided in different formats with different qualities for learners to choose, depending on their mobile network connectivity, storage, and operating system.

Table 2

Challenges and Solutions of Learning the OCW via Mobile Devices

	Challenges of mobile devices	NTHU OCW solutions
1) Screen size	The layout is not suitable for a small screen display and the context is far too small and unreadable.	The system should provide different layouts for various screen sizes and resolutions. The text should be automatically reflowed to make reading easier.
2) Navigation	Finding the course from the category on a mobile screen is annoying and tedious. Multi level navigation menus are difficult for mobile devices	The content and structure need rewriting. The form and menu should be designed to be simple, such as a one level menu design.
3) Material Format	The diversity of each operating system does not support diverse video formats.	For each video format, NTHU OCW provides various formats as mp4, flv, wmv.
4) Network	The connection via mobile connectivity might be slow.	Systems should provide high and low quality videos to allow switching according to the connectivity.
5) Storage	Not all the storage of devices is big enough to support all video files.	NTHU OCW support different sized files for learners to choose.

Evolution of NTHU OCW from Moodle-Based to Cloud-Based System

Based on the solutions proposed in this study, the production team adopted the techniques of responsive design and cloud-computing to redesign the system. From the view of the learner, the solutions we proposed focus on improving the reading experience of articles from the Moodle-based to cloud-based system in the following ways.

(1) Readability

In the Moodle-based system, when users can access the content via mobile device, the information is the same as on the desktop but with unreadable small text. If users want to read clearer content, they can spread it on the screen to focus on a portion of content with a bigger font size. However users can not read the whole sentence on the small screen. In this case, it leads to poor readability (Figure 2). However, in the cloud-based responsive system, responsive design can detect devices by inspecting the web browser's information and matching them with suitable and auto-adjustable layouts for desktops or mobile devices (Figure 3).

Figure 2. Readability of Moodle-based system.

Figure 3. Readability of cloud-computing responsive web system.

(2) Functionality

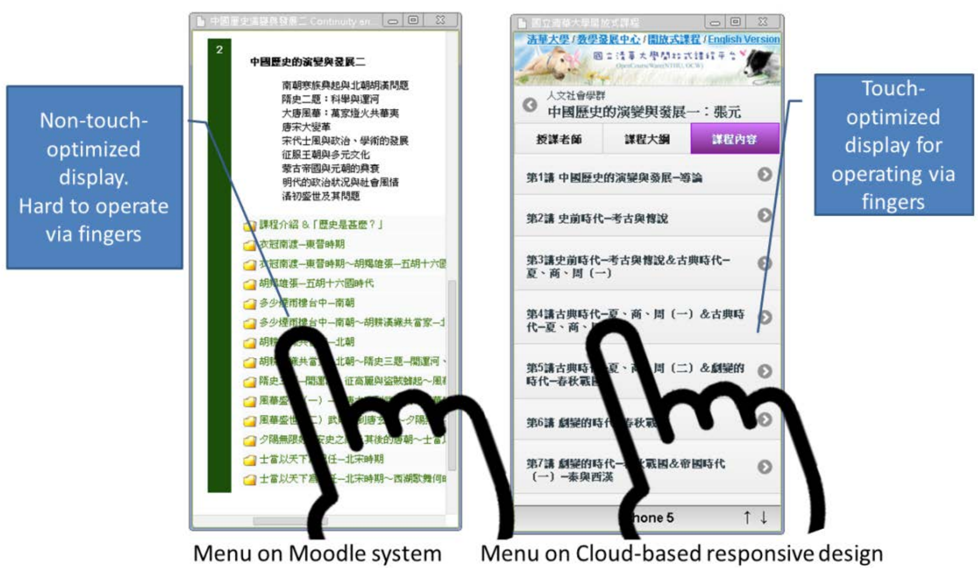

Figure 4. Traditional menu interface (left) and touch-optimized interface (right) .

In the system implementation, NTHU OCW used cloud computing to extend and encode different media formats and combine the responsive web designs based on CSS3, HTML5, and j-Query. Using j-Query as a touch-optimized web framework, jQuery Mobile is a HTML5-based user interface system designed to make responsive web sites that are accessible on all smartphone, tablet, and desktop devices. For example, the menu link on the traditional Moodle is less friendly for users to operate on the touch screen via fingers. However, the cloud-based responsive web design has a touch-optimized interface (Figure 4).

The multimedia streaming application is one of the major ways of producing digital learning materials in this study. NTHU applied a multiple media encoder service platform to construct a top-down architecture combining the existing application with modularized application programming interface in an IaaS cloud service from a bottom-up narrative. Therefore, the OCW files were created in various formats, such as MP4 and WMV, suitable for different devices. The videos published in multiple formats could ensure the accessibility of learners with different needs. Moreover, these videos can meet the technical standards required to ensure OER are interoperable across a number of devices, from computers, tablets, to mobile phones, and complying with Windows, Android, and iOS platforms.

(3) System architecture

Figure 5 shows the system architecture overview of the Moodle-based and cloud-based platform. In the cloud-based platform, after the production team finishes the capturing and editing of lecture videos, the videos are uploaded to network-attached storage (NAS) via web server. All the video waits for the command of cloud management server and schedule server to encoding. Encoding cloud contain a group of computing units which share its computing power. Via encoding cloud, all scheduled lecture videos transcoded into different video formats with different qualities are saved into the database and are ready for access by various devices via a responsive web server.

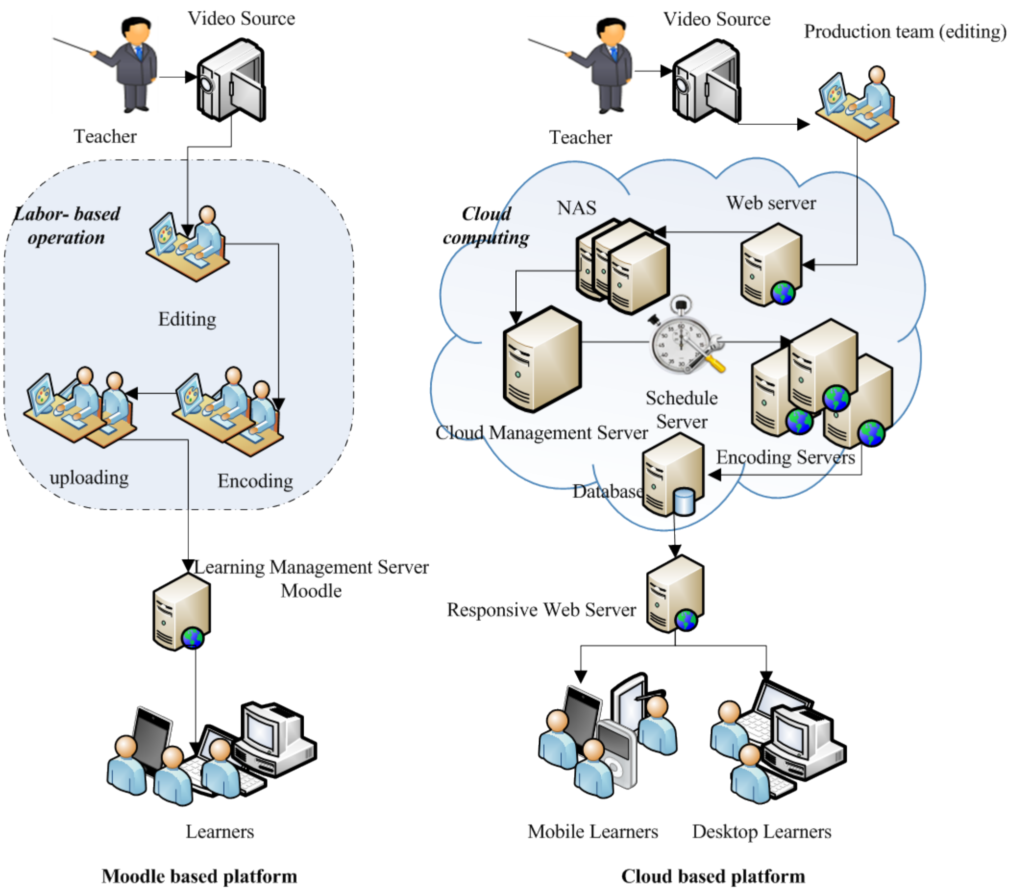

Figure 5. System architecture of Moodle-based and cloud-based platform.

Who Can Benefit from NTHU OCW?

The data from the web metrics tool indicate the platform has been utilized by users from 146 territories around the world from Jan-01-2012 to Aug-13. Table 3 shows the top 15 countries/territories from 146 countries/territories, including Taiwan (545,987 visits), China (85,366 visits), United States (15,119 visits) and so on. Moreover, Figure 6 indicates the distribution of the visits on the global map overlay.

To discuss where the learner comes from, this study analyzes the visits from 146 territories and finds the users visiting NTHU OCW to learn Chinese OER are mainly from both Chinese-speaking territories (Taiwan, China, and Hong Kong, et al.) and English-speaking territories (United States, Singapore, and Canada, et al.) (Table 4).

Table 3

Top 15 National Information of the Visitors

Country/territory	Visits	Pages/visit	Avg. visit duration	% New visits	Bounce rate
Taiwan	545987	4.48	309.80	37.06%	36.36%
China	85366	5.53	439.67	38.57%	27.36%
United States	15119	4.14	298.64	41.02%	41.03%
Hong Kong	6013	4.44	290.72	58.97%	40.26%
Malaysia	4501	4.55	375.72	51.68%	34.57%
Canada	2239	4.64	438.22	29.25%	34.03%
Australia	1528	4.67	323.95	34.23%	34.75%
Japan	1462	4.97	394.67	33.93%	36.18%
Germany	1366	5.04	385.84	28.04%	34.70%
Singapore	1238	4.88	387.50	43.86%	31.91%
South Korea	1007	4.46	267.01	33.66%	40.42%
United Kingdom	966	3.74	274.13	54.66%	45.45%
India	880	4.14	240.08	83.18%	42.27%
Macau	775	3.47	211.01	68.39%	46.32%
France	732	4.02	323.41	49.18%	44.40%

Table 4

The Official Language Analysis of the The Top 15 Countries/Territories

Official language	Territory	Visits	Percentage
Chinese	Taiwan	545,987	80.95%
	China	85,366	12.66%
	Hong Kong	6,013	0.89%
	Macau	775	0.11%
English	United States	15,119	2.24%
	Singapore	1,238	0.18%
	Canada	2,239	0.33%
	Australia	1,528	0.23%
	United Kingdom	966	0.14%
Other	Malaysia	4,501	0.67%
	South Korea	1,007	0.15%
	Japan	1,462	0.22%
	Germany	1,366	0.20%
	France	732	0.11%

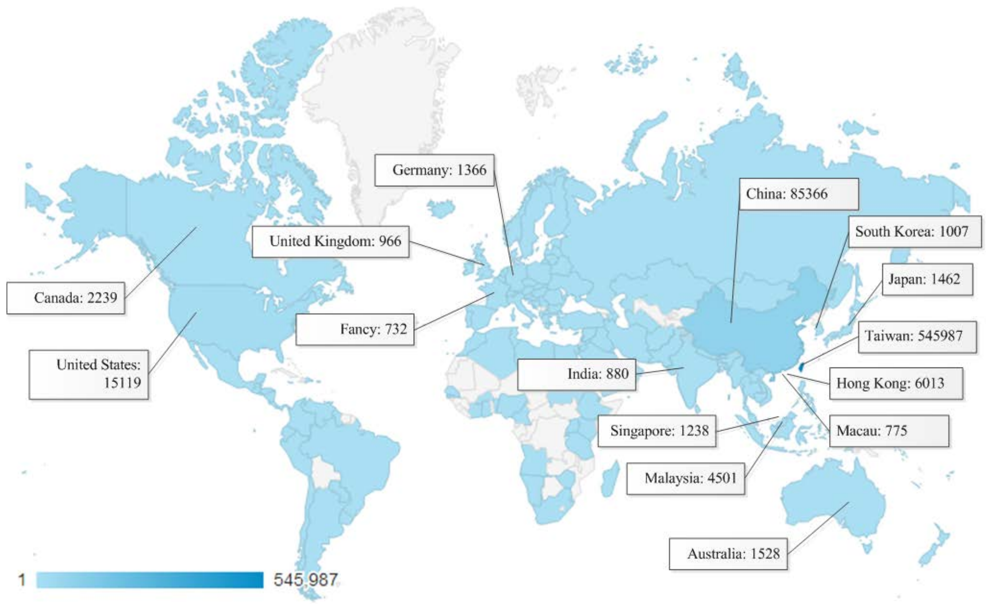

Figure 6. Map overlay on the visits of NTHU OCW around the world.

To explore the devices of 466,429 visits, data from GA from Jan-01-2012 to Aug-13 reveals those visits access the platform via 264 different mobile devices, including desktops (95.42%), mobile devices (2.61%), and tablets (1.97%). To further understand the difference between the Moodle period and the cloud-based period, Table 5 indicates the growth trends of those devices have increased in the given period; the data extracted every six months indicate that both smart phones and tablets show an increase in amount and percentage. In the Moodle period, the number of smart phones per month increased from 64 (0.28%) to 66 (0.30%) and the number of tablets increased from 23 (0.16%) to 62 (0.22%). In the cloud-based responsive web period, the number of smart phones per month increased from 192 (0.80%) to 1,540 (3.94%) and the number of tablets increased from 181 (0.76%) to 1,356 (3.47%). These results indicate there are learning needs for both tablet users and smart phone users. The design of the OCW platform should pay special attention to the growing needs of these two groups of users. Moreover, the result indicates that the cloud-based responsive web improves the mobile access more efficiently than the Moodle period.

Table 6 gives information on the top 15 mobile devices from a total 264 different mobile devices. To categorize those devices by the manufacturers and operating systems, the data show the diversity of the mobile devices (Table 7). This result indicates NTHU OCW was accessible by the major devices with iOS and Android operating systems. This result proves the system benefits learners with a cross-platform for various devices.

Table 5

Trends of Visits via Desktop, Smart Phone, and Tablet in the Moodle-Based Platform and Cloud-Based Responsive Web Platforms

	Moodle period			Cloud-based responsive web period			
Segment \month	Jan-11	Jul-11	Dec-11	Jan-12	Jul-12	Jan-13	Aug-12
	Visits	Visits	Visits	Visits	Visits	Visits	Visits
Desktop	16455	16888	20342	23533	26537	37060	36190
Mobile (a) + (b)	87	102	138	373	1164	2066	2895
(a)*Smart phone*	64	72	66	192	632	1310	1540
(b)*Tablet*	23	30	62	181	532	756	1356
Total	16629	17092	20568	23906	27701	39126	39085

Table 6

Top 15 Mobile Devices of the Visitors

Mobile devices	Visits	Pages / visit	Avg. duration	% New visits	Bounce rate
(1) Apple iPad	8981	2.63	187.84	40.75%	54.88%
(2) Apple iPhone	3954	2.03	112.01	58.27%	64.82%
(3) SonyEricsson LT15i Xperia Arc	786	2.85	193.98	44.66%	50.13%
(4) Samsung GT-I9100 Galaxy S II	767	2.35	139.20	47.20%	63.36%
(5) Samsung GT-N7000 Galaxy Note	308	2.55	160.66	48.38%	69.16%
(6) Samsung GT-N7100 Galaxy Note II	294	1.46	91.26	46.94%	76.19%
(7) Samsung GT-I9300 Galaxy SIII	254	1.72	153.16	59.45%	72.44%
(8) Google Nexus 7	240	2.08	140.99	37.08%	62.08%
(9) Apple iPod Touch	232	2.84	166.03	53.45%	62.93%
(10) Sony C2105 Xperia L	211	1.48	225.37	2.37%	62.56%
(11) SonyEricsson LT26i Xperia Arc HD	205	2.46	179.30	54.15%	51.22%
(12) HTC Desire HD	186	2.55	167.01	49.46%	58.06%
(13) HTC SensationXE Beats Z715e Sensation	186	2.22	89.31	27.42%	63.98%
(14) HTC 001HT Desire HD SoftBank	157	2.29	331.96	3.18%	60.51%
(15) Asus A68 PadFone 2	143	1.61	125.08	34.27%	72.03%

Table 7

Detailed Info of Mobile Devices

Device category	Manufacturer	Operating system	Top 15 mobile devices	Visits	Percentage
Tablet	Apple	iOS	Apple iPad	5,154	39.32%
	Asus	Android	Asus Eee Pad TF201 Transformer Prime	61	0.47%
			Asus Eee Pad Transformer TF101	38	0.29%
			Asus TF300T Transformer Pad TF300T	17	0.13%
			Asus TF700T Transformer Pad TF700T	16	0.12%
			....		
Smart phone	HTC	Android	HTC Desire HD	154	1.17%
			HTC S710E Incredible S	83	0.63%
			HTC Wildfire S	78	0.60%
			HTC SensationXE Beats Z715e Sensation	77	0.59%
			HTC Desire	66	0.50%
			HTC Desire HD	64	0.49%
			....		
	Apple	iOS	Apple iPhone	2,486	18.97%
	Sony	Android	SonyEricsson LT15i Xperia Arc	602	4.59%
			SonyEricsson LT26i Xperia Arc HD	197	1.50%
			....		
	Samsung	Android	Samsung GT-I9100 Galaxy S II	449	3.43%
			Samsung GT-N7000 Galaxy Note	176	1.34%
			Samsung GT-I9300 Galaxy SIII	107	0.82%
			....		

Easier to Operate OCW

NTHU OCW features provide the courses with various video formats. The effort required to produce lecture videos is especially costly. For each course, the production team must compile course materials from the faculty and ensure proper video formats for global distribution. In this study, after NTHU upgraded the platform, the production team noticed the cloud-based solution was more efficient than the Moodle version and reduced working hours by 30%. Table 8 indicates the steps of the workflow in the initial Moodle-based version and the upgraded cloud-based version platform. The difference of hours in the transcoding and uploading videos step is based on the labor-based operation in the Moodle-based platform, which has been replaced with cloud computing in the cloud-based system. Therefore, when producing a three hour lecture video, the production team had to spend 19 hours with the Moodle-based platform; they only spent 13 hours with the cloud-based solution.

Table 8

Working Hours in the Production Process with Moodle and Cloud-Based Platforms

NTHU OCW	The working hours in the production progress[(a)]				
	Course capture	Video editing	Transcoding & upload	Web editing	Total
Moodle-based	4 hrs * 2[(b)]	4 hrs	6 hr	1 hrs	19hrs
Cloud-based	4 hrs * 2[(b)]	4 hrs	0.5 hr	0.5 hrs	13hrs

(a) Producing a 3hours lecture video; (b) Including two cameramen to assist the course capturing

Discussion

Design Preference for Mobile Devices: Tablet or Smartphone?

From an entirely mobile perspective, according to the International Data Corporation (IDC, 2013), tablet shipments (128.3 million) in 2012 are much less than smartphone shipments (722.4 million). However, in this study, the web visits of tablets (40.33%) are much closer to the visits of smart phones (57.83%). To understand the actual uses of the two devices, this study further analyzes the pages per visit by mobile devices. The top five devices that browse the most pages per visit on NTHU OCW are Amazon Kindle Fire (22 pages / visit), Acer A101 Vangogh (17 pages / visit), Samsung GT-P3110 Galaxy Tab (15 pages / visit), ViewSonic ViewPad (10 pages / visit), and Asus Eee Pad Transformer TF101G (9 pages / visit), which are all tablet devices. On average, this study found learners view more pages per visit when browsing with a tablet compared to a smartphone. This result is consistent with White's (2013) report that internet users prefer to use tablets for more in-depth visits. Therefore, although smartphones remain much more common, we cannot ignore tablets as potentially ideal internet browsing tools for learning when we are promoting OCW.

Fair Use and Sustainability of Open Education Resources in Chinese Societies

In view of the wide education markets in Chinese societies, the amount of visits of users from China and Taiwan in this study might not be parallel to the population proportion of those two territories. While exploring our NTHU OCW on the Internet, the researchers found more than 200 lecture videos produced by NTHU OCW have been copied and redistributed to popular websites in China. Those videos include the whole package of the lecture contents of, for example, the courses entitled "Calculus", "Continuity and Change in Chinese History", just to name a few. Besides, those copied courses are listed in the top 10 popular websites in China, which are also in the top 20 Globe websites. This phenomenon might explain why visits from China to our local NTHU OCW are not significantly larger than the visits from Taiwan. This is a critical issue worthy of our attention when academic communities have been working diligently to contribute to the diffusion of OER in Chinese societies. From the educational perspective, we encourage many third parties to copy and redistribute the content of NTHU OCW, which can further explain the value and popularity of NTHU OCW in Chinese online communities and these websites could accelerate the delivery of NTHU OCW to every corner of Chinese society. However, from a copyright perspective, when the professors dedicate their time, intellect, and energy to making high-quality educational resourses for non-profit sharing online, the uses of NTHU OCW from the local sites should be cited properly. However, almost none of the websites copied to China gave credit to NTHU OCW. What is worse, most of the copied videos have added their own website logo and inserted advertisements for commercial purposes. Thus, this is an issue of serious concern.

The spirit of OCW is providing free and open access to educational resources, but it does not mean users are free of responsibility. If we want educational resources to be really open and free, in the meantime, the owners of OER should be appropriately protected and respected. Therefore, the sustainability of open education resources will be valued and remain feasible.

Conclusions

In the ubiquitous learning environment, we can access OCW not merely on the desk or in school, but also in our pockets. As technology evolves, it is important to keep up with the changes to benefit learning. This study shares our longitudinal study results and experiences over a four-year period on how cross-platform technology could be applied to help students access OER, addresses the design issues and challenges of cross-platform development, and provides suggestions and solutions for OER to be accepted and effective via the various devices. This study proposes a holistic design in terms of the platform, digital multimedia courseware production, which are meaningful for those who want to know the cross-platform development issues on OER or who want to explore OCW in Chinese communities. Our conclusions are listed as follows:

1) The main challenge is to support these inevitable technologies, given the diversity of mobile devices, including solutions for screen size, navigation, material format, network, and storage. The proposed solutions are cloud-computing and responsive web design. Cloud-computing is more efficient than Moodle, saving up to 30% of working hours in transcoding the video format for various devices. The responsive web design upgrades the conventional platform for various mobile devices and optimizes the reading experience of users by adapting the context of the OCW platform to the various devices – desktops, tablets, and smart phones.

2) A responsive web design and cloud-computing provide greater accessibility for different mobile devices and allow Chinese users over the world to reach the NTHU OCW freely. The platform has benefited learners with a cross-platform system enabling various devices from different areas. The OER on our platform can be easy to view on the device of personal choice anywhere with an internet connection. A total of 466,429 visits with 264 different mobile devices from 146 territories around the world have accessed NTHU OCW. Moreover, the visits via mobile devices, including both smart phones and tablets, have been steadily increasing month after month.

To expand OER in Chinese societies, the intellectual property rights issue of striking a balance between “open access” and “inappropriate copy and use” is crucial and worthy of our further concern. This study makes several contributions. Firstly, it gives a comprehensive overview of current approaches to cross-platform development for OER. Secondly, it demonstrates how to adopt cloud computing services and responsive web design to redesign and develop the OCW platform and to ensure accessibility and interoperability across various devices. Thirdly, we present a detailed analysis of Moodle-based and cloud-based approaches. This study reveals tablets could be considered as a potential tool for in depth visits. The OCW platform needs to put its emphasis on both tablets and smartphones. We expect the NTHU OCW will create new opportunities as a desirable platform and a popular source of OER in Chinese societies. In the future, the researchers will continue to explore learning behaviors via various mobile devices and investigate the learners’ motivation and learning outcomes. More results yielded from this series of studies will be shared.

Acknowledgements

The authors would like to thank the sponsorship from the Ministry of Science and Technology, Taiwan, under the project code of NSC 102-2511-S-007 -001 -MY3. Moreover, many thanks go to the Center for Teaching and Learning Development at National Tsing Hua University. Without its support, this study would not be possible.

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Telecommuting Academics Within an Open Distance Education Environment of South Africa: More Content, Productive, and Healthy?

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Abstract

Outside an academic setting, telecommuting has become fairly popular in recent years. However, research on telecommuting practices within a higher education environment is fairly sparse, especially within the higher distance education sphere. Drawing on existing literature on telecommuting and the outcome of a valuation study on the success of an experimental telecommuting programme at the largest distance education institution in South Africa, this article presents discerning findings on telecommuting practices. In fact, the research builds on evolutionary telecommuting assessment methods of the direct or indirect effect (work based) and affective impact (emotional) on multiple stakeholder groups. This holistic approach allowed for comparative analysis between telecommuting and nontelecommuting academics with regard to the impact of telecommuting practices. The research reveals high levels of support for telecommuting practices that are associated with high levels of work productivity and satisfaction, lower levels of emotional and physical fatigue, and reduced work stress, frustration, and overload. The study also reveals higher levels of student satisfaction with academic support from telecommuters than nontelecommuters. Overall, the critique presents insightful findings on telecommuting practices within an academic setting, which clearly signal a potential for a shift in the office culture of higher distance education institutions in the years to come. The study makes a significant contribution to a limited collection of empirical research on telecommuting practices within the higher distance education sector and guides institutions in refining and/or redefining future telecommuting strategies or programmes.

Keywords: Telecommuting; nontelecommuting; working from home (WFH); working from office (WFO); open distance learning

Introduction

Since Nilles (1975) first defined telecommuting as «a type of working model wherein the employee, with some form of telecommunications device (most often a computer with some form of modem) works at a location other than the traditional centralised office,» the magnitude of research on this human resource practice has expanded considerably. Leading salient research on the international front specifically features investigations on the impact of this phenomenon on individuals and organisations. However, much of this past research is largely limited to the private sector. On the one hand, this suggests that telecommuting in the public sector has hitherto not been as widespread as in companies within the private sector. Alternatively, it can be assumed that there is insufficient information to allow for any pragmatic view on the extent to which this phenomenon affects higher distance education employees and institutions. Consequently, it seems reasonable to question whether the public sector, and particularly the open and distance higher education sector[1], is suited to such work practices. Existing literature reveals that research to measure the potential for and impact of telecommuting practices on academics and higher distance education institutions is fairly sparse and largely limited to a few international examples. In this regard Athabasca University (Canada's Open University) published a literature review in 2006 on the potential benefits and shortcomings of telecommuting for academics as well as latent opportunities and challenges presented by telecommuting to open and distance education institutions. Although valuable, this research highlights the potential, rather than the actual impression, of telecommuting on academics and distance education institutions. The fact that the collective work of Athabasca University, as published by Ng (2006), largely resembles the outcome of earlier research chiefly conducted in the private sectors of the United States and the United Kingdom, presented sufficient rationale for conducting a local innovative empirical research study on telecommuting practices in the higher distance education sector of South Africa. Furthermore, the need for a contemporary study of this nature was motivated by the evolution of information technology and the potential for the distance education sector to benefit from these IT developments that present an ideal platform for telecommuting within an academic work environment where the practice of distance learning and research is most likely to benefit from prospective individual and institutional rewards stemming from telecommuting. By introducing a telecommuter programme in 2007 (Unisa, 2011), the University of South Africa (Unisa) is indisputably on the forefront of

1 Defined by the Department of Higher Education and Training as education that normally takes place in universities and other higher education institutions, both public and private, which offer qualifications on the Higher Education Qualifications Framework (HEQF) (DHET, 2012).

testing the potential benefits of telecommuting practices in an open distance learning environment. For the first time since the telecommuting experiment was implemented, this article reports on the effects of the telecommuting programme on individual workers and the institution. It stands to reason that as the leading and largest open distance education institution on the African continent (Unisa, 2013), the selection of this institution as the investigative research unit for this evaluative research study was an obvious decision.

Defining Telecommuting

Besides the original description of telecommuting by Nilles (1975), exploratory research on telecommuting shows many common conceptions of this phenomenon. In this regard the following selected definitions provide a broader understanding of the concept (Yamini, Balakrishnan, Nguyen, & Lopez, 1997; Fitzer, 1997; Igbaria, 1998; Federal Communications Commission, 2003; Martinez, 2004; Brown, 2010; Ipsos, 2011; Mid-America Regional Council, 2013; Wikipedia, 2013):

- a significant workplace innovation that allows for an increasing portion of the workforce to work from home;
- an alternative work mode whereby some organizational employees spend part or all of their work week in isolation or at home;
- a work arrangement in which employees perform their regular work at a site other than the ordinary workplace, supported by technological connections;
- any arrangement in which an employee regularly performs officially assigned duties at home or other work sites geographically convenient to the residence of the employee;
- the use of collaborative technologies to reduce or entirely replace traditional commuting to the workplace;
- performing work for one's employer outside that employer's office, whether at home or some other remote location, as a substitute for working in the office.

To further distinguish between the de-localisation of work, Figure 1 outlines the main forms of telecommuting as cited in the work of Pinsonneault and Boisvert (1999).

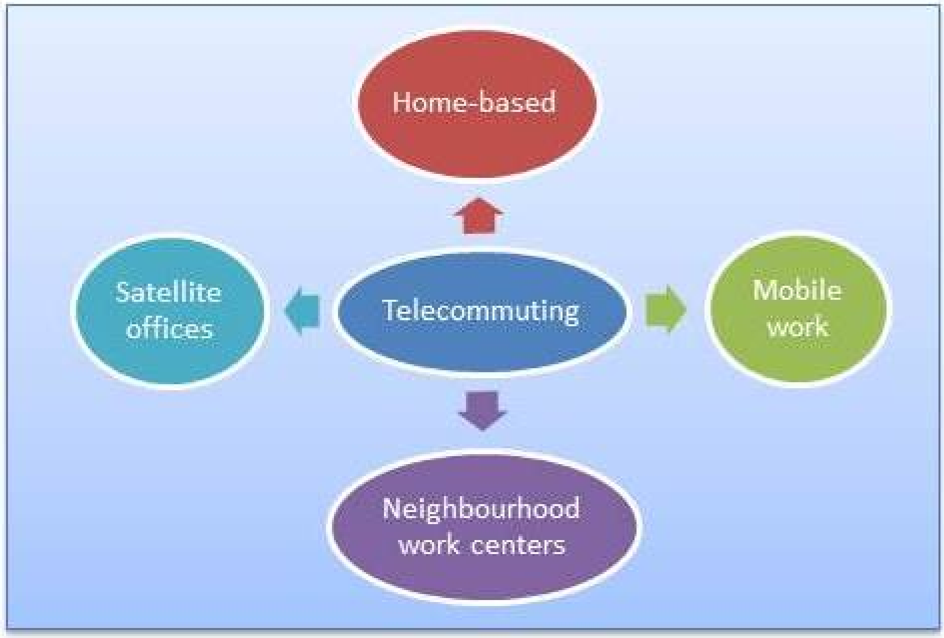

Figure 1. Leading forms of telecommuting.

A more extensive exposition of the four main forms of telecommuting follows below:

- *Home-based telecommuting* is usually performed in a dedicated area of the worker's place of residence. According to Gordon and Kelly (1986) and Nilles (1994), equipment installation fees are usually subsidised, entirely or in part, by the organisation.
- According to Doswell (1992) and Nilles (1994), *satellite offices* take the form of a small organisational affiliate generally located in proximity to residential areas where a telecommunications link with headquarters is permanently maintained.
- According to Olson (1987a), Di Martino and Wirth (1990), and Nilles (1994), *neighbourhood work centres* include private information centres that possess telecommunication tools that are shared by employees from various enterprises.
- *Mobile work* empowers employees with the capacity to perform activities in different places and in an ad-hoc fashion, such as in a car, plane, or hotel room. According to Davenport and Pearlson (1998) this form of telecommuting includes advantages such as enabling better and more personalised customer service.

Clearly, telecommuting is not restricted to any one particular form and is not limited to working from home on a full-time basis. Despite this awareness, the South African telecommuting baseline study was limited to measuring the impact of part-time home-based telecommuting as the telecommuting type tested by Unisa. However, prior to reflecting on the outcome of the study, the discussion proceeds with a holistic overview of the potential impact of telecommuting on individuals and organisations to set a sound methodological research foundation for telecommuting. In the absence of similar local research, this synopsis is based primarily on past international research on telecommuting practices within the private and public sectors. These are summarised in Exhibits 1 and 2.

Exhibit 1

Potential Advantages and Disadvantages of Telecommuting for Public and Private Sector Workers

	Advantages	Disadvantages
Academics/Individuals	Greater autonomy (Ng, 2006) Better personal, family, and work life balance (Ng, 2006) Higher quality of work (Ng, 2006) Comfortable home work environment (Ng, 2006) Opportunity to take advantage of the geographic location to conduct research and provide services to communities (Ng, 2006; Yick, Patrick & Costin, 2005) Reduction/elimination of transport time (Baruch & Nicholson, 1997; Christensen, 1992; DeSanctis, 1984; Mahfood, 1992; Nilles, 1994; Olson, 1988; Pratt 1984) Cost savings related to work habits (e.g., clothing and food) (Baruch & Nicholson, 1997; DeSanctis, 1984; Olson, 1988) Flexibility in the organisation of work hours and leisure activities (Ng, 2006, DeSanctis, 1984; Di Martino & Wirth, 1990; Olson 1988; Reinsch, 1997) Increase in productivity (Ng, 2006, Baruch & Nicholson, 1997; Caudron, 1992; Côté-O'Hara, 1993; Di Martino & Wirth, 1990; Duxbury & Higgins, 1995; Huws, 1993; Olson, 1988; Reinsch, 1997).	Increased family-work role conflicts (Ng, 2006) Lower perceived personal growth and career advancement (Ng, 2006) Lower collegiality and sense of belonging (Ng, 2006) Inadequate work environment at home (Ng, 2006) Occupational and health issues (Ng, 2006) Costs of running the home office (Ng, 2006) Feeling of isolation (Ng, 2006; Chapman, Sheehy, Heywood, Dooley & Collins, 1995; Fitzer, 1997; Guimaraes & Dallow, 1999; Huws, 1984, Johnson, 1997; Katz, 1987; Kinsman, 1987; Olson, 1988; Reinsch, 1997; Solomon & Templer, 1993) Reduction in chances of promotion (Chapman et al., 1995; DeSanctis, 1984; Gordon & Kelly, 1986; Hamilton, 1987; Katz 1987) Overwork (Ng, 2006; Fitzer, 1997; Gordon & Kelly, 1986; Nilles, 1994; Olson, 1988) Decrease in frequency of intra-organisational communication (Ramsower, 1985; Richter & Meshulam, 1993)

Exhibit 2

Potential Opportunities and Challenges for Public and Private Sector Entities

	Opportunities	Challenges
Open Distance Education Institution/Private Institution	The ability to recruit employees from a wider geographic area (Ng, 2006). Better retention of competent staff (Ng, 2006). Lower absenteeism (Duxbury & Higgins, 1995; Fitzer, 1997; Greengard, 1995; Gordon & Kelly, 1986; Huws, 1993; Kraut, 1987; Mahfood 1992; Nilles, 1994; Wilkes, Frolick & Urwiler, 1994) Increased feelings of belonging (Chapman et al., 1995) Increase in loyalty (Caudron, 1992; Pratt, 1984) Increased ability to retain best employees and attract new employees (Baig, 1995; Christensen, 1992; Cross & Raizman, 1986; Davenport & Pearlson, 1998; Di Martino & Wirth, 1990; Froggatt, 1998; Gordon & Kelly, 1986; Kraut, 1987; Mahfood, 1992; Olson, 1987b, 1988; Psikurich, 1996; Ruppel & Harrington, 1995) Increased productivity (Alvi & McIntyre, 1993; Barthel, 1995; Baruch & Nicholson, 1997; Coté-O'Hara, 1993; Duxbury & Higgins, 1995; Gordon & Kelly, 1986; Huws, 1993; Katz, 1987; Kirkley, 1994; Kraut, 1987; Mahfood, 1992; Nilles, 1994; Trembly, 1998; Weiss, 1994; Xenakis, 1997). Decrease office rental costs; decreases overcrowding (Apgar, 1998; Christensen, 1992; Davenport & Pearlson, 1998; Gordon & Kelly, 1986; Katz, 1987; Kirkley, 1994; Kraut, 1987; Mahfood, 1992; McCune, 1998; Nilles, 1994, Olson, 1987b) Quicker responsiveness to customers and to unexpected events such as natural disasters (Eldib & Minoli, 1995; Fitzer, 1997; Katz 1987; Korzeniowski, 1997; Nilles 1994); Increased organisational flexibility (Nilles, 1994; Olson 1987b; Ruppel & Harrington, 1995) Better usage of information systems (Gordon & Kelly, 1986, Hamilton, 1987)	Monitoring and evaluating performance based on results rather than physical presence or visibility (Ng, 2006). Ensuring adequate and appropriate information and telecommunication technologies are equipped in home offices, and effective training and support are provided (Ng, 2006). Ensuring telecommuting academics have an adequate, safe and healthy work environment (Ng, 2006). Providing space for research to those academics with specific spatial needs – e.g., laboratories (Ng, 2006). Creating team synergy, transmitting organisation culture, and promoting a feeling of belonging to the institution (Ng, 2006). Retaining competent staff and competing with traditional institutions for academics experienced or interested in online teaching (Ng, 2006). Greater absence of best employees from the office (Gordon & Kelly, 1986; Johnson, 1997) Loss of synergy in the organisation (Fitzer, 1997; Hamilton, 1987) Difficulty in managing telecommuting makes supervisors dissatisfied (Christensen, 1992; Fitzer, 1997; Gordon & Kelly, 1986; Katz, 1987; Nilles, 1994; Solomon & Templer, 1993) Increased data security concerns (Gray, Hodson & Gordon, 1993; Katz 1987) Difficulty in objectively evaluating the financial benefits of telecommuting (Alvi & McIntyre, 1993, Doswell, 1992)

Exhibits 1 and 2 display the plethora of previous, mostly international, research on telecommuting. However, the synopses also affirm a clear lack of similar local research and present sufficient rationale for an original baseline evaluation study for South Africa.

Research Scope and Aim

Most past models and theories about telecommuting have concentrated mainly on the telecommuter's experiences and perspective. In fact, much of prior research on telecommuting has been weakened by two assumptions, namely that telecommuters form a homogenous group and that telecommuting involves only the telecommuter (Bailey & Kurland, 2002; McCloskey & Igbaria, 2003). Also, aligned with the views of Bailey and Kurland (2002), Cooper and Kurland (2002), Golden (2007), Duxbury and Neufield (1999), Fritz, Narasimhan, and Rhee (1998), and McCloskey and Igbaria (2003), few studies have examined the potential impacts of telecommuting holistically, or investigated it from a nontelecommuter and/or student perspective and how this practice affects work outcomes and student satisfaction. With the foregoing as background, this article reflects on the aim, scope, and outcome of the first higher distance education telecommuting study in South Africa that was conducted among both home- and office-based academics, managers of academic departments, and students who received academic support from part-time (home-based) telecommuting academics and/or full-time (office-based) nontelecommuting academics.

With the aforementioned in mind, this research study included four distinctive interdependent key stakeholder groups for which separate research goals and instruments were designed. The specific study objectives for the relevant stakeholder groups are clarified in the subsections below.

Academics working from home (WFH).

This subsurvey was conducted among senior telecommuting academics (professors and associate professors), having been officially granted permission to work part-time from home. More specifically, this substudy aimed to determine telecommuting academics' experiences and perspectives regarding the working from home (WFH) initiative.

Academics working from office (WFO).

This subsurvey was conducted among two office-bound academic groups. Firstly, the study targeted senior academics (professors and associate professors) that are office-based (nontelecommuters) and who are employed in the same department as an academic working from home. The primary aim of this secondary study was to establish the attitudes and perceptions of onsite staff regarding telecommuting and to determine the perceived effect (work impact) and affect (emotions/attitudes) of telecommuting on office-based workers. Secondly the study also targeted onsite staff employed in an academic department without an academic WFH. Overall, the nontelecommuter study aimed to provide insights into some of the organisational impacts of telecommuting and the implications for nontelecommuters.

Line managers.

This subsurvey was conducted primarily among the supervisors of senior academics (professors and associate professors) who were granted permission to work from home on a part-time basis. The aim of the study focusing on line managers was to determine the perceptions of supervisors of the impact of telecommuting on the staff morale of on- and off-site workers and the operations of the department. To allow supervisors whose departments do not host an academic WFH an opportunity to voice their opinions on the WFH initiative, this subpopulation segment was also included in the line manager's study.

Students.

This subsurvey was conducted among under- and postgraduate students regarding their satisfaction with academic support offered by telecommuting academics (professors and associate professors) and nontelecommuting (office-based) academics working in the same department and lecturing similar or dissimilar modules to those lectured by academic telecommuters.

Method

Sampling Methodology

Whereas a census approach was used to conduct the surveys among academic staff members, a judgemental sampling approach was used to select students to participate in the student satisfaction survey. The judgemental approach largely reduced nonresponse errors that could have had negative consequences for the entire study. Consequently, it was logical to use the academic departments hosting an academic telecommuter as basis for constructing the sampling unit (academic departments) and sampling element (staff and students) frames for the study. More specifically, this approach supported constructive research participation by relevant key stakeholder groups.

Sample Size

Table 1 displays the sample size for each research stakeholder group who participated in the telecommuter evaluation study. It is important to note that only 33 academic departments hosted senior academic telecommuters who formed the basis for the investigation. In total, 76 Unisa academics telecommuted during the trial period of which almost half participated in the study. In total, 154 academics and 156 students were included in the study.

Table 1

Research Stakeholder Sample Size

Research stakeholder group	*n*
Academic telecommuters	36
Academic nontelecommuters	102
Line managers	16
Students	156

Survey Instruments and Fieldwork Administration

After constructing the research instruments for the various survey groups, these were transformed into web-based survey formats. For the surveys among the academic groups, an email invitation was sent to all sampling elements, requesting them to retrieve the questionnaire via a web link and to submit the survey once completed. The academic surveys were administrated in conjunction with the student satisfaction survey conducted over a two-week survey period.

The research instruments designed for all four participating stakeholder groups mainly used a 5-point agreement rating scale for a selection of predetermined statements. The number of variables for each stakeholder group for selected constructs is displayed in Table 2.

Table 2

Research Construct and Number of Items

Stakeholder group	Construct	Number of items
Telecommuting academics	Telecommuting benefits Effect and affective impact of telecommuting	21 27
Nontelecommuting academics	Effect and affective impact of telecommuting	46
Line managers	Operational impact of telecommuting	72
Students	Academic student support	17

It is important to note that participation in the research study for all stakeholder groups was voluntary and depended on participant consent. All participants were informed of the purpose of this research, the confidentiality with which information was received, dealt with, and stored, the right to terminate participation, and what to expect from the interview.

Data Editing, Cleaning, Analysis, and Reliability

Once the electronic data for all four surveys were captured, the data were edited and cleaned for data analysis and interpretation purposes. All analysis was conducted using the SPSS software statistical analysis package. The analysis also included data validation, the outcome of which is summarised in Table 3. More specifically, Cronbach's alpha was used as a tool to determine the internal consistency of items in the telecommuter survey instrument to gauge its reliability.

Table 3

Reliability Statistics

Stakeholder group and research constructs	Alpha coefficients
Telecommuting academics	
• Telecommuting benefits	$\alpha = 0.863$
• Effect and affective impact of telecommuting	$\alpha = 0.750$
Nontelecommuting academics	
• Effect and affective impact of telecommuting	$\alpha = 0.973$
Line managers	
• Operational impact of telecommuting	$\alpha = 0.964$
Students	
• Academic student support	$\alpha = 0.980$

In general, alpha coefficients (α) range in value from 0 to 1 and may be used to describe the reliability of factors extracted from, among others, scale questions (i.e., rating scale: 1 = *totally disagree*, 5 = *totally agree*). The higher the score, the more reliable the generated scale is. Nunnaly (1978) and Kline (1999) have indicated 0.7000 to be an acceptable reliability coefficient but lower thresholds are sometimes used in literature. The fact that all Cronbach alpha values exceed the 0.7000 threshold in Table 3 therefore presents sufficient evidence that the listed telecommuting constructs in the four subsurveys are reliable future predictor variables. Also, the overall consensus and consistency of responses across all four different stakeholder groups further support the reliability and validity of the survey findings.

Research Analysis

The perceptions and experiences of telecommuting and nontelecommuting academics, managers, and students are analysed in this section essentially in a descriptive analysis format.

Part-Time Home-Based Telecommuting Survey

This section reveals the outcome of the survey among telecommuting academics.

Satisfaction, benefits, and challenges.

In an introductory section, telecommuting academics were requested to rate aspects that they enjoy most when working from home. These ratings were transformed into a single enjoyment index of which the final result is displayed in Figure 2.

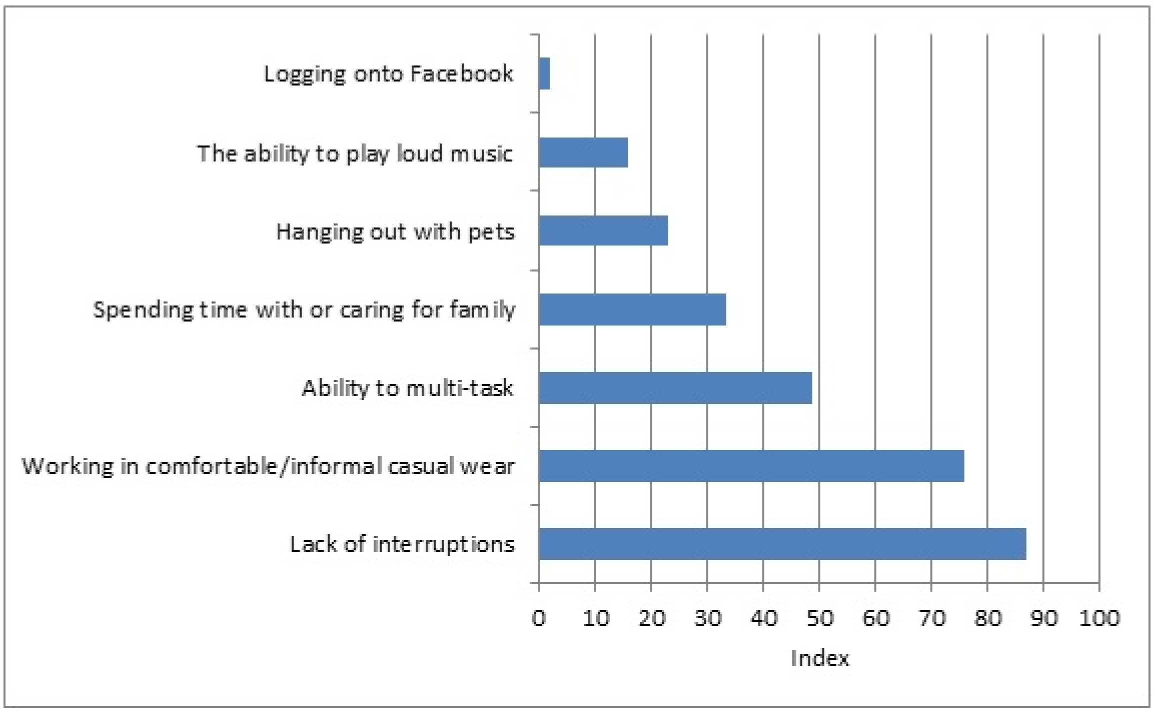

Figure 2. Enjoyment rankings of academic telecommuters.

Figure 2 shows that telecommuter academics appreciate telecommuting as this practice presents ideal opportunities for fewer work interruptions and to work in comfort or multi-task. The fact that all academic telecommuters indicated that they are extremely (80.6%) or somewhat (19.4%) satisfied with working from home further affirms high levels of pro-telecommuting sentiments. In fact, when analysing the claimed benefits experienced by academic telecommuters, it is evident that telecommuting increases work productivity, concentration, and flexibility. These views are displayed in Table 4, which summarises the outcome of the levels of agreement with the benefits of telecommuting experienced by academic telecommuters. The analysis shows the agreement index scores for the respective telecommuting benefits compiled from the agreement rating scores of academic telecommuters ranging from *totally disagree* (rating = 1) to *totally agree* (rating = 5). It is important to note that scores closer to '100' represent relatively higher levels of agreement.

Table 4

Telecommuting Benefits Agreement Index

Benefit	Index scores
Increased productivity	96.53
Stronger focus on work	95.14
Increased work flexibility	93.75
Shorter travel time	92.65
Lower travel costs	91.67
Avoid interruptions and distractions	88.19
Job satisfaction	87.86
Save time (more workdays available otherwise spent commuting)	87.86
Less focus on office politics	86.81
Improved overall quality of life	83.09
Improved employee morale	82.58
Greater freedom	81.94
Improved management of workload	79.17
Decreased carbon footprint	78.03
Improved work-life balance	77.14
Enhanced ability to meet deadlines	73.57
Less absenteeism	71.97
Organisational loyalty and belonging	70.71
Reduced work-related stress	64.39
More time for oneself	48.57
Spending more time with family/children	45.97

In general, academic telecommuters confirmed that they get more work done and concentrate better at home than at the office, which also contributes to the improvement in overall work quality and healthier (eating and lowered stress) workers. The work-related effects of telecommuting practices that echo these encouraging findings are displayed in Figure 3.

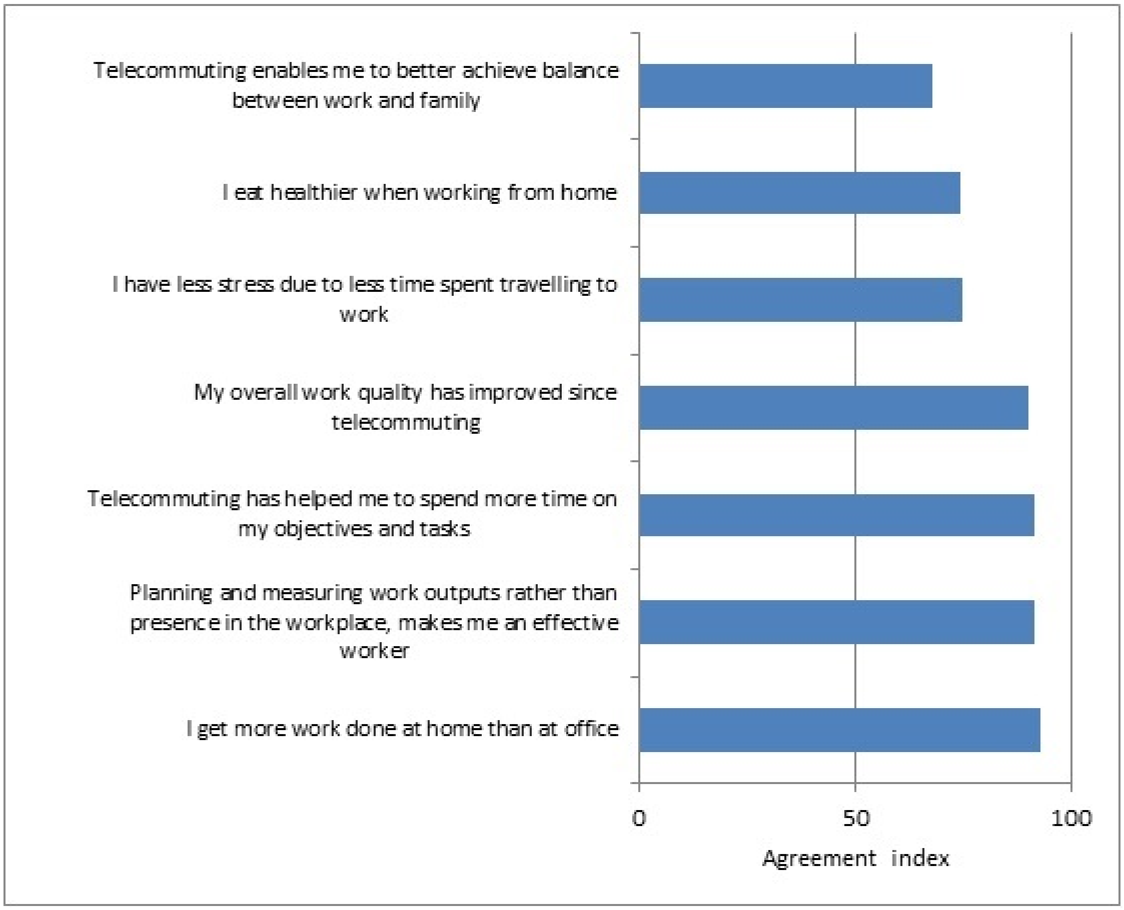

Figure 3. Work effect of telecommuting on academic telecommuters.

Despite many benefits experienced by academic telecommuters, 76.2% also indicated that the major challenge that they experience is network connectivity to allow digital connection. A further 19.0% of respondents cited the lack of office equipment as a major impediment to telecommuting while 4.8% mentioned that bad posture, as a result of working at makeshift home offices, makes telecommuting less attractive. Social interaction with colleagues at work was also cited by most academic telecommuters as a key factor missed most about not working at the office. The challenges posed by telecommuting to telecommuters are summarised in Figure 4.

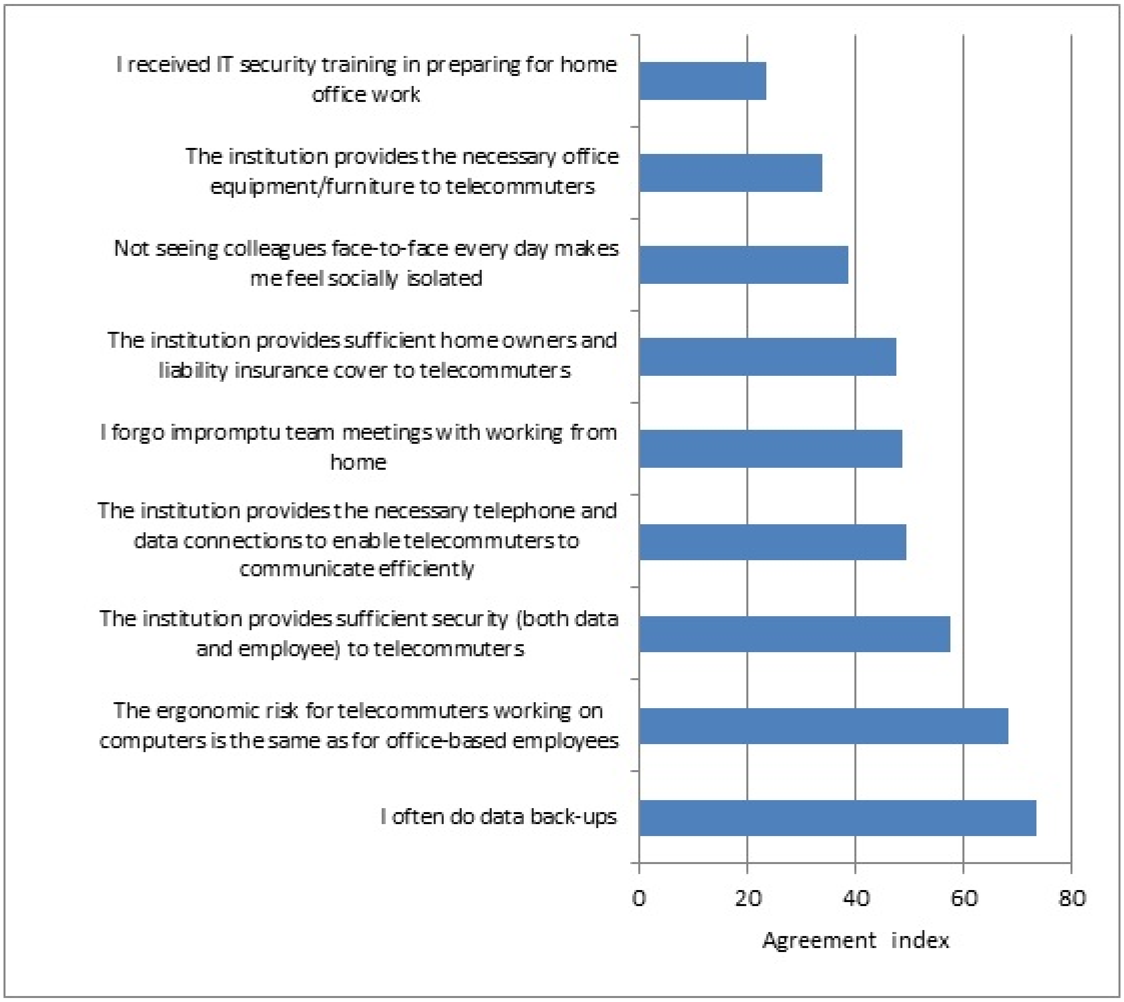

Figure 4. Challenges faced by academic telecommuters.

The key findings emerging from the academic telecommuter survey presented sufficient evidence of high levels of support for telecommuting practices within a true open distance learning environment. Experienced senior academic staff clearly articulated that telecommuting practices are very beneficial for creating a productive, dedicated, economical, flexible, and satisfied workforce. Also, telecommuters seem very positive about telecommuting as a mechanism to ease work stress and afford more valuable time with family members. However, key challenges remaining for open distance education institutions who wish to expand telecommuting practices are more dedicated attention to improved network connectivity as well as security, insurance, and infrastructure support aspects relevant to telecommuting.

Office-Based Telecommuting Survey

This section reveals the outcome of the telecommuter survey among nontelecommuting academics. When focusing on this stakeholder group, it is important to note from previous international research that telecommuting may change the scope and amount of work of those remaining in the office (see Kugelmass, 1995; Gordon, 2006; Reinsch, 1997; Chapman, Sheehy, Heywood, Dooley, & Collins, 1995; Harrington & Ruppel, 1999). To determine the effect of telecommuting on the workload of nontelecommuting (office-based) staff, a total of over 100 office-based academics participated in the telecommuter study. These academics were requested to reflect on the affective impact and effect of telecommuting practices and to indicate whether they experienced any additional work responsibilities in cases where telecommuting colleagues are absent from the office. Figure 5 reflects the expanded work responsibilities experienced by just more than half (57.5%) of the office staff.

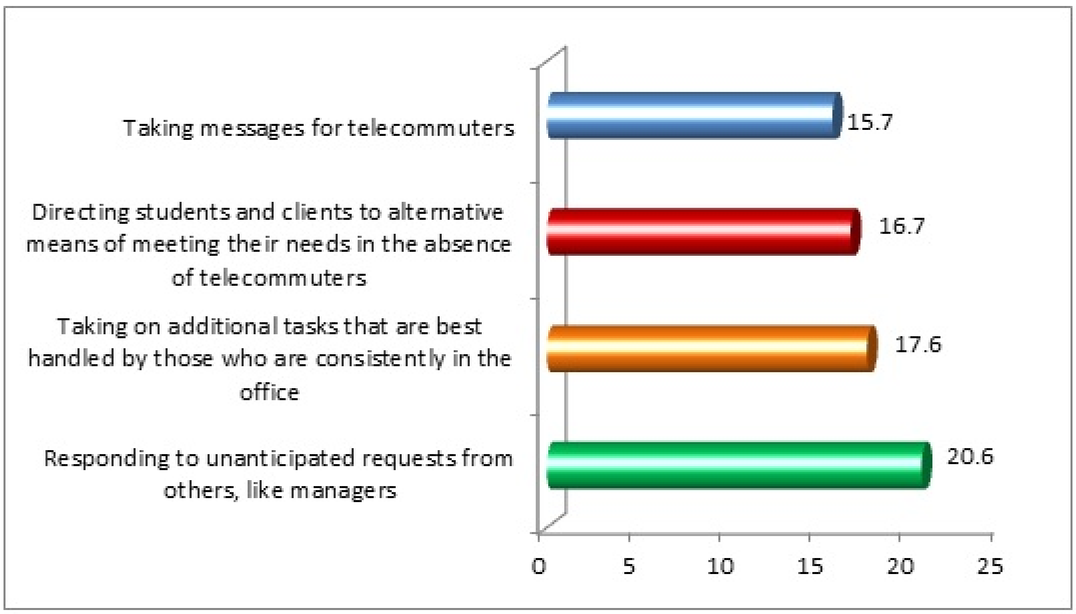

Figure 5. Effect of co-workers' telecommuting on office-based workers.

It is clear from Figure 5 that approximately a fifth of office workers have to respond more frequently to unanticipated requests from other staff like managers due to telecommuters being absent from the office. Approximately one in every 10 office staff indicated that he/she has to take messages for telecommuters (15.7%) or direct students/clients in the absence of telecommuters.

Perceptions of telecommuting.

The key section of the research questionnaire measured the perceptions of office workers regarding telecommuting practices. Office-based workers were requested to indicate their level of agreement with 46 predetermined statements using a 5-point Likert response scale where 1 = *totally disagree* and 5 = *totally agree*. For analysis purposes, the ratings of respondents were transformed into average agreement indices that are summarised in Table 5 according to the effect (work based) and affective impact (emotional) of telecommuting on office-based workers. Clearly, most office-based academics are content with the access to and productivity of telecommuting academics while some are fairly indifferent about the impact of telecommuting on the workload of office-based workers, teamwork, and shared work responsibility. It would seem that this impartial stance has not roused significant resentment or jealousy of telecommuters among office-based workers. In terms of the effect of telecommuting, office-based workers also have not experienced significant adjustments to their own work schedule, workload, or productivity since the introduction of telecommuting practices in academic departments.

Table 5

Effect and Affective Impact of Telecommuting Practices on Office-Based Academics

	Statement	Weighted index
Effect	Telecommuters make effective use of technologies such as email to communicate work-related issues to office-based co-workers	74.26
	Telecommuters are equally or immediately accessible	62.31
	I am astonished about the amount and quality of work completed by off-site workers	57.09
	The work distribution between telecommuters and nontelecommuters is equal	51.12
	Telecommuting has a negative influence on teamwork, particularly in terms of peer interaction and communication effectiveness between telecommuters and their co-workers	48.48
	Scheduling and planning meetings has become more problematic since appointing PWFH and decreases flexibility	46.74
	I tend to make adjustments in my work patterns to compensate for the absence of telecommuting co-workers and managers	43.36
	I simply proceed with my work activities without the full input and advice of telecommuting co-workers, thus increasing the risk of potential strife and misunderstandings or poor decisions	41.67
	The flexibility in conducting my work activities has decreased due to greater restrictions when coordinating and adjusting own duties and schedules to accommodate telecommuters	39.02
	My scope and amount of work has changed since some staff were permitted to telecommute	38.24
	My own productivity decreases when co-workers telecommute	33.09
	Conflict with telecommuting co-workers has increased since they began to work from home	30.60
	Since the department has appointed telecommuters my manager's attention towards me has gradually tapered off	27.50
Affective impact	I am highly frustrated having to contend with shifting patterns, interruptions and disruptions due to 'missing' colleagues	43.31
	I think highly of telework/telecommuting as long as it does not negatively affect my work or does not affect teamwork	71.69
	I feel marginalised or deprived of the advantages (i.e. resources) that telecommuters receive	40.00
	I resent telecommuters	28.47
	I am jealous of telecommuters	21.13

Comparative Analysis between Telecommuting and Nontelecommuting Academics

To begin with the comparative analysis between telecommuting and nontelecommuting academics, Table 6 firstly displays the magnitude of the agreement indices for the key drivers of job satisfaction for both academic groups.

Table 6

Key Factors Driving Job Satisfaction of Telecommuting and Nontelecommuting Academics

Factor	Agreement index	
	Telecommuting academics	Nontelecommuting academics
Flexibility of working at home/outside the office	92.97	81.52
Flexibility to decide how work is done	91.43	84.93
Quality of work environment	90.00	81.06
Flexibility of working hours	89.29	85.29
Quality of computer, mobile and other tools	89.29	84.70
Fair human resource distribution	84.09	76.49
Quality of line manager	83.09	79.10
Salary	82.86	75.37
Relationship with line manager	81.62	76.49
Rewards/benefits	81.25	78.73
Promotions	76.61	74.25
Time to commute to work	74.26	78.68

It is clear from the rank-order analysis presented in Table 6 that flexibility of working at home/outside the office, flexibility to decide how work is done, and the quality of the work environment are the key determinants of job satisfaction of both academic groups. In turn, rewards/benefits, relationship with line manager, promotions, and time to commute to work are among the least important determinants of job satisfaction.

A further key finding emerging from the telecommuting study is that telecommuting academics generally seem more productive and happier than nontelecommuters and also tend to experience lower levels of fatigue and work frustration. The comparative indices shown in Table 7 for the work symptoms experienced by telecommuters and nontelecommuters clearly illustrate these pertinent findings.

Table 7

Work Symptoms Experiences by Telecommuting and Nontelecommuting Academics

Statement	Telecommuters index	Nontelecommuters index
Emotional fatigue	40.0	73.9
Physical fatigue	32.3	69.2
Work satisfaction	85.7	58.2
Work frustration	60.0	86.9
Work overload	74.3	95.6

The findings displayed in Table 7 closely resemble a 2012 USA (TeamViewer®, 2012) study indicating that employees in WFH arrangements, whether part- or full-time, report less emotional and physical fatigue than on-site workers. When reflecting on productivity in particular, it is also evident from the 2011 International Ipsos Telecommuting Survey that 70.0% of respondents confirmed that telecommuters are more productive than those who work at the office (Ipsos, 2011). Respective figures for Argentina (topping the list) and Japan (bottom of the list) were 77.0% and 44.0%. Internationally, the average proportion of respondents that regard telecommuters as more productive stands at 65.0%.

Managers' Perceptions of Telecommuting

The core of the research instrument designed for line managers/supervisors was devoted to a series of predetermined statements related to the operational and employee impact of telecommuting. Against this background, supervisors were requested to supply their level of agreement with 72 different statements where 1 = *totally disagree* and 5 = *totally agree*. Items recording the highest and lowest agreement scores among line managers are displayed in Exhibit 3.

Exhibit 3

Top and Bottom Agreement Scores of Managers on Telecommuting Practices

Top agreement scores	• Not all academics have the makeup to be a telecommuter • The right person could telecommute regardless of his/her job duties • Telecommuting allows people the flexibility to work during their most productive hours • Unisa employees appreciate the flexibility of remote working • Telecommuting benefits employee retention and attraction • Telecommuting saves office space • Well informed about the guidelines and expectations regarding telecommuting (work from home) • Since the implementation of the PWFH Directive, telecommuting employees work with fewer distractions
Bottom agreement scores	• It is difficult to monitor telecommuting employees • All academics are responsible enough to be telecommuters • Uncertainty whether employees really work when they are at home during office hours • Concerned about getting a full day of work from a telecommuter • It is difficult to measure the productivity of telecommuters when they are not in the office • Telecommuting is unfair towards office-based workers

From the analysis presented in Exhibit 3, it is clear that the physical absence of telecommuters presents a fair measure of challenges to managers in terms of monitoring the work performance of telecommuting staff. Also, managers are clear in their views that not all academics are suitable for telecommuting. Despite this view, line managers confessed that telecommuting practices are most likely to result in more flexibility and dedicated employees.

Impact of Telecommuting on Management and Nontelecommuter workload

To measure the effect of telecommuting on the workload of managers, professional and support staff, the survey also requested line managers/supervisors to indicate whether the workload across these different staff categories had increased or remained unchanged since implementing telecommuting practices in the academic department. The outcome of this research finding is presented in Table 8.

Table 8

Effect of Telecommuting on the Workload of Managers and Nontelecommuters

Designation	Increased %	Increased slightly %	Increased substantially %	No change %
Management	13.3	20.0	-	66.7
Professional staff	14.3	21.4	7.1	57.1
Support staff	13.3	13.3	13.3	60.0

It is clear from Table 8 that approximately 60% of the managers/supervisors indicated that telecommuting had no significant impact on the workload of nontelecommuters. One in every five line managers indicated that the workload of management (20.0%) and professional staff (21.4%) had increased slightly. Just more than 10.0% of line managers indicated that the workload of support staff had increased substantially as a result of telecommuting. Most importantly, Table 8 shows that two-thirds of managers experienced no change in their own workload.

It was also evident from the line manager survey that telecommuting is an ideal strategy to retain and attract staff. Line managers were also of the opinion that telecommuting practices reduce stress and that telecommuters are as trustworthy as office-based workers. Line managers were also confident in their views that there is no resentment between telecommuters and nontelecommuters and that telecommuters are not necessarily seen as more loyal than nontelecommuters. From a managerial perspective, telecommuting does not impact severely on the management ability of line managers and does not require significantly more supervisory oversight, time, or monitoring than required for nontelecommuters. Finally, line managers were of the opinion that telecommuters are readily available and that their absence from the office does not have any significant impact on the workload of nontelecommuters.

Student Satisfaction with Telecommuting and Nontelecommuting Academics

This section reflects on the outcome of research findings among the 156 students evaluating a total of 97 different modules lectured by telecommuting and nontelecommuting academics. It is important to note that a filter question was used to determine whether students had made any academic enquiries. This precondition served as qualifier to allow students to participate and rate the groups on 17 predetermined academic support criteria where 1 = *extremely dissatisfied* and 7 = *extremely satisfied*. The information contained in Table 9 presents a holistic comparison between the student satisfaction ratings for the two academic groups.

Table 9

Student Satisfaction Rating of Academic Groups

Statement	Telecommuting academics	Nontelecommuting academics	Total
	Mean	Mean	Mean
Availability / ease of getting hold of lecturer(s) via myUnisa	4.06	3.96	4.03
Availability / ease of getting hold of lecturer(s) via email	4.24	4.04	4.17
Availability / ease of getting hold of lecturer(s) via telephone	3.85	3.94	3.88
Available time	4.32	4.24	4.29
Enthusiasm	4.68	4.30	4.53
Approachability	4.81	4.57	4.73
Extent of support	4.75	4.52	4.66
Promptness in handling enquiries	4.66	4.44	4.58
Encouraging effective learning	4.89	4.12	4.60
Punctuality	4.47	4.28	4.40
Reliability	4.52	4.29	4.44
Understanding of subject matter	5.15	4.46	4.89
Willingness to answer queries	5.04	4.68	4.90
Politeness	5.07	4.70	4.94
Ability to inspire	4.78	4.13	4.54
Helpfulness	4.79	4.41	4.63
Efficiency	4.67	4.26	4.51
Average	4.63	4.31	4.51

Although both academic groups show above-average ratings for all items, it is clear from Table 9 that student satisfaction with telecommuter academics is higher for all except one of the evaluation criteria (availability/ease of getting hold of your lecturer(s) via telephone). To establish whether the differences between the rating scores for the two professor groups are statistically significant, an analysis of variance (ANOVA) test was conducted. The outcome of this test showed statistically significant differences only for the following items:

- encouraging effective learning ($p < 0.05$, Sig = 0.013);
- understanding of subject matter ($p < 0.05$, Sig = 0.025);
- ability to inspire you ($p < 0.05$, Sig = 0.036).

Against this background, it can be concluded at a 95% level of confidence that telecommuting academics are more effective in encouraging learning and have a better understanding of subject matter and ability to inspire students. This outcome is to be expected as only academics at professor and associate professor levels with at least three years' work experience qualified to telecommute at Unisa during the telecommuting trial period.

Conclusions and Recommendations

The key findings and trends emerging from the Unisa telecommuting baseline study provide sound motivation to expand telecommuting practices at open distance higher education institutions. This recommendation is also supported by the work of Bélanger (1999), Pinsonneault and Boisvert (2001), and Potter (2003) that identified improved productivity, loyalty, job satisfaction, flexibility, employee morale, retention and attraction as major reasons for the international growth in telecommuting. Key challenges that will most likely be faced by open distance higher education institutions include the following:

- Establishing concrete and well communicated goals for telecommuters that will obviate management practices such as direct and consistent observation of employees to determine their productivity and provide clarity for employees WFH regarding precise expectations.
- Negotiating flexible work arrangements with only those employees that institutions confidently regard as responsible enough to telecommute. In this regard, a well-crafted telecommuting programme that will assist employers and employees to determine whether remote work is appropriate for a given job title or person is required.
- Develop strategies to remain in virtually constant contact with telecommuting employees. Managers should encourage telecommuters to take the initiative by communicating with nontelecommuters and establish guidelines for telecommuters to communicate at regular intervals with the office.
- Reduce the burden on nontelecommuting co-workers and minimise loss of productivity; managers should state and enforce in agreements/policies that

telecommuters must attend job-related meetings, training sessions and conferences. Managers need to inform nontelecommuters of telecommuters' availability schedule and contact information and any anticipated job responsibility changes in the absence of telecommuting co-workers.

- Management should minimise or prevent having the nontelecommuter take on additional workloads. However, if this is inevitable, then the days the telecommuter is at the office, the nontelecommuter could be given relief and the telecommuter could take on some of the nontelecommuter's additional tasks.
- Create the required computer setups and equipment for telecommuters alongside establishing a system to address the ergonomics in remote and home offices (also see Ellison, 2012).
- Eligibility needs to be established and future telecommuting policies should also address liability, homeowners and liability insurance, security (both data and employee), telephone and data connections, and how equipment and supplies will be provided.
- Proper training in the administration and implementation of the telecommuting programmes. Managers may also need to be trained in monitoring, supervising, and measuring and evaluating performance.

Higher distance education institutions have clearly become part of the transformation to introduce telecommuting and this practice is likely to expand further given the positive perceptions and emotional impact of telecommuting and the fact that such practices could turn out to be highly productive. Against this background it is important that practitioners and researchers need to continuously examine how the implementation of a telecommuting programme affects all parties, not only the telecommuters. This is precisely what the Unisa telecommuting baseline study has achieved and it is anticipated that these findings will better inform open distance higher education institutions of the factors and issues that interplay in the dynamics of the telecommuting arrangement and how to increase the effectiveness of their telecommuting programme to the benefit of all stakeholder groups.

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THE INTERNATIONAL REVIEW OF RESEARCH IN OPEN AND DISTANCE LEARNING

Promoting Reflection in Asynchronous Virtual Learning Spaces: Tertiary Distance Tutors' Conceptions

  

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Abstract

Increasingly, universities are embedding reflective activities into the curriculum. With the growth in online tertiary education, how effectively is reflection being promoted or used in online learning spaces? Based on the notion that teachers' beliefs will influence their approaches to teaching, this research sought to understand how a group of distance tutors at the UK Open University conceptualised reflection. It was hoped that these findings would illuminate their approaches to promoting reflection as part of their online pedagogies. Phenomenographic analysis indicated that these tutors conceptualised reflection in four qualitatively different ways. Furthermore, the data suggested that these educators held a combination of two conceptions: one that understood the origin of being reflective and one that understood the purpose of reflection. Analysis of structural aspects of these conceptions offered insight into tutors' own perspectives for what is needed to make online learning environments fertile territory for reflective learning.

Keywords: Distance learning; online learning and teaching; reflective learning; asynchronous forums

Introduction

Frameworks for reflective learning have developed over the last century as researchers and practitioners have sought to enhance the learning experience. Kolb's (1984) experiential learning model, Boud, Keogh, and Walker's (1985) model of reflection, Brookfield's (1987) model for critical thinking, and Gibbs' (1988) reflective cycle are examples of frameworks that explain the role of reflection in learning. All of these learning models are underpinned by Dewey's (1910) notion that reflection is the catalyst for moving between theory and practice. Fundamentally, they all share similar stages of "retrospection", "self-evaluation" and "reorientation" (Quinn, 2005, p. 81). Reflection has been proposed as a stage in a developmental hierarchy (van Manen, 1977; Schön, 1987). Others have located reflective activity in the upper levels of social development models (Perry, 1970; Butler, 1996). Reflection, it seems, plays a very important role in one's development.

Increasingly, universities are embedding reflective activities into the curriculum, especially in courses that lead to professional qualifications (Ross, 2011). Higher education institutions champion the idea of fostering reflective practitioners, often viewing reflective practice as a key learning outcome (Barnett, 1992). Theories such as Schön's (1983, 1987) "reflection-in-action" and "reflection-on-action" underline contemporary professional development (Eby, 2000).

Reflection is seen as an important theme in personal development planning and personal development plans are seen as an important link between employability, enterprise and employer engagement (QAA, 2001; Watts & Butcher, 2008). There is a wealth of literature that suggests reflection is the key to being a "transformational" learner and an agent of one's own learning (e.g., Mezirow, 1990). Central to this, some literature hints that reflection can promote deeper learning (Clare, 2007; Davys & Beddoe, 2009).

Facilitating reflective learning requires teachers to engage in a reflective relationship with students through intentional reflective dialogue (Brockbank & McGill, 1998). Indeed, the notion of "connected teaching" is based on the importance of a shared dialogue between teachers and students to "think and talk together" (Belenky et al., 1986, p. 219). Features of the learning environment, the institution's management structure and the quality of the learning activities all play a role in creating a learning space that is conducive to reflective learning (Moon, 1999). As a growing number of universities explore opportunities for online and distance education, teachers will need to develop their own online and distance pedagogies (McDonald et al., 2012). Working with cohorts in an online environment can be opportunity to engage in an ongoing construction of knowledge (Tisdell et al., 2004). And, as reflection is such a powerful ingredient for learning, it needs to be effectively promoted in online learning contexts (Johnson & Aragon, 2003).

The Problem

Asynchronous online conferencing is widely utilised as a teaching and learning tool in distance learning university courses (Andresen, 2009). However, studies have suggested that achieving an active level of participation (Einon, 2010) and an effective degree of communication (Price et al., 2007) in these online contexts is challenging for distance tutors. Despite the potential for asynchronous discussion to "capture learning in action" (McDonald et al., 2012, p. 32), it is difficult for teachers to structure asynchronous online discussions that engage students in meaningful discourse (Gilbert & Dabbagh, 2005). Without opportunities to develop reflective relationships and to engage in intentional reflective dialogue, how effectively is reflection being facilitated in online learning spaces?

Despite the apparent advantages for teachers to promote reflective skills, it is unreasonable to assume that all teachers will have the same approaches to and understandings of reflection. Studies have shown that teachers' approaches to teaching are strongly influenced by their own beliefs (Kember, 1997) and that teachers' approaches to teaching can influence learners' approaches to studying (Trigwell, Prosser, & Waterhouse, 1999). This study explored distance tutors' beliefs about reflection in order to illuminate their approaches to encouraging reflection in online spaces.

Theoretical Background

Early writings on teachers' orientations to reflection focus on the pursuit of effective teaching. Van Manen (1977) drew on Habermas's (1974) ideas regarding the movement of theory to practice in terms of pedagogical effectiveness. He reasoned that if Habermas was able to construct links between theory and practice on the basis of "cognitive interest", then it should be possible to apply these links to the activity of "making students learn" (p. 225). Van Manen postulated that there were three hierarchical levels of pedagogical reflectivity: 1) as a "means to an end", 2) as a "process of analysing and clarifying individual and cultural experiences", and 3) as a "worthwhile educational end...on the basis of justice, equality and freedom" (pp. 226-227). Van Manen proposed that teaching required the highest level of reflectivity (Level 3) in order to impart the emancipatory benefits of knowledge.

Building on van Manen's levels of reflectivity, Grimmett, Mackinnon, Erickson, and Riecken (1990) summarised three perspectives on reflection in teacher education. They referred to the basic orientation to reflection as "technical", meaning that reflection is a necessary tool in mediating action. The next, higher, perspective on reflection is called "deliberative" and involves thinking between "competing views of teaching". The third, and highest, orientation to reflective practice is termed "dialectical" and works to "apprehend and transform" (p. 35). Two additional orientations to reflection were later proposed by Wellington and Austin (1996). They took the view that a more basic level was required, one where reflection did not really occur. This orientation, referred to as "immediate", focused more on "pleasant survival". Additionally, Wellington and Austin proposed that an orientation beyond van Manen's and Grimmett et al.'s highest level of reflective practice should exist, one that centred on "universal personal liberation". This orientation was labelled "transpersonal" (pp. 309-311).

This framework provides a clear description of five ways that teachers orientate to reflective work. However, Wellington and Austin recognised that the reliance on self-reported data in constructing the model meant that it may neglect tacitly held beliefs (p. 313). Furthermore, although van Manen's original theory described these orientations as hierarchical, the flowchart depicted in Wellington and Austin's work does not appear to provide space for practitioners to move between reflective orientations. This is conflicting with van Manen's (1977) notion that practitioners' reflective orientations can change as they experience "a shift from one reality to another" (p. 212).

Ruch (2000, 2002) argued that van Manen's original model of three levels of reflectivity failed to consider the "unconscious and conscious processes at work in inter-personal encounters" and suggested that a fourth level of reflectivity should be added. Ruch termed this level "process reflection".

> The opportunity to reflect, to think about and feel, as well as act on, the relationship dynamics and associated thoughts and feelings, enables professionals (educators, practitioners, researchers) to gain insight into the experiences of those with whom they work and their own responses to situations. (2002, p. 205)

Clearly, teachers approach reflection in different ways. A teacher's approach to promoting reflection in online spaces may be influenced by their conceptions of e-learning. Kirkwood and Price (2005) claimed that the efficacy of online teaching relies heavily on the relationship between the teacher and the technology. In a later study, Kirkwood and Price (2012) claimed that most of the research into teaching and learning with the use of online tools has neglected the conceptions that instructors and curriculum designers hold of these technologies. They argued that conceptions of these phenomena will affect the approach used in online teaching and that these ideas and approaches will be influenced by the technological context. These authors concluded that, in illuminating these areas, better decisions can be made regarding course design and delivery.

Stein et al. (2011) carried out a phenomenographic study to "identify the variety of conceptions of e-learning and professional development for e-learning by teaching and teaching-support staff" (p. 150). The project involved a cross section of higher education teachers and staff members across New Zealand. Findings from this research showed there were five conceptions of e-learning among tertiary educators: 1) e-learning as tools, equipment, hardware and software; 2) as a means through which learning interaction is facilitated; 3) as learning; 4) as a means through which to reduce distance between and among teachers, students, and the course materials; and 5) as a collaborative enterprise (pp. 150-153).

While studies such as Kirkwood and Price's and Stein et al.'s work toward a better understanding of teachers' conceptions of e-learning, there is a dearth of knowledge related to the ways in which teachers in higher education conceptualise reflection.

Design and Method

The design followed a phenomenographic approach to investigate the qualitatively different ways in which distance tutors understood the phenomenon of reflection (Marton, 1986). Phenomenography seeks to gain a "second-order perspective" (Marton, 1981, p. 177), whereby the goal is to describe "an aspect of the world as it appears to the individual" (Marton, 1986, p. 33). Open-ended email questionnaires and follow-up telephone interviews were used to collect data from the participants. The questionnaire included two demographic questions and 13 open-ended questions. The interviews lasted between 10-20 minutes and involved approximately 12 open-ended questions. Some of the questions were adapted from Stein et al.'s (2011) study and the order of questioning (e.g., "What do you mean by 'reflection'?" posed at the end of the survey) echoed Säljö's (1979) approach to interviewing for his study on conceptions of learning. Gender-specific pseudonyms are provided in this paper to maintain the anonymity of the participants.

Participants

This study used data collected from nine distance tutors on a business management module, B121 : Managing in the Workplace, at the UK Open University. Participants included two female and seven male tutors, who responded to a request to take part in a practice-based study. This particular module is underpinned by Kolb and Fry's (1975) experiential learning cycle and the assessments for this module include aspects of personal development and reflection. Furthermore, this module is supported primarily by an asynchronous online conference. All nine participants took part in the first phase of the research (the open-ended email questionnaire) and of these participants, eight were available for follow-up interviews. (See Appendices A and B for the questionnaire and interview protocol.) All of the participants were familiar and comfortable with the chosen data collection methods (i.e., email and telephone) and they were able to clearly articulate their own ideas relating to reflection.

Analytic Methods

Analysis of phenomenographic data involves identifying a small set of "qualitatively distinct descriptive categories", or conceptions (Booth, 1997, p. 138). The process is summarised by Marton (1994) as follows:

> The interviews are transcribed verbatim and the analysis is carried out in an iterative manner on those transcripts. Distinctly different ways of experiencing the phenomenon discussed in the interview are the units of analysis and not the single individuals. The categories of description corresponding to those differing understandings and the logical relations that can be established between them constitute the main results of phenomenographic study. (p. 4424)

Broadly speaking, the analysis of these data followed Marton's description. However, the analysis studied two different strands based on Marton and Pong's (2005) explanation that there are two aspects to every conception. First there is the "referential aspect", or what would be typically considered as the meaning of an object. Second, there is a "structural aspect", which involves the different features of the conception or, in this case, the participants' perspectives within the conception (p. 336).

These data were analysed in several phases. Initially, the transcripts were scanned to identify key themes. A list of these themes was compiled and then grouped into related categories. Through an iterative process of regrouping and refining, a set of conceptions—or, the referential aspect—emerged. Then, the evidence to support the existence of each conception was investigated more closely. This helped to understand the structural aspect of each category.

Results

The analysis of these data yielded four different ways that these tutors conceptualised reflection: 1) as a trait, 2) as learning, 3) as an activity, and 4) as a skill. An interesting feature of these tutors' conceptions of reflection was that all of the participants seemed to hold a combination of two conceptions. Four of the tutors thought of reflection as both a skill and an activity. Three of the participants considered reflection as both a skill and as learning. One tutor conceptualised reflection as a personality trait and as learning. The majority notion that reflection is a skill implies that these tutors believed reflection can be taught or developed. The evidence suggests that the tutors thought about this aspect of reflection in terms of requiring time and practice.

Interview response: Mary	Yeah, I think I try hard to be...yeah, I think I'm reflective. I do think I work hard at that aspect.

Interview response: Luis	I'm sure we'd be more reflective practitioners if we had more time to reflect.

A few of the participants were able to talk about reflection in terms of their own experiences as a learner on a professional development course.

Survey response: Luis	I recently completed a piece of work that required use of reflection to help consider more abstract theories.
Survey response: Mohammed	When I was doing my MBA, I put some things into my blog. It was useful to see just how I was thinking back then.
Survey response: John	It wasn't until I did my PGCE that I realised how frightful reflection is. In my previous jobs, reflection wasn't particularly important. But I've changed tack now and I've realised how important it is.

When discussing reflection as an activity, the teachers used action words to explain their ideas: "stepping back...", "recalling experiences", "constructing thoughts", and "interrogating our thoughts". Tutors who held conceptions of reflection as learning were able to link these activities to developmental outcomes.

Survey response: Mary	Learning—making the unconscious conscious...to help us decide how we will approach a current situation or problem.
Survey response: Sarah	Thinking about events which have passed and pausing to consider whether there is any learning to be had from these.
Survey response: Malcolm	Reviewing action and performance so that success can be reinforced and modification of behaviour when things don't go so well.

Despite conceptualising reflection as an important element of higher learning, these teachers remarked that other factors constrained their ability to promote reflective learning in the asynchronous forum (referred to as the tutor group forum or TGF). The main factor, according to the participants, seemed to be low rates of participation on the TGF.

> Researcher: How important is the TGF in your role as a distance tutor?
>
> John: As far as [this module] is concerned?
>
> Researcher: Yes.
>
> John: I hate it. [laughing]
>
> Researcher: Why?
>
> John: Because I'm speaking into a void. They don't answer me. They don't talk to me. I hate it. There must be another way.

There was also some indication that the module design was a constraining factor in operationalising reflective learning.

> Researcher: Okay. And, how important is the TGF in your role as a distance tutor?
>
> Sarah: Well, on this course, not as important as it might be really. But I'd prefer it to be much more important.
>
> Researcher: Okay, what could the University or the module team do to make the TGF a more effective tool for you?
>
> Sarah: Um, I think the critical issue is devising activities which are both engaging and also really kind of force students to engage with the TGF.

There was a suggestion that reflective activities could be designed and provided by the module team to be used on the forums.

Interview response: Mohammed	There are no centralised activities, you know, that come from the module team. That could be helpful.

Many of the tutors remarked that their online pedagogies were affected by this module's assessment strategy. Participation in the online forum is not required on this particular course and, if it were, teachers feel they would have more opportunities to promote reflection on the TGF.

Interview response: John	...as soon as they find out there's no marks allocated, they don't bother. Then I say to them: 'please participate'. What's the point? They don't get any marks given to them.

Interview response: Malcolm	And because it's not assessed it's very difficult to keep the enthusiasm with people working on the TGF and if I'm being totally honest, my enthusiasm in trying to keep people going on it low. Their argument is 'well I'll do it but only if it's of benefit'.

The other big factor was time, both personal time available to "teach" and the temporal dimension of asynchronous learning technologies. The belief that these educators held that reflection takes time seemed to influence the way they thought about promoting reflection on the TGF.

Interview response: Malcolm	I think that's the problem, none of us really have the time to reflect with work so its there in [the course] and it will come out in the assignment, rather than the TGF I think.

Also, the timeliness of using the forum for teaching and learning was laughable by some of the teachers.

Interview response: Malcolm	I know it's asynchronous but it's very asynchronous. [okay...laughing] umm, yeah, rather than everybody going in there every three days and then in three days everyone's got an answer to their questions, or have had an opportunity to participate, and then another three weeks and they aren't there at all.

Discussion

Barnett (1992) described the institutional space between a student's entry into and exit from higher education as the "black box" (p. 99). This black box holds "an array of invisibles" that, among other things, includes the educational backgrounds, values, feelings and beliefs of its teachers. This study aimed to learn more about teachers' beliefs about reflection in the hope that doing so would shed light on how they promoted reflection in online learning contexts.

The findings of this study indicated that these distance teachers each held a *pair* of conceptions related to reflection. One conception dealt with the *origin* of the phenomenon (whether it was an innate feature or a learned skill) and the other conception in the pair addressed the *purpose* of reflection (whether it was a discrete activity or whether it was developmental). The dualist nature of this phenomenon may reflect the way the data was collected (i.e., the questionnaire and interview questions). It may also be an indication that the participants were considering the questions from different stances.

The notion of stance is an important consideration in the learning context. Salmon (1989) explained that the stance a teacher takes is representative of his or her knowledge and understanding. Brockbank and McGill (2007) suggested that even a teacher's best efforts at hiding their own struggles at engaging with or being enthusiastic about a particular aspect of learning will not trick anyone in the longer term. Resentment of particular approaches to teaching will influence the learning situation. While the findings of this study seemed largely positive regarding teachers' conceptions of reflection, their comments about promoting reflection in the forums were often negative. When relating the contents of the black box to the student experience, it seems pertinent for teachers to be aware of their personal stance toward certain approaches to learning, particularly when trying to develop a reflective relationship with their students.

Norton et al. (2005) investigated teachers' beliefs of "knowledge transmission" and "learning facilitation", while simultaneously asking their participants to rank their approach to teaching (p. 542). Norton et al. differentiated between teachers' intentions (intended approaches) and teachers' conceptions (beliefs) by arguing that "teaching intentions thus reflect a compromise between teachers' conceptions of teaching and their academic and social contexts" (p. 537). In the case of this present study, the teachers' relatively positive intentions for promoting reflection on the forums were affected by both their institutional and social contexts as well as their underlying beliefs about the phenomena. Teachers in this study noted that low participation rates in the forums, the design of the module, the lack of pre-fabricated reflective learning activities, too little time to facilitate reflection, and the asynchronous gap were constraining factors in promoting reflective learning in the forums.

While there is literature to suggest that asynchronous forums typically suffer from low participation rates, it seems plausible that by addressing some of these other perceived constraints, students and staff may come to understand these forums as valuable learning tools. Perhaps the use of protocols for online discussions, as promoted by Gilbert and Dabbagh (2005) and McDonald et al. (2012), would provide structured activities for fostering reflective online discourse. The use of these protocols may also assuage teachers' concerns about not having enough time to promote reflection in the forums. Despite these teachers' concerns that the asynchronous nature of the forums does not provide scope for reflection, Hamilton and Cherniavsky (2006) explained that an asynchronous discussion thread is a record of a student's deliberate and focused understanding of a particular topic. Such a space offers great potential for learning and understanding, which, according to learning theory, necessitates reflection. Perhaps universities need to 'shout louder' about the potential of asynchronous fora to facilitate reflective learning.

Further research regarding teachers' conceptions of and approaches to reflection in online spaces could yield more salient and generalisable findings for institutions considering or developing e-learning technologies. The gender composition of this sample may have influenced the findings. Similar studies with equal number of male and female participants and/or comparison studies of wholly male and wholly female samples may yield interesting insights. Findings related to the dual-conceptions of reflection among practitioners offer a foundation for further studies on personal stance and the institutional and social contexts of practitioners are important to consider, both as catalysts and as constraints.

Acknowledgements

We are grateful to the B121 module team at the UK Open University for endorsing this study.

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Appendix A

Questionnaire

Demographic questions:

1. How long have you worked as a distance tutor for the Open University?

2. How many presentations of B121 have you taught?

Open-ended questions:

3. When you think of e-Learning, what comes to mind?

4. When you think of teaching that includes e-Learning, what comes to mind?

5. What is your understanding of the purpose of the Tutor Group Forum (TGF)?

6. How do you use the TGF in teaching B121?

7. In what ways do you use the TGF to facilitate reflective learning for this course?

8. In what ways do you use the TGF to promote personal development among B121 learners?

9. How do your students use the TGF to engage in reflection and/or personal development?

10. Please describe at least one example of how your students have (or haven't) responded to your efforts on the TGF.

11. How have you learned how to use the TGF as a teaching tool?

12. To what extent is your own teaching and/or personal development supported as a distance tutor?

13. Please provide any questions thoughts about your own teaching or teacher-training that would be relevant to this project.

14. What do you mean by 'reflection'?

15. What do you mean by 'personal development'?

16. If you are willing to participate in a follow-up telephone interview, please provide your best telephone number(s) here. The date/time will be arranged with you via email.

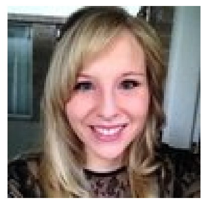
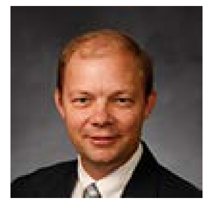
Appendix B

Interview Protocol

1. As a distance tutor, how would you position yourself on a spectrum of novice to expert?
2. How important is the TGF in your role as a distance tutor?
3. To what extent do you feel it's important to prompt reflection in the forum?
4. What about personal development?
5. What has been problematic with your efforts to use the TGF in your teaching?
6. What has worked well on your forums?
7. To what extent do your students use the forum to reflect?
8. What evidence is there that learners have engaged with the forum for personal development?
9. Do you feel you would benefit from additional training in using the TGFs for distance learning?
10. What could the University or course team do to make the TGF a more effective teaching tool for you?
11. How could PDP be encouraged on the forum?
12. To what extent are you a reflective practitioner?

THE INTERNATIONAL REVIEW OF RESEARCH IN OPEN AND DISTANCE LEARNING

Examining the Impact of Video Feedback on Instructor Social Presence in Blended Courses

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Abstract

This mixed method research examined instructors' use of video feedback and its impact on instructor social presence in 12 blended sections of three preservice educational technology courses. An independent samples *t*-test was conducted and found no significant difference in perceptions of instructor social presence between students who received video feedback (M = 5.77, SD = 0.85) and those who received text (M = 5.62, SD = 0.75); $t(178) = 1.23$, $p = 0.22$. The analysis of 22 student and nine teacher interviews found that participants generally viewed video feedback to be more effective at establishing instructor social presence because instructors could better speak with emotions, talk in a conversational manner, and create a sense of closeness with students. Students also explained that the blended learning format lessened the impact of video feedback on instructor social presence, which may help to explain why statistical differences were not found.

Keywords: Blended learning; online learning; social presence; feedback; community; higher education; computer mediated communication

Introduction

Johnson (2008) stated that there are two sides of teaching—the academic and the human—adding that the human side of teaching can be especially difficult for teachers. This is particularly true in online and blended learning environments where face-to-face instruction is lowered or eliminated, resulting in a feeling of isolation for many students (Palloff & Pratt, 2007). Research has found that this sense of isolation can negatively impact academic learning outcomes (Dziuban, Hartman, & Moskal, 2004; Song, Singleton, Hill, & Koh, 2004; Hara & Kling, 1999). However, Moore (1980) explained that this psychological distance can be reduced when interaction is increased. For instance, Boling, Hough, Krinsky, Saleem, and Stevens (2012) found that instructor feedback in an online course was “an important component for building a strong student-instructor connection” (p. 121). Evans (2013) added that feedback has a social dimension even when it focuses largely on the course content. However, instructor feedback is largely text based and lacks many of the non-verbal communication cues that make it easier to form a connection with students.

Some instructors have begun to incorporate asynchronous video feedback into their online and blended courses as a way to enhance the social dimension that was described by Evans (2013). However, research examining asynchronous video feedback’s impact on instructor social presence is limited and has focused largely on student perspectives. Price, Handley, Millar, and O’Donovan (2010) explained that “The learner may be in the best position to judge the effectiveness of feedback but, on the other hand, may not always recognize the benefits it provides” (p. 277). Combining student and instructor perspectives may provide a clearer understanding of how instructors use feedback to establish their social presence. As a result, this research combines student and instructor perceptions to examine the impact of asynchronous video feedback on instructor social presence in blended courses that provide the majority of instruction online. More specifically this research addressed the following:

1. Do students who received video feedback report higher levels of instructor social presence as compared to students who received text feedback?
2. What are students’ and instructors’ perceptions of how video feedback influences instructor social presence?

Literature Review

We will first discuss the concept of social presence and its relationship to modes of communication. Following we will discuss the literature examining the use of video feedback to establish instructor social presence.

Social Presence and Modes of Communication

Historically social presence has been closely related to the mode of communication used. Short, Williams, and Christie (1976) originally defined social presence as "the degree of salience of the other person" in mediated communication (p. 65). They also emphasized that social presence was an attribute of the mode of communication—the more communication cues that the tool could transmit, the more social presence it contained. Short et al.'s original definition of social presence is similar to the concept of media richness (Draft & Lengel, 1986). Draft and Lengel (1986) defined media richness as a communication medium's capacity to process rich information and explained that face-to-face communication had the highest richness and "impersonal written documents" and "numeric documents" had the lowest (p. 560).

Short et al. (1976) also believed that social presence was closely related to the concept of immediacy. Wiener and Mehrabian (1968) defined immediacy as the level of psychological distance that exists within communication. The words that are used, as well as the visual and auditory cues, during communication can affect the level of immediacy. Short et al. (1976) reasoned that when using the same communication tool it was possible for immediacy (a product of behavior) to vary while social presence (an attribute of tool) stayed constant.

The distinction between immediacy and social presence has become less clear. Unlike Short et al. (1976), Gunawardena (1995) contended that social presence was in part a product of behavior and thus could "be cultivated" by participants (p. 162). Gunawardena's view that social presence can be cultivated has become widely accepted within the research community and is the view we adopted for this research. Garrison, Anderson, and Archer (2000) built on this new definition when they created the community of inquiry (CoI) framework to examine text-based learning interactions in an online learning environment. Similar to Gunawardena (1995), Garrison et al. (2000) defined social presence as the degree to which participants are able to project their full personality socially and emotionally and that communication behaviors—not media—are the most important factors when measuring social presence. The CoI framework also explained that social presence can be a prerequisite to *cognitive presence* or the extent that students are able to construct knowledge from their interactions with others in the course. Garrison, Anderson, and Archer (2010) would later explain:

> An important contribution of our work was describing social presence from a multi-dimensional perspective that had overlap with the other presences. Building on the affective expression dimension we added "open communication" as a category within social presence to reflect the purposeful nature of the community, and "group cohesion" to reflect the collaborative nature of the community and its activities. (p. 7)

These three subcategories (i.e., affective expression, open communication, and group cohesion) were confirmed when Garrison and his colleagues (Rourke, Anderson, Garrison, & Archer, 2001) performed content analyses on online text discussion boards. In doing so, they also concluded that social presence could be established using only written communication. However, Garrison at al. (2000) acknowledged that "the lack of visual cues [in text] may present particular challenges to establishing social presence" (p. 95).

Within the CoI framework, social presence focused largely on student social presence; however, Anderson, Rourke, Garrison, and Archer (2001) acknowledged that a teacher's responsibility to facilitate discourse within the course "overlaps with many of the behaviors identified in [the CoI's] larger model of 'social presence'" (p. 7). The examination of instructor social presence is especially important in light of Swan and Shih's (2005) finding that instructors' social presence had a larger impact on student outcomes than did students' social presence.

The Impact of Audio and Video Feedback on Social Presence

Although research has shown that social presence can be established using text (Gunawardena, 1995; Rourke et al., 2001), it is more easily established when nonverbal and vocal cues are present (Tu & McIssac, 2002). Some instructors have attempted to use audio communication to more effectively establish social presence in their course. Overall, students have reported that audio feedback is more personal and humanizing than text (Cuthrell, Fogarty, & Anderson, 2009; Kim, 2004; Olesova & Richardson, 2011; Wood, Moskovitz, & Valiga, 2011) and helps them to feel connected to their instructors (Gould & Day, 2012; Ice et al., 2007; Oomen-Early, Bold, Wiginton, Gallien, & Anderson, 2008). For instance, Ice et al.'s (2007) analysis of student surveys and interviews found that the vocal cues in audio feedback helped students to know that their instructor cared about their learning, resulting in a sense of belonging and involvement. Similarly, a student in Oomen-Early et al.'s (2008) research believed that audio had a softening effect when receiving corrective feedback. Research has also indicated that audio feedback can help to motivate students to complete assignments (Kirschner, Brink, & Meester, 1991; Pearce & Ackley, 1995; Wood et al., 2011).

Although audio contains more communication cues than text, both lack visual cues such as facial expressions and body language that "provide context for verbal interactions" (Wolsey, 2008, p. 311). Cuthrell et al.'s (2009) examination of audio feedback described one student who found that audio feedback was difficult to understand because it lacked the instructor's facial expressions. As a result, some researchers have sought to establish their social presence via asynchronous video communication. Overall student response has been positive, reporting that the richness of video helps them to perceive their instructor as real (Borup, Graham, & Velasquez, 2011; Borup, West, & Graham, 2012; Matheison, 2012) and caring (Griffiths & Graham, 2009b; Moore & Filling, 2012). Additionally students reported that the visual cues in video helped their instructor to feel more conversational (Silva, 2012), friendly (Griffiths & Graham, 2009b), and personal (Griffiths & Graham, 2009a; Matheison, 2012; Parton, Crain-Dorough, & Hancock, 2010). For example, Borup et al.'s (2012) analysis of student interviews found that students' abilities to hear and see their instructor made him feel more *real*. Additionally, blended learning students in Parton et al.'s (2010) research stated that the personal nature of video feedback helped them feel connected to their instructor with one student stating that, "through this video feedback I felt more connected to my professor, that she knew me personally, and that my responses to assignments were important to her" (Analysis section, para. 7). Although research largely lacks instructor perceptions, Griffiths and Graham (2009a) found that video feedback helped instructors to know their students on a personal level and the instructor in Parton et al.'s (2010) study thought asynchronous video feedback increased students' involvement.

These benefits are not without some costs. Although the use of asynchronous video communication affords time to reflect, it is not easily edited and may reduce some of the rigorous thinking that occurs when using text (Garrison et al., 2000). Furthermore, technological problems are more likely to arise when using video (Barrow, 2012; Thompson & Lee, 2012). Barrow (2012) added that providing video feedback can be less convenient because it requires the instructor to be "in an indoor quiet setting with minimal external audio and visual distractions" (p. 170).

In summary, the use of audio and video feedback has been perceived by both students and instructors as effective in enhancing social presence. However, as yet the few studies that have specifically reported on video feedback tended to qualitatively examine only student—not instructor—perceptions. Although insightful, these initial research studies should be interpreted cautiously—especially by those wishing to apply their findings in varying populations and contexts. More research is needed that uses a variety of methodologies to examine student *and* instructor perceptions in a variety of contexts, such as blended learning environments.

Methods

We addressed the research questions using a complementary mixed-methods design to "measure overlapping but also different facets" of instructors' use of video feedback to establish social presence (Greene, Caracelli, & Graham, 1989, p. 285). More specifically we used quantitative data to address the first research question (Do students who received video feedback report higher levels of instructor social presence as compared to students who received text feedback?) and qualitative data to address the second research question (What are students' and instructors' perceptions of how video feedback influences instructor social presence?).

Context and Participants

Research was conducted in 12 sections of three one-credit technology integration courses required for secondary and elementary education majors at a large university in the Midwestern United States. In total the courses enrolled 229 students (211 female and 18 male) and were taught by 10 instructors (8 male and 2 female). Tech4SecEd enrolled 71 secondary education majors in 6 sections. The remaining two courses were required for all elementary education majors. Tech4ECE enrolled 72 students in 3 sections that focused on integrating technology into grades K-2 and Tech4ElEd enrolled 86 students in 3 sections that specialized in technology integration for grades 3-6. All sections used Canvas as a learning management system (LMS) because it allowed instructors to easily provide students with text or video feedback. Students could also reply directly to the feedback they received within the LMS.

The majority of the instruction was presented primarily online for all sections. However, students were provided with optional face-to-face labs each week that they could attend to receive personalized face-to-face help when needed. All sections also met face-to-face on the first day of the semester and all but two sections met face-to-face 4-5 times during the 14 week semester to introduce students to new projects, provide direct instruction, and allow for group discussions and presentations.

Data Collection

Throughout the course, each student received personalized feedback on the courses' three major assignments that were similar for all sections. All three assignments used a mastery based approach that allowed students to resubmit work after they received feedback from their instructor. Students created an online portfolio or blog for the first assignment and an instructional video for the second. The third assignment required students to create a presentation. Tech4ElEd and Tech4ECE students created a presentation regarding their experience designing and implementing a technology enhanced lesson during a four-week practicum experience. The Tech4SecEd did not have a concurrent practicum so students selected, learned, and presented on technologies that they could use in their specific content areas.

The control group contained 99 students in five sections who received text feedback on the first two assignments and the experimental group contained 130 students in seven sections who received video feedback on the same assignments. For the third assignment, instructors switched the mode of communication to ensure that each student received both video and text feedback from their instructor. Researchers also met with the instructors at the start of the semester to establish guidelines regarding the timing and content of the feedback they would provide to students.

Data was collected using two student surveys and interviews with students and instructors. The first survey was administered mid-course after students had received feedback on the first two assignments. The eight survey items measured student perceptions of instructor social presence and were obtained from the larger Social Ability Instrument (Yang, Tsai, Kim, Cho, & Laffey, 2006) that used a seven-point response scale (1 = *strongly disagree* and 7 = *strongly agree*) (see Appendix). Yang et al.'s (2006) instrument was selected for two reasons. First, it was validated in a setting similar to the one examined in this research; and second, it specifically measured the social presence of instructors where other instruments have focused on measuring social presence of students (Arbaugh et al., 2008; Kim, 2011; Swan et al., 2008). One instructor neglected to provide students video feedback for the third assignment and her course section was excluded from data collection beyond the mid-course survey.

At the end of the course, researchers administered the following open-ended survey item to students: "In this course, you have received feedback from your instructor via both video and text. Which type of feedback did you prefer, and why?" Using the responses to this item, 22 students were sampled in an attempt to represent opinions and demographics of the student population. These students, along with nine instructors, participated in a 45-60 minute interview that discussed various aspects of social presence in video feedback. Interview transcriptions were then sent to all participants to check for accuracy and provide clarification when needed.

Data Analysis

Student's quantitative responses to the mid-course survey were aggregated and compared using an independent samples *t*-test. Researchers qualitatively analyzed student and instructor interviews, using elements of constant comparison coding methods (Glaser, 1965). As stated previously, we adopted Garrison et al.'s (2000) definition of social presence for this research and the analysis was guided by their three subcategories of social presence (i.e., emotional expression, open communication, and cohesion). Two researchers double coded six interviews (three instructor and three student), meeting after each interview to compare codes and identify themes. Any disagreements were discussed until researchers reached agreement. Researchers coded the subsequent interviews separately and met following every three interviews to discuss emerging themes. Additionally, all four members of the research team met twice during coding to discuss the primary coding patterns and themes.

Findings

Quantitative and Qualitative Findings

Quantitative findings.

One-hundred and ninety students completed the instructor social presence scale for a total response rate of 83.0%. However, 10 students reported that they did not view any of their feedback comments and were excluded from the analysis resulting in a useable response rate of 78.6% (105 students who received video feedback and 75 who received text feedback). An independent samples *t*-test was conducted and found no significant difference in perceptions of instructor social presence between students who had received video feedback (M = 5.77, SD = 0.85) and those who received text feedback (M = 5.62, SD = 0.75); $t(178) = 1.23$, $p = 0.22$.

Qualitative findings.

Guided by the three subcategories of social presence identified within the community of inquiry framework (i.e., emotional expression, cohesion, and open communication), we organized student and instructor perceptions into three categories: (1) emotional expression, (2) closeness, and (3) natural and open communication.

Instructor Perceptions

Easier to express emotions.

All of the instructors agreed that the richness of video allowed them to more easily convey their emotions in feedback because, as Jake explained, “you can look in the camera, you can smile, you can laugh, [and] you can talk with your hands if you want to.” Jake further stated, “I prefer video because I want [my students] to see me and understand who I am and that I really care for them, and I think that comes across much easier in video.” Instructors also believed that the visual and vocal cues in video allowed students to recognize the authenticity of their emotions. Kurt said that with video feedback “It’s easier to detect whether the teacher is really caring about you.” Robert added that his tone of voice in video feedback was especially important when providing corrective feedback because students could better “feel the empathy [he] had for them.” The added richness of video also helped instructors to feel more comfortable using humor because it decreased the likelihood that students would misinterpret their comments. For instance, Robert explained that “the problem with text is that sarcasm can come across as biting.”

Instructors found that they could include emotional expressions in text by using emoticons and expressive punctuations. However, the effectiveness of these strategies appeared to be limited. John found that it was difficult to convey emotions in text "even if you try and punctuate [text feedback] differently or use little emoticons," whereas video feedback "just naturally made everything more human." David added that an instructor's ability to include emotional expressions in text depended largely on their writing ability, "How well can you convey emotion through text? I can't do it very well. Some people are really good at it. I'm not." Gwen summarized that in text, instructors had to "find a translation" for emotional expressions whereas "with video, it's straight."

Although instructors found that video was more effective than text at conveying positive emotions, instructors found two primary limitations. First, although the richness of video appeared to make it easier to express emotion, it did not ensure that instructors would do so. For instance, Jake had to remind himself "to smile and speak with inflections, because [he] can be kind of monotoned" in video and Kurt had to "make a conscious effort to look into the camera" and smile. Second, instructors found that video conveyed their actual emotions even when they did not want them shared. Chris explained, "I think when we are talking face to face, I can tell if your praise is for real or if it is just something that you are saying just to say." David added that in video, "I share information that I don't want to share through my face." David also shared an experience where video conveyed the negative emotions that he was feeling and possibly hurt his relationship with one student:

> I kind of went off on [a student] and that came across [in my video comment]. . . . So I went back and deleted the video and made a new one where I was less animated. . . . I don't know if he ever saw [the first video post] and ironically, he's one of the kids who just stopped [working].

Matt added that in some cases he could appear more excited in text than he could in video because he "can use an exclamation mark in text, when [he] wouldn't come across as using an exclamation mark in person."

Easier to communicate naturally and openly.

Although students did not typically reply to their feedback, instructors felt that their video feedback had a conversational feel. Robert explained, "I try to talk as if they were really there. I'm not just sitting there, I'm actually looking at them, and saying 'Hey, how are you doing?' I'm trying to be as conversational as I can." Bill believed that when instructors provided feedback in this manner, students would feel as if they "could jump in at any moment and say something, and it seems like we are actually having that conversation even though we're not." Although Gwen tried to be conversational in text feedback, she found that there "always is a barrier" and in video it was easier to be "more conversational, more natural, more normal to what you would do in a face-to-face situation than if you typed it."

However instructors liked the ability to edit their text comments and wished that they could do the same with video. Chris explained that he wanted his video feedback to be "fluent" but found that in video he would sometimes be "rambling a lot or just drawing a blank." Initially instructors would commonly rerecord their videos when it contained several imperfections but became more comfortable with small mistakes and "gave up on trying to [be] perfect." David found that these imperfections were more acceptable in video because "when people talk, we naturally slip over our words, we backtrack, we change our sentences" but "when we write, it has to be a lot cleaner." In fact, instructors felt that these imperfections, as John said, helped their feedback feel "more human."

Easier to build a sense of closeness.

Instructors believed that their students could potentially feel "like just a number" or "a sheep in a herd." As a result instructors used their feedback to recognize students' individuality and develop a sense of closeness with them. Some strategies, such as addressing students by name and acknowledging aspects of students' personalities or lives that they self-disclosed in their projects, were independent of the mode of communication. However, instructors found that the richness of video made these strategies more effective. David explained the following:

> I think two things go into play in order for [a connection] to happen. One is . . . making comments about, "Hey, I noticed on your website that you are from Colorado. That's cool, I didn't know that. What part are you from?" You could do that on text, sure, but the other part is that aspect where the instructor is speaking to [the student] specifically and [they] can see that . . . because they are hearing my voice . . . but also just because they are constantly seeing me.

The visual cues in video appeared especially helpful in forming connections because it added a "human touch" that let students know that they "were talking with a real person" and not receiving a "computer generated response." Chris explained, "I think it feels more intimate on video than it would on text just because my face is there—I feel more present." Instructors also provided a "human touch" to their feedback by recording it at home where students could see them in more personal surroundings. For instance, when providing feedback from home, Jake would like to have a bookshelf behind him with "family photos and little things that are important to [him]." Robert also explained that on a couple of occasions he had his "toddler sitting on [his] lap" and remembered students telling him, "It's really fun to see you at home. You're like a regular person!" Robert summarized that he could create a connection with students through text "to some degree but not as well as with video."

Instructors found some limitations and costs to providing students with video feedback. David acknowledged that while video "provides more than text" it is "still not as good as face to face." Instructors also found that it was less convenient to provide video feedback. Gwen remembered, "I had to do video [recordings] at home because that's where I had my camera and my microphone." Robert, a father of young children, liked to provide feedback at night but found that he needed to "talk more quietly because [his family was] asleep." Other instructors also commented that providing video feedback was inconvenient because they felt uncomfortable providing it in public places such as a computer lab.

Student Perceptions

Video contained more emotions.

Students found it easier to perceive their instructors' emotions in video than in text feedback because, as Margie explained, "you have a lot more ways to [do it]. . . You can do it through your face, your voice, [and] your body language." For instance, Angie, one of Robert's students, shared the following: "When Robert talked in the video . . . he's just more likely to bring out his personality as if he was sitting just right there." Similarly, Tiffany stated that video feedback made her instructor "seem more like a person" because she could see his "personality and mannerisms." Additionally, Nancy found that the content in her text and video feedback was similar but her ability to see and hear her instructor in video feedback helped her to "feel more like it's coming from a person."

Students also found that instructors' emotional expressions in video had more authenticity than text. For instance, Hanna found that it was easier to know that her instructor "cared about us" because in text feedback "you can kind of fake it." Kelly attributed some of the added authenticity to the visual cues in video because "the face is credible." Natalie also explained that the authenticity of video feedback helped her to increase her confidence in her abilities because she could better see that the instructor "felt like [she] was competent in what [she] was doing." The ability of students to see their instructors' demeanor and hear their tone of voice was also helpful in avoiding misconceptions. For instance Natalie found that humor was better understood in video:

> I made a video about how to write a thesis statement. The thesis statement I wrote for an example was, "Is Spiderman better than Batman?" In the video he said something about "I'm not sure this thesis statement is going to work because Spiderman is clearly better than Batman!" . . . He could have [said something similar in text] but it might've been harder for me to tell whether he was really joking or not.

Neal also preferred receiving corrective feedback via video because he "could see his [instructor's] demeanor and could see that he wasn't upset."

Although students could also perceive instructor emotions in text, it appeared to be limited. Dallin explained that while she recognized some emotional expressions in text feedback, she could not "see as much" because it felt as if her instructor was "behind a wall" and Natalie found her text feedback to be "cold" because "it's hard to see the emotion in it." Similarly, Kelly stated that the visual nature of video was especially helpful for emotional expression, "In text, you can hear their voice because that's how they normally talk or write, but you can't feel any emotion because you don't have a face to connect with it."

Video felt more conversational and interactive.

Students found video feedback more conversational and interactive than text. Rebecca explained "it was like he was having a conversation with me even though I wasn't responding. He was talking to me as if I was right there in front of him." Similarly, Lisa found that her video feedback made her feel like she was "just talking to him in class" and that "she always felt very approachable." Edith also found that video feedback comments "were very fluid and natural" because her instructor was not "constrained by that medium." Rebecca wondered if her video feedback felt more conversational because "maybe [her instructor] communicates better verbally," indicating that instructors' ability to express emotion in feedback is somewhat dependent on their communication skills.

Although students found that video feedback was "more like a real face-to-face interaction," some students indicated that they were more likely to actually respond to text feedback. Sadie said that when she received video feedback she "felt like [she] had to respond in video" even though her instructor did not have that requirement. Similarly, Natalie found that "text was easier for [her] to respond to" because responding to a video using text "felt a little unbalanced." Nancy rationalized, "If I'm going to reply in text, we might as well just talk in text."

Video makes it easier to feel a connection.

Some students felt "more of an emotional connection" to their instructor as a result of their video feedback because it contained their instructors' "voice, tone, and . . . facial expressions." Sabrina shared the following: "Just talking with someone face to face always makes you feel more connected to them . . .which I think is especially good for a blended course where you're not with them all the time. "

Students also believed that video feedback impacted their sense of closeness with their instructor because it made their instructor seem more "real." Rebecca explained that in video feedback "you are actually seeing [the instructor] and you see that he is just a person too." Video seemed to give students "a peek" into their instructor's environment. For instance, Jaime stated "I can see him in his office . . . or his home.

It was like 'Welcome to Bill's life!'" Kara also shared the following: "In the background there were toys on the ground and some of his home stuff and he was kind of just chilling in his chair. I was like, 'He has a life. Weird!'" The knowledge that Hanna's "professor [was] a person" lessened her frustration in the course:

> Throughout my college experience, there have been classes with professors that students tend to not like. . . I think the video [feedback comments] are helpful in dealing with that because then [the instructor] is a person—not just words. . . It makes it harder to be frustrated at the teacher because the teacher is a person and you are actually interacting with them.

Margie added that the closeness she felt to her instructor made her feel "more accountable" and "included."

Video feedback also felt more personalized because students knew that their instructor was communicating with them directly. Sadie explained that her instructor "couldn't make the same video for everyone" but he could have reused the same text feedback comments by simply changing the student name. Some students also felt that hearing the instructor say their name helped them to feel closer to their instructor more than reading their name in text. Margie believed that with text the instructor could "just look at your name and type it in" but hearing her instructor say her name helped her to feel like he knew who she was. Caroline explained that people tended to mispronounce her name and felt a connection with her instructor because he pronounced it correctly and was appreciative that "he remembered."

Samuel felt like he actually received more "one-on-one and face-to-face" feedback then he would have received in a "regular classroom."

> I felt like he was just speaking to me and how I could do better. I liked that. Usually in other [face-to-face] classes that I've had, when you get an assignment back you'd have to approach the professor and go and say, "Well, what did I do? What can I do better?" With him, he would look at your assignment and immediately do a video feedback just for you, so you would always get it rather than having to go and ask for it. I liked that.

Interestingly Caroline also found that she received more of her instructor's attention than in a face-to-face class, however, unlike Samuel, the attention was somewhat unwanted because she was not "an attention seeker usually so direct eye contact and direct interaction sometimes makes [her] uncomfortable" and "was a little bit weird." Similarly, Sabrina found that video feedback was more personal, which was "partly why [she] didn't like it as much" because she "didn't want to be too personal with the teacher."

Although students found that video was more effective than text at helping them feel a connection with their instructor, blended students found that the impact was limited because they had already developed a sense of closeness with their instructor in face-to-face class sessions. Nancy explained,

> Since I had talked to him one-on-one before, in person, I don't feel like I needed the videos to help me feel like I knew him. . . but I could see how it would help in an all online class.

Natalie believed that video feedback would have been helpful in "forming a student-teacher relationship" even in a fully face-to-face course but agreed that video feedback would be even more important in a fully online course because students "wouldn't have had any other way of seeing the professor." Jaime summarized that "face-to-face would be the best [but] video is pretty good."

Discussion

Anderson (2009) explained that "Distance education has always been to a great degree determined by the technologies of the day. . . As these technologies have developed, distance education has evolved in parallel to support new forms of interaction" (p. 112). For instance, the advent of the Internet has enabled instructors to provide students with more feedback than was previously possible (Garrison, 2009). However, previous constraints in online communication tools resulted in feedback that was largely text based (Parsad & Lewis, 2009). Although text can be an effective mode of communication, it lacks visual and vocal cues that can make it more difficult to establish social presence (Garrison et al., 2000). As a result we used a mixed method research design to examine the impact of video feedback on instructors' ability to establish their social presence in blended courses.

Our quantitative analysis of student responses to items measuring instructor social presence found no significant difference in perceptions of instructor social presence between students who received video feedback (M = 5.77, SD = 0.85) and those who received text (M = 5.62, SD = 0.75); $t(178) = 1.23$, $p = 0.22$. However, our qualitative analysis of instructor and student interviews indicated that participants perceived video feedback to be more effective than text in establishing instructor social presence. Students commented that the richness of video helped them to view their "professor [as] a person" because they could see their instructor's face and surroundings. One student explained that in text feedback his instructor was "just words on a page" but in video feedback he could "hear emotion" that allowed him to develop "more of a relationship" with his instructor. This supports previous research that has found audio communication effective in helping instructors convey emotions (Hew & Cheung, 2013).

Additionally our qualitative analysis found that the visual cues in video feedback allowed for emotional expressions that are not possible in text or audio feedback. One student explained that in video feedback there were "a lot more ways to [express emotions]." One instructor added that text feedback could contain some emotional expressions, but it required instructors to "find a translation" such as emoticons. Hailey, Grant-Davie, and Hult (2001) summarized the limitations of text to express and perceive emotions: "In the strictly written medium . . . tone is hard to read and create, and the invisible, inaudible teacher has a less moderating presence in the class" (p. 390). There was also some evidence that video feedback actually made "it harder to be frustrated at the teacher because the teacher is a person." This finding may help to explain Griffiths and Graham's (2009b) case study that found that an instructor who provided video feedback received higher than average student ratings. It is also important to note that the visual nature of video feedback could also prove distracting.

The visual and vocal cues in video also appeared to help students avoid misunderstandings. This supports Draft and Lengel's (1986) claim that by increasing the media richness, information can be conveyed with less uncertainty. Wolsey (2008) added that visual communication cues can provide important context. Instructors stated that they were more likely to use humor in video feedback because students were less likely to misinterpret their comments. Similarly, Swan's (2002) analysis of text discussion board posts found that humor was seldom used "because many forms of humor are easily misinterpreted" (p. 39). The difficulty to recognize humor in text was also highlighted by Rourke et al. (2001) who were only able to obtain an inter-rater reliability of 0.25 when coding for humor in text discussion boards.

Students also found that video feedback was more conversational than text. Similarly, Thompson and Lee's (2012) qualitative examination of video feedback concluded:

> While [asynchronous video feedback] does not allow students to ask questions as they would in a face-to-face, phone, or video conference, hearing the voice of the teacher going through the paper does give students the sense that they can ask more questions because it establishes a personal connection and rapport, creating a sense of availability. (para. 37)

One teacher in our research explained that instructors' ability to make text feedback conversational was largely dependent on their writing abilities. However, even skilled writers may find it difficult to match the conversational tone that instructors can convey in video. For instance, Silva (2012) found that an instructor with high writing abilities could not match the conversational tone found in her video comments when she provided text feedback. Ultimately, the establishment of social presence in video feedback is dependent on instructors' communication behaviors (Garrison et al., 2000). One student explained that video was simply an "an extension" of his instructor's personality, "because he is a nice person, his [video] feedback was nice." If instructors do not speak with emotion or in a conversational manner in a face-to-face context, they are unlikely to do so in video feedback. Instructors also found that it was difficult for them to hide their disappointment or frustration when providing video feedback. One instructor wondered if providing video feedback when frustrated actually harmed his relationship with one student who stopped working in the course. Similarly one student in Rodway-Dyer, Knight, and Dunne's (2011) research felt like she was "being told off" (p. 220) when she received corrective audio feedback. Instructors should be aware of this finding and consider providing text feedback when frustrated. Borup, West, and Graham (2013) found that students ability to establish their social presence via video was somewhat dependent on their personal characteristics. It is also likely that some personal characteristics can make it more difficult for instructors to establish their social presence via video feedback.

Although students agreed that video feedback was more effective at establishing instructors' social presence than text, they also believed that their face-to-face class sessions lessened video's impact on their instructor's social presence. This may help to explain why no statistical difference was found in perceived instructor social presence between those students who received text and those who received video. One student explained, "Since I had talked to him one-on-one before in person, I didn't feel like I needed videos to help me feel like I knew him." Similarly, Martin and Mottet (2011) found that instructors' immediacy behaviors in face-to-face classes were more important than those found in online feedback. Khurana and Boling's (2012) research of multimedia in an online graduate course also found that audio feedback enabled students to better perceive their instructor's tone of voice in subsequent text feedback comments. Shea, Sauli, and Pickett (2006) also hypothesized that online students close to campus may feel less of a need to develop an online learning community as compared to students living far from campus who may not have the same social opportunities.

These research findings may prove insightful to those in a variety of contexts. Merriam (1998) explained that "Insights gleaned from case studies can directly influence policy, practice, and future research" (p. 19). However, these findings need to be understood within our research context and should not be generalized to other settings. As a result we have attempted to follow Wolcott's (1994) warning to avoid "the temptation to read too far beyond the case itself in speculating about its meaning or implications" (p. 37). As stated earlier participants were enrolled in blended course sections that met on the first day of the semester, which may have limited the impact that video feedback had on instructors' social presence. As a result, future research should examine this phenomenon in fully online courses with off campus students. In addition, this research only examined instructor feedback on student projects and additional research could build on studies such as Borup, Graham, and Velasquez's (2011) case studies that sought to understand how instructors establish a persona for their other instructional responsibilities, including facilitating online discussions and class announcements. Students were also enrolled in one-credit courses which may have diminished the value that students placed on instructor social presence. Future research could similarly examine this phenomenon with varying instructor and student populations. For instance, although Borup et al. (2013) found that a non-native speaker had difficulties establishing her social presence in video, research may find that non-native speakers or students who have difficulty hearing may benefit from the non-verbal cues that are present in video feedback. Researchers may also seek to understand video feedback—including peer feedback—in non-educational settings to create virtual collaborative teams.

Garrison and Arbaugh (2007) explained that more research is needed "to understand exactly how social presence patterns develop" (p. 160). This is especially true with video feedback, and research may find that it is more important in establishing social presence at the start of a semester and less important once instructors have established their voice. This type of research could provide instructors with helpful heuristics on when video feedback is the most effective and could save instructors valuable time considering that video appeared to be more time consuming and less convenient than providing text feedback. Because video contains audio, future research should also seek to compare audio and video feedback in an attempt to isolate the impact that the visual cues in video have on instructor social presence. Although beyond the scope of this research, future research may also attempt to examine how video feedback impacts the quality of students' work and cognitive presence.

Social presence is also to a large degree determined by how participants perceive the person with whom they are communicating. As a result this research relied on participant-reported data. However, when measuring social presence, Rourke et al. (2001) measured student social presence by analyzing discussion board comments. Future research examining the impact of video feedback on instructor social presence may strengthen their research by combining these two approaches. This type of triangulation can be time intensive and difficult but would improve the validity of the research findings and provide additional insights (Mathison, 1988).

Conclusion

Although innovations in communication technology have enabled instructors to more easily provide students with video feedback, research examining its use is currently lacking. This mixed method research examined the impact of asynchronous video feedback on instructor social presence in blended courses that provided the majority of instruction online. An independent samples *t*-test found no significant difference in perceptions of instructor social presence between students who received video feedback (M = 5.77, SD = 0.85) and those who received text (M = 5.62, SD = 0.75);

$t(178) = 1.23$, $p = 0.22$. However, qualitative analysis of nine instructor and 22 student interviews found that video enabled instructors to better establish their online social presence because they could more easily speak with emotions and communicate in a conversational manner. Students also found that the ability to see and hear their instructor helped them to create a sense of closeness with their instructor. Although video feedback appeared to be more effective than text in establishing instructor social presence, students believed that the need for video feedback to establish social presence was less in blended courses where students and instructors interact face-to-face. This may help to explain why no statistical difference was found in student perceptions of instructor social presence. Future research can test this hypothesis by examining the effects of video feedback on instructor social presence in fully online courses.

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Appendix

Survey Items

The following survey items were obtained from the larger Social Ability Instrument (Yang et al., 2006) and were used to measure student perceptions of instructor social presence. Students responded to each item using a seven-point response scale (1=strongly disagree and 7=strongly agree).

1. My interactions with the instructor are sociable and friendly
2. I feel comfortable expressing my feelings to the instructor
3. My online interactions with the instructor seem personal
4. The actions of the instructor in the course are easily visible in our online system
5. In my interactions with the instructor I am able to be myself and show what kind of student I really am
6. I trust the instructor in the course to help me if I need it
7. When I log on I am usually interested in seeing what the instructor is doing or had done
8. I feel connected to the instructor in this course

THE INTERNATIONAL REVIEW OF RESEARCH IN OPEN AND DISTANCE LEARNING

Global Transition in Higher Education: From the Traditional Model of Learning to a New Socially Mediated Model

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Abstract

This article reports on the pedagogical value of Web 2.0 tools at Unisa (i.e., whether these tools can improve teaching and learning). A quantitative approach was used to conduct the study, with a questionnaire as a data collection instrument. The sample size was 301 lecturers drawn using stratified sampling, with proportional allocation drawn from all Unisa colleges. Descriptive statistics were employed to analyse and interpret the data. The results show that Web 2.0 tools are playing a pivotal role when it comes to opening avenues and collapsing the transactional distance in an ODL institution. A combination of web technology and the trend of constructivism can transform the learning process. This article therefore recommends that Unisa sensitise its lecturers to the adoption of Web 2.0 tools as an innovative way to improve teaching and learning.

Keywords: Distance education; open distance learning; Web 2.0; new media; electronic learning; distributed learning

Introduction

Many global tertiary institutions are beginning to embrace social media and are realising the pedagogical value and implications these social media have for teaching and learning. There are various social media tools that can be used to bridge the transactional distance between students and lecturers. Some of these popular social media tools include Facebook, MySpace, YouTube, Twitter, blogs, and so on. By using a survey instrument, the research being reported here sought to identify the pedagogical value of Web 2.0 tools at the University of South Africa (Unisa) in order to improve the university's services to students, ensure a seamless learning experience, and bridge the transactional distance in the university's open distance learning context. The pedagogical value of these tools can also be understood through the exploration of the transition currently taking place in higher education. Higher education is in the process of transition from the traditional model of learning to a new**,** socially mediated model (Mbatha, 2013). The new, socially mediated model has been spearheaded by the advent of new media tools such as Web 2.0 approaches (Maree, 2011; Mbatha, 2013). These approaches include social networks such as Facebook, Twitter, and YouTube. These tools have been buttressed by numerous researchers acting as catalysts in improving teaching and learning, particularly in distance education (Mbatha & Manana, 2012; Mbatha, 2013). This transition is currently being witnessed all over the world and Unisa is no exception. It is therefore fitting to focus the current study in this mega ODL university.

Sonnekus, Louw, and Wilson (2006, p. 46) observe that "Unisa was founded in 1873 as a university college offering correspondence courses". They add that over the years, "the university underwent various developmental stages of distance education and, in January 2004, was reconfigured as a comprehensive open distance learning (ODL) university after being amalgamated with two similar educational bodies". The 'new' Unisa has effectively become the fifth largest ODL education institution in the world, and services approximately 450,000 learners (Sonnekus, Louw, & Wilson, 2006). Students at Unisa are from a plethora of geographical backgrounds, ranging from rural, urban, and peri-urban environments; Unisa's learners also include overseas learners. These geographical differences impact on the university's service delivery, which has a mandate to enrol a large and diverse student body. Mbatha, Naidoo, and Ngwenya (2010) point out that "not only is the infrastructure in these areas vastly different, but so is the level of exposure to and availability of modern technology". This, in turn, influences the level of technical support that can be provided through a learner support system.

The research was based on the assumption that Web 2.0 tools facilitate and open avenues for effective teaching and learning: This is because these tools can collapse the transactional distance between students and the institution by allowing easy access to course material, regardless of the student or the lecturer's time and location.

Problem Statement

The problem that was investigated, and which forms the basis of this article, pertains to educational traditionalists' dichotomous approach to teaching, an approach that obliges them to have a high regard for established practices of teaching and learning and to reject new media as being dangerous and seductive (Lister, Dovey, Giddings, Grant, & Kelly, 2003). In this study, the researcher intends to identify the perceived benefits of using new media as far as teaching and learning are concerned. One of the major reasons (or, at least, so it is believed) that some academics do not embrace the transition at Unisa is because they lack knowledge on how Web 2.0 tools can be adopted to improve teaching and learning. One of the problems encountered in this research study stemmed from the fact that little has been written at Unisa on how Web 2.0 tools can be used to enhance teaching and learning. The current study therefore also intends to close this gap and add to the body of knowledge. The fear is that if this problem is not properly addressed the current transition at Unisa may not be successful.

Literature Review

Fang and Li (2013, p. 458) assert that "Web 2.0 has become a hot topic in the research of new generation network-related development and application". In support of this view, Paily (2013) notes that new developments in the area of ICTs in general and Web 2.0 in particular have provided a variety of tools and resources for designing and delivering instruction based on constructivist principles. Hence it is difficult to circumvent the effect that Web 2.0 approaches have had in the early part of the 21st century (Bennett, Bishop, Dalgarno, Waycott, & Kennedy 2012; Sacks & Graves, 2012; Mbatha, 2013).

Theoretical Framework

This study adopted the three part model of interaction posited by Moore (1999) as its theoretical framework. Moore (1999) outlines three types of interaction that are crucial for learning and engagement: "learner-content, learner-instructor, and learner-learner".

a) Learner-content interaction

This can best be described as an interaction between the learner and the content or subject of study. Moore and Kearsley (1996) describe the learner-content interaction as "involving a process of individual learners elaborating and reflecting on the subject matter or the course content". These authors note that, "unlike learner-instructor or learner-learner interactions, only the learner is directly involved in learner-content interaction".

b) Learner-instructor interaction

Moore and Kearsley (1996) note that this is basically “the interaction between the learner and the expert who prepared the subject material”.

c) Learner-learner interaction

Moore and Kearsley (1996) observe that this is “the interaction between one learner and other learners, alone or in group settings, with or without the real-time presence of an instructor”. They describe the learner-learner interaction as a “two-way reciprocal communication between or among learners who exchange information, knowledge, thoughts, or ideas regarding course content, with or without the presence of an instructor”. However, for teaching and learning to be realised, some kind of interaction has to take place. This could involve the student engaging with his/her study material, or a lecturer making use of learning resources to impart skills to the students. Anderson (2010) defines interaction as the key in fostering, supporting, and engaging learning. Likewise, Moore and Kearsley (1996) note that “interaction has been deemed one of the most important components in distance education owing to the isolation of instructors and learners”.

Method

A paper-based survey method was deemed to be an appropriate instrument for measuring lecturers’ perceptions regarding the use of Web 2.0 as a method of improving teaching and learning at Unisa. Also, the researcher decided on a survey method because this method is a relatively quick and cheap way of obtaining data from a targeted population. It is also a very effective and reliable quantitative method of obtaining data. It allowed the researcher to carefully choose the population and to organise the data and present it systematically; finally, this method of data collection also makes interpretation of data relatively easy. Given the diverse nature of the Unisa community and the large size of this community, the researcher narrowed down the focus of this study to Unisa’s main hub, which is located in Pretoria (Tshwane) in South Africa. In this region, lecturers were targeted across all colleges to get their views on the adoption of Web 2.0 as a means of improving teaching and learning at Unisa. For this study, it was vital that the researcher established lecturers’ perceptions on Unisa’s e-learning, simply because lecturers play a major role in the success of this initiative. Stratified random sampling with proportional allocations was used to select lecturers across all colleges at Unisa (see Table 1). Systematic sampling was then used within each stratum. Stratified random sampling is a probability sampling technique that enables a researcher to select elements randomly by first putting them into non-overlapping homogeneous groups called strata. A random sample is then selected from each stratum using either simple random sampling or systematic sampling. Probability samples are used in such a way that the researcher can generalise the results to the population, thus ensuring external validity. In order to conduct an in-depth study and to acquire a demonstrable degree of reliability and validity, the researcher used stratified random sampling to select the population sample. The sample size was 301 lecturers drawn by stratified sampling with proportional allocation drawn from all Unisa colleges. A total of 301 participants was selected because a smaller sample is more manageable and less costly. All 301 questionnaires distributed were returned and usable.

Table 1

Distribution of Lecturers per College

College	Number of Lecturers	Sample size
Agriculture and Environmental Sciences	945	102
Human Sciences	740	80
Law	345	37
Science, Engineering and Technology	274	30
Education	257	28
Graduate School of Business Leadership	133	14
Graduate Studies	84	10
TOTAL	2778	301

A self-administered questionnaire consisting of both structured and non-structured questions was used. As already mentioned, questionnaires are a cheap and cost-effective method of collecting data. Also, in this case, the validity of the data collection instrument was enhanced by the fact that questions were based on the objectives of this research study. Each question was checked to determine whether it contributed to the research objectives. As far as internal validity was concerned, the researcher scrutinised the work critically to ensure that the research assistants adhered to the topic and thus that the study measured what it was intended to measure. Internal validity was also ensured by reviewing studies by other researchers in the same field. With regard to reliability, the research instrument was pre-tested in a pilot study for clarity, completeness, relevance, and shortcomings. The pilot study aimed to test the subject matter of the current research, the population it was to cover, its spatial variability, and respondents' possible reactions to questions. The reliability of the research instrument was improved by including both closed-ended and open-ended questions in the survey. The researcher made sure that the wording of the questions was simple, direct, and unbiased. Data was analysed by using descriptive statistics and the Statistical Package of Social Sciences. Relationships among variables were compared and interpretations made. Descriptive statistics were employed to further analyse and interpret the data.

As far as ethical considerations were concerned, informed consent was obtained from each participant in the study in order to ensure that each participant fully understood what he or she was doing and to verify the fact that he or she was willing to participate in the study. The respondents were assured of their rights, including the right of consent, protection from disclosure of information, and respect for their privacy. All the research participants participated voluntarily and none were forced to take part in the study. With regard to protection from harm, the researcher ensured that the participants were not at any risk and would not be exposed to embarrassment, unusual stress, or any demeaning treatment. Anonymity and confidentiality were promised and maintained. The information that participants provided was not made available to anyone who was not directly involved in the study and no information could be traced to any participant. The researcher also ensured that participants remained anonymous throughout the study. In terms of professional standards, the researcher ensured that the results were collected in a professional manner without misrepresenting anyone and/or intentionally misleading the respondents about the nature of the study. The researcher ensured that all the results were presented honestly without fabricating any data to support any particular finding.

Results

Respondents' Characteristics

Background information sought from the respondents included age, college attachment, gender, and highest educational attainment. These structured questions were asked in order to determine the relationships between demographic characteristics and Unisa lecturers' use of Web 2.0 tools. The majority of respondents were females (189, 63%). This was not at all surprising, given that there are more females than males at Unisa. Some studies have identified women and girls as disadvantaged in their uptake of ICTs (Mbatha, Ocholla, & Le Roux, 2011). The majority of respondents (233, 77%) were between the ages of 29 to 34, followed by those who were between 35 to 40 years old (45, 15%). Only 23 (8%) of the respondents were over 50 years of age. The aim of requesting respondents to indicate their age was two-fold: first to ascertain the distribution of respondents by age, and secondly to establish whether there was any correlation between respondents' age and their use of Web 2.0 tools. As far as educational background was concerned, most respondents had master's degrees (178, 59%), followed by those who had doctoral degrees (89, 30%). Only 34 (11%) were professors.

Essential Elements of Cooperative Learning

Respondents were asked to indicate which types of Web 2.0 tools are essential for improving teaching and learning. Respondents were therefore provided with a list of Web 2.0 tools and asked to rate each of them on a Likert scale of 1 to 5 (1= *strongly* *agree* [SA]; 2 = *agree* [A]; 3 = *not sure* [NS]; 4 = *disagree* [D]; and 5 = *strongly disagree* [SD]). Table 2 presents the results.

Table 2

Essential Elements of Cooperative Learning (N = 301)

WEB 2.0	SA	A	NS	D	SD	MEAN	LEVEL
	n & %	*n & %*	*n & %*	*n & %*	*n & %*		
Social networks	276(92%)	15(5%)	-	10(3%)	-	1.1	SA
Vodcasts	209(69%)	47(16%)	40(13%)	5(2%)	-	1.4	SA
Podcasts	190(63%)	54(18%)	49(16%)	8(3%)	-	1.5	SA
Blogs	176(58%)	41(14%)	22(7%)	62(21%)	-	1.9	SA
Wikis	144(48%)	57(19%)	52(17%)	48(16%)	-	2.0	SA
Shared docs	167(55%)	87(29%)	39(13%)	8(3%)	-	1.6	SA
YouTube	98(33%)	67(22%)	98(33%)	38(13%)	-	2.2	SA
Bookmarks	87(29%)	41(14%)	150(50%)	23(8%)	-	2.3	NS
Multimedia sharing	76(25%)	184(61%)	41(14%)	-	-	1.8	A
Tagging	61(20%)	40(13%)	180(60%)	20(7%)	-	2.5	NS
RSS syndication	34(11%)	41(14%)	201(67%)	25(8%)	-	2.7	NS
Mashups	28(9%)	39(13%)	212(70%)	22(7%)	-	2.7	NS

As Table 2 shows, the majority of respondents believe that social networks are essential elements of cooperative learning. This is evident when combining positive phenomenon, that is levels 1 and 2 which adds up to 291 (97%). Only 10 (3%) of the respondents disagreed with the statement, implying that these respondents do not regard social networks as essential elements of cooperative learning. Likewise, those who indicated that vodcasts were essential elements were also significant, a total rating of 256 (85%) at the combined levels 1 and 2 as they are both positive phenomenon. Forty (13%) were unsure, while only 5 (2%) disagreed with the assertion. Similarly, a significant number of respondents (244, 81%), when combining levels 1 and 2, indicated that podcasts are essential elements in teaching and learning. A minority (8, 3%) disagreed with this statement that podcasts are essential elements of cooperative learning. Blogs were also regarded as essential elements in teaching and learning, as can be seen from the answers of a significant number of respondents (217, 72%) when combining levels 1 and 2 respectively. Those who indicated that wikis were essential elements of cooperative learning were also significant (201, 66%, levels 1 and 2 combined respectively), while 48 (16%) disagreed. It is also clear from Table 2 that Web 2.0 applications such as shared documents, YouTube, and multimedia sharing were regarded by the majority of respondents as essential elements of cooperative learning.

Essential Attributes of Web 2.0

One of the objectives of the study was to establish whether respondents were familiar with the characteristics of Web 2.0 tools. The respondents were therefore provided with a list of possible characteristics of Web 2.0 tools and asked to rate each one of them on a Likert scale of 1 to 5 (1 = *strongly agree* [SA]; 2 = *agree* [A]; 3 = *not sure* [NS]; 4 = *disagree* [D] and 5 = *strongly disagree* [SD]). The results are shown in Table 3.

Table 3

Essential Attributes of Web 2.0 (N = 301)

Attributes	SA	A	NS	D	SD	Mean	Level
Evolving content	240(80%)	41(14%)	20(7%)			1.2	SA
Social networking	223(74%)	47(16%)	31(10%)			1.3	SA
Collaboration	201(67%)	87(29%)	13(4%)			1.3	SA
Google docs	147(49%)	93(31%)	61(20%)			1.7	SA
Dynamic content	144(48%)	92(31%)	41(14%)	11(4%)		1.6	SA
Participatory culture	141(47%)	96(32%)	64(21%)			1.7	SA
Freedom	108(36%)	97(32%)	71(24%)	25(8%)		2.0	SA
Openness	103(34%)	78(26%)	109(36%)	11(4%)		2.0	NS
User participation	102(34%)	94(31%)	84(28%)	21(7%)		2.0	SA
Cloud computing	91(30%)	87(29%)	104(35%)	19(6%)		2.1	NS
User control	87(29%)	74(25%)	99(33%)	41(14%)		2.3	NS
Self-publishing platform	69(23%)	74(25%)	96(32%)	62(21%)		2.5	NS
Metadata	68(23%)	54(18%)	147(49%)	32(11%)		2.4	NS
Collective intelligence	66(22%)	49(16%)	87(29%)	72(24%)	27(9%)	2.8	NS
Rich user experience	66(22%)	69(23%)	97(32%)	41(14%)	28(9%)	2.6	NS
User-created website	66(22%)	87(29%)	121(40%)	27(9%)		2.3	NS
Scalability	59(20%)	67(22%)	142(47%)	33(11%)		2.4	NS
Tagging	58(19%)	71(24%)	101(34%)	71(24%)		2.6	NS
Modularity	47(16%)	48(16%)	189(63%)	17(6%)		2.8	NS
Social bookmarking	47(16%)	91(30%)	109(36%)	54(18%)		2.5	NS
Convergence	55(18%)	87(29%)	141(47%)	18(6%)		2.4	NS

Web standards	45(15%)	63(21%)	101(34%)	92(31%)		2.7	NS
Spamming	45(15%)	38(13%)	178(59%)	21(7%)	19(6%)	2.7	NS
Identity	35(12%)	41(14%)	178(59%)	47(16%)		2.7	NS

Table 3 depicts that the majority of respondents when combining levels 1 and 2 (288, 96%) strongly agreed with the statement that collaboration is a Web 2.0 attribute. Interestingly, only 13 (4%) were not sure about the statement. Openness was also considered as one of the attributes (181, 60%, levels 1 and 2 combined). Also of note is that those who were not sure about the statement were almost average (109, 36%), while only 11 (4%) totally disagreed with the assertion. Forty-five (15%) strongly agreed that Web standards were essential attributes, and those who simply agreed numbered 63 (21%). Notably, 92 (31%) of respondents disagreed with the statement. Of respondents, 189 (63%) were not sure whether modularity was one of the essential attributes of Web 2.0, while 17 (6%) totally disagreed with the statement. Evolving content was undoubtedly regarded by the majority (281, 93%) as one of the essential attributes of Web 2.0. Those who mentioned that user control was an essential attribute were also the majority, a fact which is evident when levels 1 and 2 are combined, given that they represent a positive phenomenon in this instance (161, 53%). As far as identity is concerned, a large number of respondents (178, 59%) were unsure about the statement. The majority (153, 51%, levels 1 and 2 combined) regarded user-created websites as one of the essential attributes of Web 2.0. Unsurprisingly, a total of 270 (90%, levels 1 and 2 combined) respondents considered social networking as an essential attribute, while only 31 (10%) were unsure of the claim. It is also important to note that Web 2.0 attributes such as self-publishing platforms, tagging, social bookmarking, convergence, cloud computing, rich use experience, and user participation were regarded by many respondents as essential attributes. Again, dynamic content, freedom, collective intelligence, participatory culture, and Google docs were considered as essential attributes. This is evident when levels 1 and 2 are combined, since both represent a positive phenomenon.

Web 2.0 Benefits in an ODL institution

One of the objectives of the study was to establish whether respondents were aware of the pedagogical value of Web 2.0 tools in an ODL context. The respondents were provided with a list of possible benefits of using Web 2.0 tools and asked to rate each one of them on a Likert scale (1 = *strongly agree* [SA]; 2 = *agree* [A]; 3 = *not sure* [NS]; 4 = *disagree* [D] and 5 = *strongly disagree* [SD]). The results are shown in Table 4.

Table 4

Web 2.0 Benefits In an ODL Institution (N = 301)

Benefits	SA	A	NS	D	SD	Mean	Level
Easy and quick communication	299 (99%)	2(1%)				1.0	SA
Collaboration	287(95%)	14(5%)				1.0	SA
Social networking	224(74%)	41(14%)	36(12%)			1.3	SA
Cost reduction	201(67%)	58(19%)	31(10%)	11(4%)		1.5	SA
Self-publishing platform	199(66%)	82(27%)	20(7%)			1.4	SA
News publishing	197(65%)	98(33%)	6(2%)			1.3	SA
Evolving content	189(63%)	91(30%)	21(7%)			1.4	SA
Dynamic content	154(51%)	88(29%)	46(15%)	13(4%)		1.7	SA
Participatory culture	154(51%)	86(29%)	61(20%)			1.6	SA
Freedom	110(37%)	99(33%)	71(24%)	21(7%)		2.0	SA
User participation	104(35%)	91(30%)	87(29%)	19(6%)		2.0	SA
Openness	96(32%)	74(25%)	110(37%)	21(7%)		2.1	NS
Surveys creation	93(31%)	80(27%)	101(34%)	27(9%)		2.2	NS
Cloud computing	82(27%)	74(25%)	112(37%)	33(11%)		2.3	NS
User-created website	74(25%)	66(22%)	123(41%)	38(13%)		2.4	NS
Customised lists of students	63(21%)	74(25%)	147(49%)	17(6%)		2.3	NS
Metadata	61(20%)	54(18%)	147(49%)	39(13%)		2.5	NS
Collective intelligence	59(20%)	72(24%)	155(51%)	15(5%)		2.4	NS
Social bookmarking	58(19%)	71(24%)	139(46%)	33(11%)		2.4	NS
Tagging	51(17%)	62(21%)	142(47%)	46(15%)		2.6	NS
User control	47(16%)	57(19%)	178(59%)	19(6%)		2.5	NS
Convergence	47(16%)	51(17%)	187(62%)	16(5%)		2.5	NS
Spamming	43(14%)	51(15%)	119(40%)	69(23%)	19(6%)	2.9	NS
Scalability	41(14%)	51(15%)	189(63%)	20(7%)		2.6	NS
Modularity	36(12%)	45(15%)	194(64%)	26(9%)		2.6	NS

Table 4 shows that all respondents (301, 100%) at the combined levels of 1 and 2 (remember that these both represent a positive phenomenon) indicated that collaboration is one of the benefits of using Web 2.0 tools for teaching and learning. Openness was also considered by many (170, 56%) as an advantage, while only 21 (7%)

totally disagreed. A significant number of respondents (194, 64%) were unsure about whether or not modularity was one of the benefits. Those who indicated that evolving content was one of the benefits formed a significant majority (208, 93%, when levels 1 and 2 are combined). When it comes to user control, the majority of respondents (178, 59%) indicated that they were unsure about the truth of the assertion. User created websites was also regarded as one of the benefits (140, 47%, levels 1 and 2 combined), while 265 (88%, levels 1 and 2 combined) respondents were of the view that social networking was one of the benefits. As far as self-publishing platforms are concerned, the majority (281, 93%) mentioned that such platforms were part of the benefits of Web 2.0.

Table 4 also shows that the majority of respondents were unsure about the educational benefits of the following Web 2.0 tools: tagging, social bookmarking, convergence, spamming, metadata, scalability, collective intelligence, and customised lists of students. Cloud computing was regarded by many (156, 52%) as one of the benefits, while 195 (65%) indicated that user participation was a benefit. A total of 242 (80%, levels 1 and 2 combined) respondents were of the opinion that dynamic content was one of the benefits, while 209 (69%) revealed that freedom was also a benefit. Likewise, a significant number of the respondents indicated participatory culture as one of the benefits. Unsurprisingly, all the respondents (301, 100%, levels 1 and 2 combined) were of the view that easy and quick communication was one of the benefits, while news publishing was also indicated as a benefit (295, 98%, levels 1 and 2 combined). Those who mentioned that survey creation was also a benefit were also significant (173, 57%, levels 1 and 2 combined), while a very large number of respondents (259, 86%, levels 1 and 2 combined) regarded cost reduction as one of the benefits of using Web 2.0 applications in an ODL institution.

Challenges Faced by Lecturers and Students when Using Web 2.0

Although the main focus of the study was to identify the pedagogical value of Web 2.0 tools in improving teaching and learning, the researchers also deemed it necessary to identify the challenges (to both lecturers and students) of using these tools. This was to ensure that challenges that hamper the effective usage of Web 2.0 tools are identified and dealt with accordingly. Respondents were therefore provided with a list of possible challenges and asked to rate each one of them on a Likert scale of 1 to 5 (1 = *strongly agree* [SA]; 2 = *agree* [A]; 3 = *not sure* [NS]; 4 = *disagree* [D]; and 5 = *strongly disagree* [SD]). The results are summarised in Table 5.

Table 5

Challenges Faced By Lecturers and Students (N = 301)

Challenges	SA	A	NS	D	SD	Mean	Level
Poor internet access	233(77%)	68(23%)				1.2	SA
Negative attitude towards technology	213(71%)	52(17%)	36(12%)			1.4	SA
Computer illiteracy	208(69%)	93(31%)				1.3	SA
Electricity supply problems	203(67%)	98(33%)				1.3	SA
Digital divide	179(59%)	122(41%)				1.4	SA
Limited number of trained lecturers	144(48%)	89(30%)	54(18%)	14(5%)		1.7	SA
Computer anxiety	117(39%)	84(28%)	55(18%)	45(15%)		2.0	SA
Lack of trust in e-learning platforms	114(38%)	103(34%)	84(28%)			1.9	SA
Lack of adequate ICT policy	107(36%)	94(31%)	87(29%)	13(4%)		2.0	SA
Lack of technical support	104(35%)	97(32%)	59(20%)	41(14%)		2.1	SA
Lack of administrative support	103(34%)	92(31%)	82(27%)	24(8%)		2.0	SA
Fear of change	102(34%)	105(35%)	84(28%)	10(3%)		2.0	SA
Lack of financial resources	97(32%)	89(30%)	92(31%)	24(8%)		2.1	SA
Lack of computers	87(29%)	65(22%)	121(40%)	28(9%)		2.2	NS
Cyber crimes	69(23%)	78(26%)	102(34%)	52(17%)		2.4	NS
Lack of institutional support	65(22%)	24(8%)	181(60%)	16(5%)	15(5%)	2.6	NS
Unreliable equipment	66(22%)	52(17%)	151(50%)	32(11%)		2.4	NS
Limitation on cost	63(21%)	46(15%)	147(49%)	45(15%)		2.5	NS
Lack of cyber security	58(19%)	61(20%)	104(35%)	78(26%)		2.6	NS
Limited support by management	52(17%)	41(14%)	145(48%)	56(19%)	48(16%)	3.4	NS

Table 5 shows that all respondents (301, 100%, when levels 1 and 2 are combined since both represent a positive phenomenon) indicated that the digital divide was a challenge faced by lecturers and students in the use of Web 2.0 tools to improve teaching and learning. Computer illiteracy was also identified by all the respondents (301, 100%, at the combined levels 1 and 2) as a major challenge. Again, when it comes to problems with the electricity supply, all respondents (301, 100% when levels 1 and 2 are combined) indicated that this was indeed a barrier as far as the effective use of Web 2.0 tools was concerned. The majority (147, 49%) believe that cybercrime is also a barrier, while 52 (17%) respondents disagreed.

Fifty percent of the respondents (152) were of the view that lack of computers was one of the challenges, while all respondents (301, 100%, levels 1 and 2 combined) shared similar sentiments (i.e., that poor internet access was also a challenge). Also of note is the fact that the results shown in Table 5 demonstrate that the majority of respondents believe that some of the challenges include lack of cyber security, lack of trust in e-learning platforms, lack of adequate ICT policy, lack of financial resources, and the fact that there is a limited number of trained lecturers available. Likewise, 265 (88%) of respondents indicated that negative attitude towards technology was a challenge to the use of Web 2.0 tools, while a significant number (201, 67%) mentioned that computer anxiety was one of the challenges. Similarly, many respondents indicated that fear of change, lack of technical support, and lack of administrative support were also challenges. Interestingly, a large number of respondents (181, 60%) were unsure about whether or not lack of support was one of the challenges. About half of the respondents (145, 48%) were unsure about whether or not limited management support (i.e., management of the institution) was one of the challenges in the use of Web 2.0 tools.

Discussion

When asked to indicate the types of Web 2.0 tools that are essential for enhancing teaching and learning, the majority of respondents were of the view that tools such as social networks, vodcasts, blogs, Wikis, shared documents, YouTube, and multimedia sharing were essential elements of cooperative learning. In terms of the essential attributes of Web 2.0, a significant number of respondents indicated that collaboration, openness, evolving content, user control, user-created websites, social networking, self-publishing platforms, tagging, social bookmarking, convergence, cloud computing, rich use experience, and user participation were all regarded by many respondents as essential attributes. Dynamic content, freedom, collective intelligence, participatory culture, and Google docs were also considered as essential attributes of Web 2.0.

In terms of the benefits of Web 2.0 tools in an ODL context, unsurprisingly, many respondents indicated the following as some of the benefits of using Web 2.0 tools in an ODL learning environment: collaboration, openness, evolving content, user-created websites, user control, social networking, self-publishing platforms, cloud computing, dynamic content, participatory culture, easy and quick communication, online surveys creation, and cost reduction. Interpreted in light of the three part model of interaction, which was adopted as a framework for this article, there are three types of interaction that are essential for learning and engagement, one of which being learner-content interaction (Moore, 1999). In line with this model, this research study established the fact that Web 2.0 tools promote interaction between the learner and the content or subject of study. Also, the model describes the "learner-instructor interaction" as one of the interactions that are fundamental in an ODL environment (Moore, 1999). This is evident in the results of this study, where a majority of respondents indicated that Web 2.0 tools improve communication and collaboration – and communication and collaboration can obviously exist between students and lecturers.

In support of the results of this study, Sacks and Graves (2012) are of the view that "Web 2.0 tools allow users to interact and collaborate with each other in a social media dialogue as creators of user-generated content in a virtual community". This is in contrast to those websites that only allow visitors to view them passively. As Stanciu, Mihai, and Aleca (2012) note, there are many possible uses of Web 2.0 tools in education, all of which possess a certain amount of educational value. Bogdan, Patrut, and Cmeciu (2013) are of the view that Web 2.0 tools have "emerged as an important tool in the creation and exchange of user-generated content and social interaction". In support of the results of this study, Olive (2013) claims that Web 2.0 tools offer lecturers and students new media for teaching and learning both inside and outside the lecture room.

For this study, it was important to establish respondents' views regarding the challenges they encounter in using Web 2.0 tools to improve teaching and learning. This was obviously important in order to identify strategies that can be used to overcome these challenges and problems. Table 5 shows that there are many challenges that hamper the effective and optimal use of Web 2.0 tools at Unisa. The most common problems include the digital divide, cybercrime, poor internet access, computer illiteracy, limited supply of electricity in some areas in South Africa (and especially in other African countries – note that the majority of Unisa students are from South Africa and elsewhere in Africa). Expectedly, lack of computers was also one of the major challenges. It is important to note that Unisa has and is continuing to ensure that all its students have access to the relevant technology required to enable them to study effectively and efficiently online. Some of these technologies include access to notebooks and internet access. This initiative is intended to end the digital divide that exists in Unisa's student body as a whole.

Interestingly and understandably so, many respondents revealed that lack of cyber security, lack of trust of e-learning platforms, lack of adequate ICT policy, lack of financial resources, and limited trained lecturers, negative attitude towards technology, computer anxiety, fear of change, lack of technical support, lack of administrative support were also challenges. These results can be attributed to the fact that Unisa has yet to design a policy that can protect academics against certain real cyber threats when using Web 2.0 tools for teaching and learning. In line with these results, Kleiner, Thomas, and Lewis (2007) conducted a study on the development of educational technologies and found that teachers' reluctance to use these technologies plays a key role in the non-integration of these new technologies in education. Likewise, Stanciu, Mihai, and Aleca (2012, p. 57) established the fact that many teachers still consider social networking sites as little more than virtual playgrounds for their students.

Conclusion

The primary aim of this article was to shed some light on the pedagogical value of Web 2.0 tools at Unisa in order to improve the university's services to its students. This research study was based on the assumption that Web 2.0 tools facilitate and open avenues for effective teaching and learning because these tools can collapse the transactional distance between students and the institution by allowing easy access to course material, regardless of either the student or the lecturer's time and location. This assumption has proved to be true, since the results of this study show that Web 2.0 tools are catalysts in enhancing teaching and learning. Based on the results of this study, the researcher recommends that a task force be formed which will provide proper guidance and a baseline set of recommendations for the adoption and management of Web 2.0 and social software throughout Unisa. This recommendation is based on the fact that Web 2.0 tools were initially designed for recreational or social purposes. Hence many people still consider these tools as social technologies which cannot be used for non-recreational purposes.

This study has established that Web 2.0 tools are, in fact, capable of enhancing teaching and learning, particularly in an ODL environment. The transactional distance between all stakeholders involved in the learning process can best be bridged through the adoption of Web 2.0 tools. Tertiary institutions should create their own task teams which implement this guidance and create specific policies to guide the use of Web 2.0 and social software in their modes of teaching and learning. Academics should be encouraged to explore these tools themselves, and to visit the institutional presence in various social software venues. The best way to maintain an effective presence on the web is to encourage and enable participation among staff members, with the emphasis on academics (simply because it is the academics who interact with students). The institutional ICT Department needs to develop a policy for official interaction, and staff members should be permitted to participate in this policy development process. The advantages of this kind of controlled, informal interaction are significant, since this type of interaction naturally creates broad platforms that can be used to interact with the student body. While care must be taken to properly represent official institution positions and maintain accuracy of information, the nature of this environment can make an institution more connected with the students, and vice versa. Keeping an active, public Web 2.0 presence can allow institutions to meet the public, potential students, and their own staff members in environments they are increasingly a part of.

One of the issues in the educational use of social media tools is the lack of security on these sites; this issue has led to a great deal of heated debate, and is one of the reasons why many people have and are continuing to vehemently oppose the adoption of these tools in education. It is therefore important to note that understanding and addressing security and legal consequences is vital to institutional success in interacting with Web 2.0 approaches. Comprehensive programmes for teaching and learning and awareness should be incorporated into current security and information technology training and policy. Tertiary institutions, including Unisa, should endeavour to prudently and incessantly research and comprehend how innumerable Web 2.0 approaches might best be adopted to enhance teaching and learning. This determination should be incorporated into mechanisms for the assessment and enhancement of existing information processes. The embracing and actual use of Web 2.0 tools necessitates a perfect and defined obligation and backing from the management, and general support at all levels of the institution. Tertiary institutions clearly have the opportunity to utilise Web 2.0 tools as a “springboard” to the more effective use of information, and the more effective capture and transfer of knowledge. This article only reports on the Unisa lecturers’ perceptions regarding adoption and diffusion of Web 2.0 tools to enhance teaching and learning at Unisa. Therefore, a future study is recommended to focus on the students’ perceptions to complete the picture of pedagogical value of Web 2.0 tools at Unisa.

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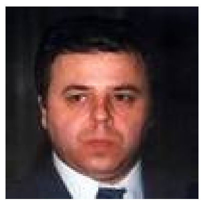
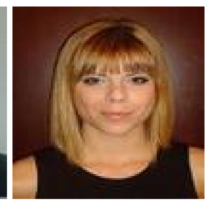
Using Supplementary Video in Multimedia Instruction as a Teaching Tool to Increase Efficiency of Learning and Quality of Experience

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Abstract

The main objective of this research is to investigate efficiency of use of supplementary video content in multimedia teaching. Integrating video clips in multimedia lecture presentations may increase students' perception of important information and motivation for learning. Because of that, students can better understand and remember key points of a lecture. Those improvements represent some important learning outcomes. This research showed that segmentation of teaching materials with supplementary video clips may improve lecture organization and presentation in order to achieve effective teaching and learning. The context of the video content and the position of supplementary video clips in teaching material are important influences on factors for motivation and efficiency of learning. This research presents the effects of the use of supplementary videos with different context of content (entertainment and educational) as well as the effects of their position within the teaching material. The experimental results showed that the most efficient method of use of supplementary video is integration with educational video content in the middle of a lecture. This position of video insertion provides the best results. The context of video content influences efficiency of learning also. Entertainment video was not as efficient as educational, but it can be used to engage and motivate students for learning. The given results have been confirmed with a subjective assessment of students' quality of experience with different methods of embedding video clips.

Keywords: Learning efficiency; student motivation; multimedia instruction; supplementary video; quality of experience

Introduction

Web-based instruction in the educational and training domains plays an important role, and its effects on learning outcomes, performance, and student satisfaction are important research topics (Olson & Wisher, 2002). Integration of video clips in teaching materials has recently attracted more attention in academic research.

The outcomes of using supplementary videos are increasing student activity and efficiency of the teaching process. An important issue is establishing a methodology of embedding video clips in multimedia teaching material in order to improve the learning process (Kay, 2012). Distance learning and college courses where the students are working individually on their projects after class are especially suitable for testing of new methods aimed at improvement of students' work.

The main motivation for testing the effects of video clip integration into multimedia presentation is that visual stimulation with a media application familiar to the student population can increase their engagement. It is well known that Internet video traffic is constantly increasing its share of consumer Internet traffic. Social media applications such as Facebook, YouTube, blogs, and wikis can be used as supplemental materials in the teaching process (Burke, Snyder, & Rager, 2009).

The selection of appropriate video clips and methodology for their display within the teaching materials represents an important issue for curriculum design, leading to positive learning outcomes (McConville & Lane, 2006). The cognitive theory of multimedia learning shows that it is necessary to select relevant information and organize it into a verbal and pictorial model (Mayer, 2001). Using appropriate teaching media and methods to organize and present only relevant information may also increase the efficiency of the self-learning process (Ruiji, 2012). Evaluating the effectiveness of the use of teaching materials in video format in distance learning environments and the measuring of "viewer engagement" is important for improvement of the learning process (Stiubiener et al., 2012).

An important aspect of the learning process is students' satisfaction, especially in the case of online learning (Roach & Lemasters, 2006). Considering this theory, students' satisfaction, as an important outcome of a multimedia learning process, should be analyzed more closely. The quality of student satisfaction and experience depends on the method of usage of video clips in designing linear educational video materials. Therefore, the quality of the learning process may be described also with *quality of experience* (QoE).

In this paper, the efficiency of learning and quality of experience for different types of video clips and methods for integration in multimedia lecture presentations are analyzed.

Video as a Factor of Influence in Motivation, Satisfaction, and Successful Learning

Modern teaching processes are based on the use of multimedia teaching materials and the Internet. The cognitive theory of multimedia learning represents a foundation for the implementation of multimedia educational content presentation. This theory explains the significance of the modality principle in the learning process, as shown in Figure 1.

In order to efficiently process multimedia information it is necessary to select relevant information and organize it into a verbal and pictorial model. Processing the information is performed in two channels after receiving the auditory and visual information that appears in the working memory as verbal and pictorial information models. A rational use of resources is very important, so design of multimedia presentation is a crucial factor for the learning process outcome (Mayer, 2001; Moreno & Mayer, 1999).

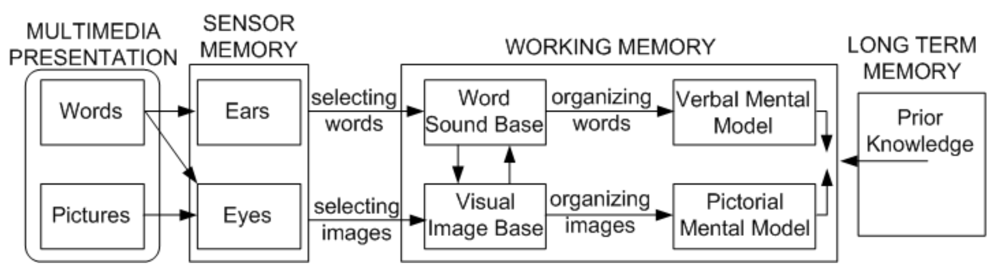

Figure 1. The cognitive theory of multimedia learning (Mayer, 2001).

Cognitive load theory, educational research, and instructional design are closely related, thus they should be analyzed together to achieve the best learning results (De Jong, 2010). Previous research also shows that the efficiency of the learning process is closely related to interaction between motivational and cognitive variables (Valle et al., 2003).

Multimedia technology has been exploited often for improving teaching and learning. Videos are a tool for engaging the verbal (linguistic), visual (spatial), and musical (rhythmic) intelligence of the student in the learning process, especially in the self-learning process (Gardner, 2000). Positive effects of features of video clips (multi-sensory, dynamic and capable of engaging the viewer's attention) were often used in engineering education (Marques , 2012).

Different methods of embedding and different contexts of supplementary video content can be used in the teaching process. Teachers are using multimedia presentation prepared for the course as well as additional, supplementary videos. Supplementary videos may have different contexts. Two of them are important for this research: The first is that they are closely related to the presented lecture topic and the second context is entertainment used for capturing the attention and interest of the students. Methods for integration and use of different contexts of supplementary videos in multimedia education materials are important tasks for research aiming to improve the learning process.

In this research, the purpose of supplementary video material use is to increase student's attention on the topic of the lecture. In order to increase learning quality, two important goals should be achieved: reducing cognitive load and increasing student's attention. Besides educational and entertainment content, it is possible to use commercial content as supplementary video. Although the commercial content may contribute to reducing the cognitive load of the student, this type of context potentially may take away students' attention from the topic of the lecture and focus it on the commercial content. Due to that, supplementary videos with commercial content have been less relevant to this research than educational and entertainment content. In future research, the influence of supplementary videos with commercial content on students' attention should be investigated.

Previous research explored the results of the use of videos as an educational tool (Bravo et al., 2011). In this study the authors used educational videos with a duration of approximately four minutes. They used a teaching platform based on Moodle and YouTube channels for reproduction. The study showed that streaming videos used as supporting material for learning had a positive effect upon students' perception regarding the enhancement of their learning motivation. The study emphasized that proper definition of content and amount of information delivered through supplemental video is an important task to solve. Durations of videos and methodologies of displaying them influence the effectiveness of learning and student satisfaction. An important result of this research is that streaming supplemental videos improve students' ability to learn in an autonomous way.

Hsin and Cigas (2013) used short videos to enhance student satisfaction and motivation for an online introductory course in computer science/mathematics. They achieved a significantly higher percentage of involved students and their average grades increased. Another method to engage and to motivate students is showing entertainment videos (Steffes & Duverger, 2012). As Steffes and Duverger reported, showing supplementary videos within an entertainment context at the beginning of the class can be used to increase the positive mood of the students. Both previous studies, Bravo et al. (2011) and Steffes and Duverger (2012), emphasize the importance of the proper design of supplementary video content and the methodology of displaying video to students.

Donkor (2011) showed that use of video-based instructional materials for teaching practical skills at a distance also appears promising.

One of the key questions is the quality of experience (QoE) achieved with the presented multimedia materials. This problem is more interesting if the different contexts of the video content are merged. In the research presented in Le Callet et al. (2012), the authors defined experience as an individual's stream of perception and interpretation of one or multiple events. On the other hand, quality is defined as an outcome of an individual's comparison and judgment process, which includes perception, reflection about the perception, and description of the outcome.

Finally, a working definition of *quality of experience* is:

> Quality of Experience (QoE) is the degree of delight or annoyance of the user of an application or service. It results from the fulfillment of his or her expectations with respect to the utility and/or enjoyment of the application or service in the light of the user's personality and current state. (Le Callet et al., 2012)

The definition of quality of experience gives a framework for analyzing the efficiency of delivery of video content using the Internet. Ljubojevic et al. (2013) analyzed linear internet video advertising efficiency using QoE methods. Another important task is the influence of the delivery of supplementary video used in the teaching process on students' quality of experience.

Therefore, students' quality of experience and learning outcome may depend on the context of inserted supplementary videos and the method for embedding video into teaching material.

Method

Previous research findings showed that segmentation of multimedia teaching materials enables easier processing of complex information by reducing high cognitive load. Students with a low level of prior knowledge learned more efficiently if segmented material was presented instead of continuous material (Spanjers et al., 2011). This finding is especially important for novices in the learning process.

In our study, the participants in the experiment were students who attended the class for the first time and had a lower level of prior knowledge. Therefore, the efficiency of different methods of segmentation of multimedia teaching material in learning for novices was analyzed. Due to the fact that video with different video content types is inserted in multimedia learning materials, supplementary videos have a different influence on students' motivation and QoE. The efficiency of different methods for integrating those videos should be investigated in detail.

The teacher has to decide how he wants to use video clips, where and when to embed them into multimedia learning material (Berk, 2009). Previous research described the effectiveness of videos embedded in multimedia teaching materials and their influence on the improvement of teaching (Pryor & Bitter, 2008; Borko et al., 2008). This choice has a strong influence on the students' QoE and the efficiency of the learning process. The instructional design model is also important in developing teaching skills (Isman et al., 2012). In order to analyze the multimedia learning quality process and level of student motivation for learning, especially if supplementary video streaming was used within the lecture, the quality of experience assessment should be used.

Testing Methodology

Important aspects of this study are principles for designing multimedia teaching content and presenting supplementary videos. A method for assessment of the efficiency of learning and student's QoE was also proposed.

In this study two influence factors in motivation and efficiency of learning were tested: the context of inserted supplementary video and position of the embedded videos into teaching material.

Two contexts of videos were used: the entertainment context of the video and the educational context similar to a lecture. Methods for embedding the videos were analyzed in the sense of the position of the supplementary video regarding the main multimedia teaching material. Three possible methods were tested: displaying supplementary videos before, in the middle, and after the lecture.

In order to simulate spatial and temporal separation between the students and the professor (main characteristic of distance learning and the self-learning process), multimedia materials created for the experiment were presented to the students in a multimedia classroom. Two assistants also assisted as technical support during the lecture presentation.

Each of the applied methods for embedding supplementary videos was separately tested. After the lecture presentation, using one of the methods, participants had a 60 minute break and then the testing was performed. Students answered 20 questions related to the lesson that was presented. By analyzing the given testing results, the efficiency of different methods for inserting supplementary video may be compared.

A subjective assessment of the user's quality of experience was also conducted. The testing was performed according to the subjective video quality assessment methods for multimedia applications described by Recommendation ITU-T P.910 (ITU-T, 1999). During the testing, a single test condition (one multimedia education content with supplementary video) was presented to students once only. Then they gave a quality rating on an Absolute Category Rating (ACR) scale. By use of the previously described methodology, the subjective assessment of the quality of experience (QoE) was conducted immediately after the presentation of the teaching materials.

In order to assess the subjective perception of the method for the presentation of lecture content, participants answered carefully chosen questions, listed in Table 1.

Table 1

Assessment Questions

No.	Question
1	Were the directions for participating in experiment sufficient?
2	Did you find the quality of presenting a lecture sufficient?
3	Did you think video and audio quality of supplementary video stream was good?
4	Were you able to maintain the attention level during the session?
5	Do you think that you correctly answered the questions?
6	Was it easy to answer the questions?

According to Recommendation ITU-T P.910 and assessment and rating of the quality of experience, a five level mean opinion score (MOS) scale was used as presented in Table 2.

Table 2

Scale for Quality of Experience Rating and Gradation

Mean opinion score (MOS)	Explanation
5	Excellent
4	Good
3	Fair
2	Poor
1	Bad

This research has several limitations, which are related to deeper analysis that needs a longer period of testing. The performed experiment should be applied for a whole semester with the participation of a number of different classes of students. Several different curriculums should be used in research for a deeper analysis and an efficient comparison of results. Those limitations should be overcome in future research.

Participants and Testing Environment

The research was performed at a university located in Bosnia and Herzegovina. The multimedia classroom is well-equipped for advanced multimedia presentations and high speed internet access.

The participants were 46 undergraduate students who attended the same academic course. During the preparation of the experiment students were informed about the testing procedure. In order to motivate students for serious participation they were informed that they would receive extra credits for their course grade based on their individual performance. Participants filled in questionnaires regarding personal data, prior experience related to multimedia learning methods, and prior knowledge about the topics covered in the multimedia testing materials.

Analysis of collected data showed that participants had a similar level of prior knowledge about the multimedia learning and topics that were presented in the multimedia teaching materials. Therefore, it may be assumed that there was homogeneity in learners' prior knowledge and skills related to the teaching process. Demographic data showed that out of 46 participants, 28 were male and 18 were female with the average age under 22 (93%).

Design of the Testing of Multimedia Learning Material

The multimedia teaching material was designed for the purpose of this research using topics defined in the course curriculum. The teaching material consisted of two parts: the main multimedia educational material and the supplementary videos. The main multimedia education material was created using video lectures recorded by using a professional video camera and PowerPoint presentations. Video lectures and PowerPoint presentations were merged so the text of the PowerPoint presentation, audio information and effect of occasional appearance of the instructor on the screen were used to achieve better knowledge transfer.

Supplementary videos that were used were downloaded from YouTube keeping in mind users' interests and the number of views. Video clips were inserted and presented before, in the middle, and after the main multimedia educational material. The method of integrating two videos by displaying only one of them on the screen, if the user has no control over the presented video, may be described as a linear method of multimedia presentation. The supplementary videos have two contexts. The first context is entertainment and the second one is closely related to the lecture.

For designing one dataset of teaching material one main multimedia educational material content and two videos with previously described contexts (entertainment and educational) were used. From the aspect of usage of supplementary video, three types of multimedia test material were created:

- Supplementary videos were not used at all and the lecture was presented continuously;
- Supplementary video with the entertainment context was used;
- Supplementary video with the educational context closely related to the lecture topic was used.

In order to test the influence of the position of supplementary video within the multimedia presentation, the video was displayed at the beginning, in the middle, and at the end of the main multimedia educational material, as shown in Figure 2. Therefore, for each type of multimedia materials three different subtypes were created.

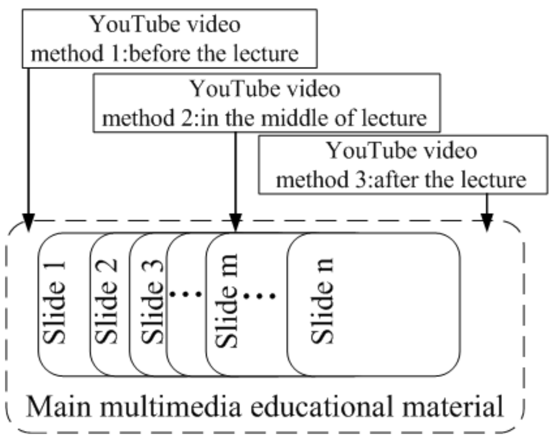

Figure 2. Principle of inserting the supplementary video in lecture presentation.

According to the proposed methodology the following types of multimedia teaching materials were created:

- main multimedia without supplementary video and application of continual presentation of lecture (M_nv);
- main multimedia with educational supplementary video inserted at the beginning (M_ed 1), middle (M_ed 2), and at the end of the presentation (M_ed 3);
- main multimedia with entertainment supplementary video inserted at the beginning (M_ent 1), middle (M_ent 2), and at the end of the presentation (M_ent 3).

The influence of the segmentation method by inserting supplementary video within the presentation of the lecture content was analyzed comparing the previously described methods of lecture presentation.

Results

For every type of multimedia education material which was created for this research, the level of acquired knowledge and student's quality of experience were tested. In order to describe key research variables, two research instruments were used. Test questions and results illustrated with average number of correct answers, median value, and standard deviation were used to measure the level of the acquired knowledge and to describe the testing procedure. The assessment of students' quality of experience was performed using a MOS scale with the five levels.

If the presentation of the lecture is continuous, without inserting supplementary videos, which is considered as a method that provides acquiring a reference level of knowledge, two remaining methods may describe possible improvements achieved by inserting different videos.

Tested methods of embedding the supplementary videos were:

- main multimedia without supplementary video using continual lecture presentation (M_nv);
- main multimedia with educational supplementary video inserted at the beginning (M_ed 1);
- main multimedia with educational supplementary video inserted in the middle (M_ed 2);
- main multimedia with educational supplementary video inserted at the end of the presentation (M_ed 3);
- main multimedia with entertainment supplementary video inserted at the beginning (M_ent 1);
- main multimedia with entertainment supplementary video inserted in the middle (M_ent 2);
- main multimedia with entertainment supplementary video inserted at the end of the presentation (M_ent 3).

The results of testing the acquired knowledge and student's quality of experience are analyzed and presented in Table 3 and Table 4, respectively. In Table 3, the average number of correct answers for every tested method of embedding and displaying supplementary videos is presented.

Table 3

Results of Testing of Acquired Knowledge

		Methods of embedding and displaying supplementary video						
Statistical measure		M_nv	M_ed 1	M_ed 2	M_ed 3	M_ent 1	M_ent 2	M_ent 3
	AV	12.22	13.78	15.50	12.85	13.13	13.76	12.33
	Med	12.00	14.00	15.00	12.00	13.00	14.00	12.00
	Std	3.11	2.51	2.29	2.52	2.00	2.06	2.44

AV - Average number of correct answers, Med - Median value, Std - Standard deviation

The least number of correct answers was in the case of continual presentation of lecture content. It illustrates that segmentation by inserting video clips may increase memory and better understanding in the learning process. Therefore, the results showed that methods based on the insertion of videos in multimedia teaching materials gave a higher number of correct answers regardless of the position or the context of supplementary videos.

The presented results indicate that a more efficient method for increasing the students' participation and deeper learning is to display the educational context of supplementary video clips instead of inserting entertainment videos.

The experimental results also showed that the biggest influence on efficiency of learning is the method that is based on inserting videos in the middle of the lecture presentation. The results were the same for both contexts of the supplementary videos. In the case of inserting the videos in the middle, the data were closest to the mean and the standard deviation was smallest, so the answers were fairly uniform. It confirmed the superiority of inserting video clips in the middle of the lecture.

The results of knowledge testing (average number of correct answers) for different methods of inserting supplementary video clips are illustrated in Figure 3.

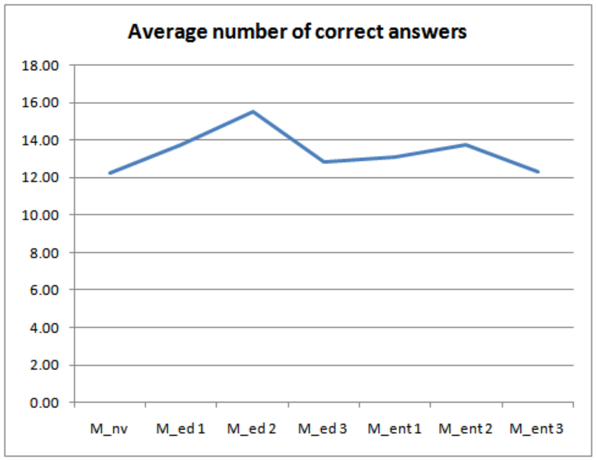

Figure 3. Illustration of average number of correct answers.

Experimental results of the subjective assessment of quality of experience for every tested method of embedding supplementary video, presented in Table 4, showed that participants were satisfied with the preparation of the experiment process, technical aspects of the presented material, and quality of the lecture presentation.

Table 4

The Results for Assessment of Quality of Experience

	MOS values						
	M_nv	M_ed 1	M_ed 2	M_ed 3	M_ent 1	M_ent 2	M_ent 3
Question 1	5	5	5	5	5	5	5
Question 2	5	5	5	5	5	5	5
Question 3	5	5	5	5	5	5	5
Question 4	4.1	4.7	4.8	4.5	4.2	4.4	4.2
Question 5	3.4	4	4.2	3.9	3.6	3.7	3.5
Question 6	3.9	4.3	4.3	4.1	4.1	4.2	4

The attention of participants was maintained at the highest level during the session with the use of educational supplementary videos, especially if they were inserted in the middle of the presentation. The usage of complementary video with an educational context gave the best results regarding students' self-confidence in the answering of test questions.

An illustration of the MOS results for questions 4, 5 and 6, that closely describe quality of experience, is presented in Figure 4.

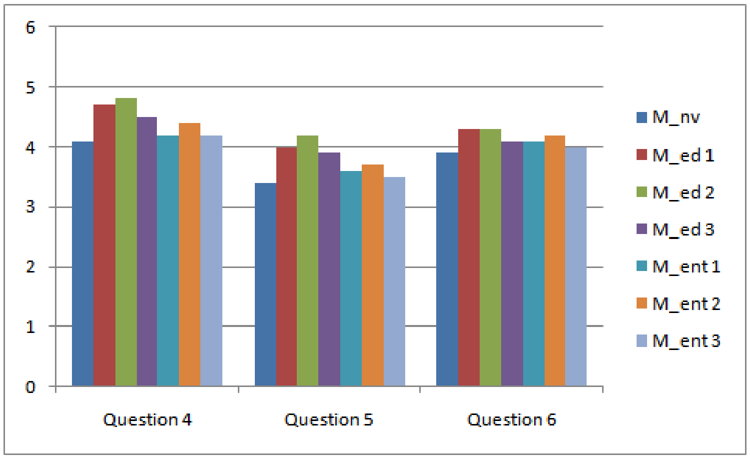

Figure 4. An illustration of MOS results for questions 4, 5 and 6.

Demographic data analysis confirmed that there were slight differences between male and female students in terms of quality of experience with e-learning. Female students were a little more satisfied if supplementary video material was used within the lecture presentation.

Conclusion

This research aims to present the positive effects of the use of videos as a supplementary teaching tool. Students' motivation and efficiency of learning may be increased if supplementary videos are used.

The analysis of methods for inserting video clips regarding different positions and the context of supplementary content shows that the methodology of inserting the supplementary videos is very important for improvement of teaching.

The positive effects of segmentation as an instructional method of teaching was confirmed with experimental results. Students acquired a higher level of knowledge if the lecture was presented in segments separated with videos, regardless of the context of the video content.

Research also demonstrated the importance of adequate design and presentation of multimedia teaching materials. Different contexts of use of supplementary video content in teaching showed that better efficiency is achieved if the educational content congruent with the lecture has been displayed. Entertainment video was not as efficient as educational, but it can be used to engage and motivate students' learning.

The position of inserted video has an important role in increasing efficiency of learning. The entertainment video at the beginning of the lecture motivated students towards learning, so testing results were better for that method than if a lecture without videos was used. A better effect was achieved when educational video content was used. This research showed that the most efficient method of use of supplementary video is integration of educational video content in the middle of the lecture.

Positive feedback from students about enhancement of their learning motivation and results of performed testing confirmed positive effects of the use of videos in teaching. Subjective assessment of quality of experience achieved by the use of supplementary video in teaching confirmed that the educational video inserted in the middle of the lecture may increase efficiency of learning. The results indicate that female students are more interested than male students to use learning material enriched by supplementary videos.

In further research we are planning to investigate different aspects of integrating video content into a presentation (duration of video, usage of video streaming, interactive video content, etc.).

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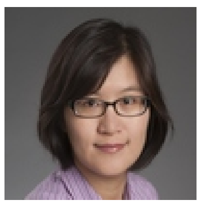
Exploring the Impact of Role-Playing on Peer Feedback in an Online Case-Based Learning Activity



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Abstract

This study explored the impact of role-playing on the quality of peer feedback and learners' perception of this strategy in a case-based learning activity with VoiceThread in an online course. The findings revealed potential positive impact of role-playing on learners' generation of constructive feedback as role-playing was associated with higher frequency of problem identification in the peer comments. Sixty percent of learners perceived the role-play strategy useful in assisting them to compose and provide meaningful feedback. Multiple motivations drove learners in making decisions on role choice when responding to their peers, mostly for peer benefits. Finally, 90% of learners reported the peer feedback useful or somewhat useful. Based on the findings of this study, we discussed educational and instructional design implications and future directions to further the line of research using role-play strategy to enhance peer feedback activity.

Keywords: Role-play; peer feedback; case-based learning; online learning; VoiceThread; higher education

Introduction

Case-based learning uses a "problem-based approach" to engage learners in solving "real or hypothetical problem situations, reflecting the kinds of experiences naturally encountered in the discipline under study" (Ertmer & Russell, 1995, p. 24). These complex problems usually involve rich but not complete information, dynamic factors, limited resources, and multiple stakeholders with competing perspectives (Jonassen, 1997, 2000). In this case-based context, learners are charged to analyze the given information, identify strengths and weaknesses of provided approach, generate a solution or reflect on other possible solutions as alternatives (Pozzi, 2010). Case-based discussion enables learners to bridge the gap between theory and practice through application and transfer of knowledge and skills when they solve realistic problems (Ertmer & Russell, 1995; Winter & McGhie-Richmond, 2005). In addition, the rich information and narratives in the case resemble vivid human experiences that may be easier to assimilate and reflect upon as opposed to abstract information (Pozzi, 2010). However, case-based learning is likely to impose heavy cognitive loads on novice learners due to the complexity of real-world problems and the demanding task of applying newly learned knowledge in practice. When overwhelmed by the rich information in the cases, learners may find it even more challenging to apply newly learned knowledge and skills during the problem-solving processes. In this situation, support from an online learning community may benefit learners when they tackle complicated issues embedded in the case scenarios. Support, in the form of peer feedback, can help learners validate ideas, identify problems, and expand the spectrum of thinking.

Peer feedback activities engage learners in cognitive interactions of sharing relevant experiences, exchanging ideas, and negotiating meanings. Peer feedback refers to "a communication process through which learners enter into dialogues related to performance and standards" (Liu & Carless, 2006, p. 280). Peer feedback can be part of peer assessment in which "students engage in reflective criticism of the products of other students and provide them with feedback, using previously defined criteria" (Van der Pol, Van den Berg, Admiraal, & Simmons, 2008, p. 1805). When providing peer feedback, learners may "consider the amount, level, value, worth, quality or success of the products or outcomes of learning of peers of similar status" (Gielen et al., 2011, p. 137). While peer feedback can be employed for formative or summative assessment, research suggests that it benefits learners the most when it is used for formative purpose with no grades on the peers' work involved (Nicol, 2008). Formative feedback, consisting of comments on strengths, weaknesses, and/or suggestions (Falchikov, 1996), is presented in a nonevaluative, supportive, and timely manner during the learning process for the purpose of improving learning (Shute, 2008). After reviewing 26 peer assessment studies, Van Zundert et al. (2010) found that enabling students to revise their work on the basis of peer feedback improved domain-specific skills.
The social constructivist view of learning underpins the use of peer feedback. This view emphasizes learning as a social activity and asserts that learners' interactions with

people in the environment lead to their cognitive growth (Gunawardena, et al., 1997; Schunk, 2008). When providing and receiving peer feedback, learners have the opportunity to articulate and clarify their own thinking, to view peers' ideas, and to negotiate and make sense of different perspectives. Through this interactive process, learners collaboratively explore the given issues and develop more comprehensive knowledge on the issues, and achieve deeper understanding toward the subject.

Benefits have been found for both receiving and providing peer feedback. When receiving feedback, learners invite peers to contribute experiences and perspectives to enrich their own learning process (Ertmer, et al., 2007). When providing feedback, learners actively engage in articulating their evolving understanding of the subject matter (Liu & Carless, 2006). They also apply the learned knowledge and skills when assessing others' work. This process involves learners in thinking about quality, standards, and criteria that they may use to evaluate others' work, which helps them become critical thinkers and reflective learners (Liu & Carless, 2006). In their study of peer assessment in an undergraduate technology application course, Li, Liu, and Steckelberg (2010) found a positive and significant relationship between the quality of peer feedback that students provided for others and the quality of the students' own final products, controlling for the quality of the initial projects. They concluded that active engagement in reviewing peers' projects might facilitate learning performance. Examining how undergraduate peer reviewers learned from giving comments, Cho and Cho (2011) found that students improved their writing more by giving comments than by receiving comments. Giving comments involves evaluative and reflective activities in which students identified good writing, problematic areas in the writing, and possible ways to solve the problem.

Despite the cognitive benefits of peer feedback activity, research identified both cognitive challenges and affective barriers of this activity on learners. Providing peer feedback is a cognitively demanding task for learners because they have to use their knowledge and skills to review, clarify, and evaluate other peoples' work (van Gennip et al., 2010). Especially, learners may not possess the domain knowledge or skills to provide useful and meaningful feedback (Palloff & Pratt, 1999) as learners are often novices in the field. As such, they may provide feedback at a superficial level that does not lead to critical thinking of their own (Li et al., 2010), nor does it contribute to peers' learning. Affectively, students may have anxiety about giving feedback (Ertmer, et al., 2007) or little confidence in assessing their peers (Venables & Summit, 2003) if they are not used to this activity, as they do not want to appear to be criticizing peers' work. For example, Ellison and Wu (2008) found that college students were uncomfortable providing peer feedback on blogs. In addition, peer feedback may not be perceived as valid by the receivers as peer reviewers are usually not regarded as a "knowledge authority" by feedback receivers (Gielen, et al., 2010), and, thus, learners refuse to take the feedback seriously. In addition, learners' peer feedback performance also varies depending on their characteristics, such as thinking style and level of academic achievement (Van Zundert et al., 2010). Lu and Law (2011) found that learners' ability to identify problems in peer work and give suggestions was a significant predictor of the feedback providers' learning performance. Davies (2006) found that "better" students were more willing to criticize their peers than weaker students.

Recently, researchers started to identify instructional intervention to train or scaffold learners in providing better peer feedback. For example, Sluijsmans et al. (2004) found that training that engaged learners in defining assessment criteria positively influenced learners' peer assessment skills. Ching and Hsu (2013a) explored graduate students' peer feedback activities in an online course and examined different types of feedback provided by peers. They found that when guiding questions were used to scaffold learners' peer feedback activity, learners seemed to generate more feedback consisting of "Suggestion" and "Problem Identification." In the current study, a different instructional approach was taken to scaffold learners to provide constructive peer feedback. This study explored whether a role-play strategy helps improve the generation of constructive peer feedback in a case-based problem solving learning activity in an online course. Specifically, in this study, the constructive feedback is defined as feedback that involves identifying problematic areas, asking questions to probe deeper thinking, and providing suggestions to address the problematic or weak areas.

Using Role-Playing to Augment Constructive Peer Feedback

Role-playing is a teaching method that has been used widely for "experiential learning" (Russell & Shepherd, 2010) and that "provides an imaginary context in which issues and behaviors may be explored by participants who take on a specific role or character" (Bell, 2001, p. 256). It is considered to be particularly effective for learning about complex social/human systems (Russell & Shepherd, 2010), and has been implemented to develop group decision-making (Bos & Shami, 2006; Pata et al., 2005), motivate learners (Wishart et al., 2007), improve communication skills (Chien et al., 2003), and develop problem-solving abilities (Hou, 2012). When participating in role-play, learners explore a complex scenario that requires resolution through discussion, debate, and negotiation among roles with different points of view (Russell & Shepherd, 2010). It gives opportunities for learners to apply knowledge in contexts and receive the consequences of actions in safe environments. Research shows that role-playing benefits learning in several ways (Dracup, 2008). First, it produces deep-level learning outcomes that resonate for a long time (Bolton & Heathcote, 1999). Second, it engages both learners and instructors. That is, learners tend to enjoy the experiential learning experiences (Raphael & O'Mara, 2002) and the instructors tend to find the experiences rewarding (Bolton & Heathcote, 1999). Third, role-play can help learners develop problem-solving abilities by assuming different roles situated in complex problem scenarios relevant to the professional domain (Hou, 2012).

Role-playing can be an innovative way to elicit constructive feedback from peers. In a case-based learning environment, learners can play different roles of stakeholders to provide meaningful feedback to their peers. Role-playing allows feedback providers to use a specific lens to anchor their analysis, interpret, and evaluate peers' work, which may result in more directed and constructive feedback. Role-based peer feedback can be more in-depth and critical, which helps result in more comprehensive problem solutions.

Technology to Enhance Role-Play and Peer Feedback

The process of role-based peer feedback activity can be enhanced with a Web 2.0 tool that enables easy communication and smooth collaboration. In this study, we used VoiceThread as the virtual learning environment. VoiceThread is a tool that meets a variety of criteria of a useful online role-play environment (Russell & Shepherd, 2010), such as authenticity, asynchronous communication, student accessibility, and low set-up costs. Like other Web 2.0 tools, VoiceThread featuring audio or video presentations can be used as a cognitive tool that allows learners to organize and present their knowledge for deep learning (Hsu, Ching, & Grabowski, 2009). Its text, audio and video comment-sharing function also makes it possible for learners to actively interact with peers in an authentic and meaningful environment (Ching & Hsu, 2011). With its affordance to create multimedia artifacts, learners can share their ideas in multiple formats (e.g., texts, images, audio, and video) from which they can further build their understanding of the learning materials (Hsu, Ching, & Grabowski, 2014). Role-playing and commenting with VoiceThread also augments communication as the process emulates face-to-face interaction, providing learners the opportunity to see and hear each other. Research has found that learners felt more connected when they use audio-based and video-based discussion on VoiceThread (Ching & Hsu, 2013b) compared to text-based discussion in discussion forums.

Research Purpose and Questions

This study explored the impact of role-playing on the quality of peer feedback and learners' perceptions of the role-play strategy in a case-based learning activity with VoiceThread in an online course. Specifically, the study answers the following research questions:

1. How does role-playing impact the type of peer feedback provided?
2. How do learners perceive the role-play strategy?
3. How do learners decide on which roles to take when they provide peer feedback?
4. How do learners perceive the usefulness of the peer feedback?

Research Method

Participants and the Context

Participants were graduate students in an online master's program in a northwestern state university in the United States. Twenty of the 39 students in an online instructional design course participated in this study on a voluntary basis. Forty-five percent of the participants were males and 55% were females. Fifty percent of the participants were younger than 40 years old. This online course was mainly hosted on the Moodle learning management system (LMS) where the course instructor posted course materials, and made regular announcements regarding course requirements and reminders. VoiceThread was used as an additional learning environment where learners worked on one of the major activities, the one concerned in this study.

Learning Activity

Students participated in a case-based role-playing peer feedback activity as part of the required course work. This activity lasted for four weeks and involved learners in analyzing an instructional design (ID) case individually, creating a presentation on the analysis on VoiceThread, participating in role-playing peer feedback to three peers, revising one's own original analysis based on peer feedback and submitting final analysis for grading. Students chose a relevant ID case out of the three cases that represent scenarios in different professional contexts. When providing feedback to peers, students were asked to use the role-play strategy (*role play*) by assuming a stakeholder's role of their own choice in the case scenario and providing constructive feedback from the perspective of the selected stakeholder. For example, in a case situated in an elementary school setting, many learners chose the associate principal's role to construct their feedback from. Specifically, two prompts were provided to help learners construct their feedback: (1) How does the analysis address your existing (the stakeholder's) concerns and/or needs? (2) What are some concerns you may have toward the analysis (and the solutions if there are any)? Figure 1 shows a screenshot of the VoiceThread presentation of the case analysis created by a participant in this study. This presenter's avatar is on the upper left and two peer commenters provided feedback on the case analysis.

Figure 1. An example of role-playing peer feedback activity on VoiceThread.

Data Collection and Analysis

We collected data from two sources to answer the aforementioned research questions. Peer feedback entries were used to answer research question 1 and a survey of learner perceptions to answer research question 2, 3, and 4. First, peer feedback entries on VoiceThread were collected and analyzed using content analysis. Content analysis is a research method that builds on procedures to make valid inferences from text (Anderson, Rourke, Garrison, & Archer, 2001). In this study, a person can give directed comments at individual presentation slides on VoiceThread. We treated a comment given by a person on an individual slide as one complete message and we used one complete message as the unit of analysis like in other studies that applied content analysis (e.g., Gunawardena et al., 1997). For example, when one learner commented at five different slides throughout a presentation, five complete messages were generated for analysis. Using this method, 123 entries of peer feedback were identified on 20 VoiceThread presentations. On average, each learner generated 6.47 pieces of feedback on VoiceThread with a range from 2 to 27 entries. One learner did not provide feedback on VoiceThread but on a Moodle discussion forum; as such, his/her feedback entries were not included in this analysis.

All the feedback entries retrieved from VoiceThread were coded for cognitive and affective categories using the coding scheme presented in Table 1. This coding scheme was adapted based on the scheme in Lu and Law (2011) and Ching and Hsu (2013a). Each peer feedback entry can be coded into multiple categories.

Second, a survey with open-ended questions was administered after the end of the peer feedback activity to solicit participants' experiences and their decision-making process during their participation in the activity. Specifically, we asked questions on learners' perceptions of the role-play strategy when providing feedback, the method learners used to select the role to take, whether they changed to different roles when providing feedback to different peers, and the usefulness of the received peer feedback. The responses to the survey questions were then examined using the constant-comparative approach espoused by Lincoln and Guba (1985). We initially examined the survey responses to group similar comments into themes, and evaluated the fit between each student response and the theme. We then gave each theme a suitable label, and selected and reported representative statements for each theme.

Table 1

Coding Scheme for the Types of Comments

Categories	Definitions	Examples of comments from the current study
Cognitive		
Problem Identification	Addressing specific issues	There are a few resources that may have been overlooked. The curriculum coordinator is the missing person on the PDT.
Question	Asking questions to clarify or to prompt deeper thinking	What kind of knowledge background are new employees coming into the plant with? Prior experience or none or a mix?
Suggestion	Providing a method to deal with the problem	Maybe the equipment manufacturer could come in to provide training sessions for new employees.
Affective		
Support	Praising the work or expressing positive comments on the ideas	Nice presentation, the way it is presented focuses on a learning process, linking technology to the means to address student achievement. I agree with your analysis.

Results and Discussion

The Impact of Role-Playing on The Type of Peer Feedback Provided

When examining peer feedback entries, it was found that not all learners adopted the role-play strategy when they provided feedback. As a result, we distinguished feedback entries generated with the strategy from those without the strategy. Table 2 presents the descriptive data showing the detailed breakdown of the percentage of different types of comments generated with or without *role play*. In total, 76 entries of messages were generated with role play and 47 entries of messages were generated without role play. Problem Identification is the least frequent category (11%) in the comments generated without role play, followed by Question, Suggestion, and Support. When role play was adopted, the frequency of all the coded categories was increasing. Particularly, Problem Identification, the least present category without role play, doubled in frequency. To test if the increases in these categories were associated with role play, chi-squared tests of independence were performed on these categorical data.

Table 2

Percentage of the Types of Comments Generated With and Without Role Play

Categories	Role Play	
	With (76 entries) %	Without (47 entries) %
Cognitive		
Problem Identification	28	11
Question	14	13
Suggestion	51	47
Affective		
Support	78	68

Overall, 28% of comments made by learners engaged in role play were classified as Problem Identification, compared to 11% of those made by learners who did not take a particular role. The results of a chi-square test (χ^2 (1, N = 123) = 5.03, $p < .05$) supported the conclusion that the use of the role-play strategy was associated with a higher proportion of comments that contains Problem Identification compared to those generated without the use of the strategy. However, the results of chi-square tests did not support the conclusion that the use of the role-play strategy was associated with increase of comments in the following categories: Question (χ^2 (1, N = 123) = .07, p >

.05), Suggestion (χ^2 (1, N = 123) = .24, p > .05), nor Support (χ^2 (1, N = 123) = 1.38, p > .05).

The results of chi-square tests of independence showed significant association between role play and Problem Identification. Problem Identification has been the least frequent category reported in the past literature of peer feedback concerning whether learners were able to provide constructive comments (Ching & Hsu, 2013a), as well as in the current study when learners did not adopt intervention to generate comments. It can be argued that Problem Identification is a type of comment that learners often do not feel comfortable producing compared to other types of comments. Studies have shown that learners did not feel comfortable identifying problems in peers' work because they did not want to appear to be criticizing peers (e.g., Ertmer, et al., 2007), to risk the interpersonal relationships, or to use their new knowledge to evaluate. The association of role play with higher frequency of Problem Identification in the peer comments seems to suggest that through role play, learners were able to overcome the affective barriers of critiquing peers and point out the weakness for improvement. Being able to detect problematic areas in peers' work could lead to better learning in the domain knowledge of the feedback providers (Lu & Law, 2011). However, this finding needs to be further validated by studies with research design that can establish the causal relationship between the intervention, role play, and the behavior of problem identification in peer feedback.

Learners' Perception of the Role-Play Strategy

When learners were asked about their experiences of using the role-play strategy to provide feedback to peers, it was found that the role-play strategy alleviated cognitive challenges of peer feedback, made the activity more engaging, and relieved the affective barriers of providing peer feedback. However, some learners also reported that the strategy limited the feedback they could provide.

The strategy alleviated cognitive challenges of peer feedback.

Sixty percent of learners perceived the role-play strategy useful in enabling them to compose and provide meaningful feedback. Commenting based on a role helped learners delve deeper into the issues in the case study, and create more directed and focused comments. For example, two learners commented the following.

> I thought that by taking on a role of a specific person or people, it helped focus my feedback. I was able to look at and respond to other people's analysis through a specific perspective.

> I liked focusing on a role as it made me look deeper into the questions and forced me to see it through their glasses, so to speak.

As the case scenarios used in this study presented complex instructional design issues that involved multiple stakeholders, taking a role to give peer feedback alleviated cognitive challenges because it made it easier for learners to only take into consideration one stakeholder's perspective to process the analysis, instead of trying to be comprehensive by taking into account multiple perspectives.

The strategy made peer feedback more engaging.

Learners also thought the role-play strategy made the peer feedback activity more engaging and authentic as they were put into stakeholders' shoes to make sense of the analysis and use the corresponding perspective to address complex issues. For example, one learner commented that

> Picking up a specific role and giving feedback was actually fun. It gives the students a chance to see what it will be like should they want to become an instructional designer. It is like working on a project at work and getting feedback from your boss.

The strategy relieved affective barrier.

A particularly interesting and critical perspective revealed by two learners indicated that the role-play strategy made them feel more comfortable critiquing peers' work during the process, as learners did not feel they were personally attacking others' work.

> It felt a bit freeing - I wasn't "personally attacking" something in their project, and it gave me a better foundation/better criteria on which to give positive feedback (something beyond "I liked it!").

> Looking at it from a stakeholder's viewpoint, it only helps in the analysis to rectify flaws. It helps eliminate personal opinions and focuses on constructive feedback which is relevant to the case.

The strategy limited the feedback one could provide.

On the other hand, 20% of students found the role-play strategy limiting, instead of enabling. In all these cases, learners reported that they could have given more comments to peers if they were not limited to the specific role they were taking. Two learners commented that

> It (role-playing) was limiting in a way because I then could not speak to things outside that character's experience or expected knowledge base. Maybe I took the task too seriously, but I think I might have been able

> to make more meaningful comments in a place or two had I had more freedom.
>
> I thought it would have been more helpful to comment from a global perspective from multiple viewpoints. It would give the presenter feedback that was more well-rounded.

The findings to this research question show that learners mostly had positive perceptions of the role-play strategy. Particularly, two learners commented that using the role-play strategy freed them from the uncomfortable feeling of critiquing peers' work. This finding seems to provide an explanation for the content analysis results that role play is associated with the increased frequency of problem identification in the peer feedback. Taking a role empowers learners to pinpoint problematic or weak areas relevant to the perspective without learners being afraid of hurting a peer's feelings or risking the interpersonal relationships with peers.

However, the findings also revealed that there is a need to establish psychological safety among the learners if the goal is to offer a task-oriented environment for peer feedback. Psychological safety refers to "a shared belief that it is safe to take interpersonal risks in a group of people" (Van Gennip et al., 2010, p. 282), and "a sense of confidence that the team will not embarrass, reject, or punish someone for speaking up" (Edmondson, 1999, p. 354). When learners appreciate differences in opinions as opportunities to frame a problem (Edmondson, 1999) instead of disagreement, they are likely to improve their performance of providing constructive comments.

Peer-Benefits Driving Role Choices

Based on the design of the learning activity, learners were given the freedom to choose the roles they preferred to play when providing peer feedback. When asked about their decision-making regarding role choices, learners identified multiple reasons for picking the roles, including peer-benefit and self-benefit reasons.

About 30% of learners tried to help their peers by picking a role that enabled making valuable comments on peers' analysis. Participants reported that they would listen to the peer presentation and choose a role that could contribute the most. For example, two learners commented that

> Based on who I thought would be the most "antagonistic" to their approach - the "devil's advocate."
>
> After I listened to the other person's analysis, depending on what they said, I chose who would be most concerned with the information that they provided.

Some learners picked roles based on the relevance of the roles to the case study. For example, one learner picked the role that seemed to be the controlling stakeholder whose opinion matters the most, and another learner picked a role that could provide a different perspective. There are also learners who picked the roles most people could relate to, the roles interesting to themselves as learners, or the roles relevant to their past experiences. Lastly, 20% of the learners made a decision randomly.

Learners were further asked about whether they took the same role when they provided feedback to three or more peers. Forty percent of students took the same role when responding to different peers due to multiple reasons such as time saving, being able to compare several analyses from the same perspective, and being able to provide more constructive feedback by delving into one specific role in depth. Fifty-five percent of students took different roles when responding to multiple students. Some of them felt playing different roles was more interesting; others wanted to expand their own learning by seeing a case from different perspectives; still others changed roles because they thought they could provide more useful feedback that way. In summary, various motivations drove learners in making decisions on role choice when responding to their peers. The majority of learners reported altruistic reasons as they intended to provide the most helpful feedback for their peers. Only very few learners were more interested in the opportunities for self-learning and growth, as they picked various roles to explore and broaden their own understanding of the issues presented in the cases.

The decisions for learners to play consistent or different roles have implications for their own learning. By taking the same role, learners are able to use one perspective to examine multiple peer analyses and alternative solutions, leading to a deeper and more focused understanding toward the underlying issues that are important to the stakeholder. Through altering roles, learners gain the opportunity to explore analyses and solutions from different stakeholders' perspectives. A design challenge, thus, emerges regarding how much freedom we give to learners in terms of role choice. A study on online role-playing found that familiarity with the role being played helped role engagement and appropriate voice when performing the role (Cornelius, et al., 2011). In this study, the goal is to have learners provide constructive feedback to other learners. Therefore, it may be more reasonable to have learners identify a role that they can relate to the most, and develop a deep understanding of the issues critical to the chosen perspective. This way, learners can offer more meaningful and constructive feedback to their peers.

Positive Perception of the Usefulness of the Peer Feedback

Overall, 90% of learners reported the peer feedback they received useful or somewhat useful. Sixty percent of the learners perceived that peer feedback was useful. Learners reported that feedback helped them identify holes in their case analysis and ideas that had been overlooked or that could be analyzed deeper. Useful peer feedback also gave them suggestions on how to improve their work. A sample comment reads, "The feedback was very useful. In particular, one of the roles that was chosen was at direct odds with my analysis, so it was very eye-opening."

Thirty percent of learners found the feedback somewhat useful. In these instances, learners wish they could receive more specific and deep feedback that could be used to improve their work. For example, a learner commented the following : "Moderately. It did not seem as in depth as the feedback I had tried to give."

Out of all the learners, 10% reported that they did not receive feedback either because they posted their case analysis presentation late or there were technical issues that prevented making their presentation accessible to their peers.

Implications and Future Directions

Based on the findings of this study, the role-play strategy appears to have a great potential in facilitating learners to compose constructive feedback that identifies problems for improvement. We would recommend online educators and instructional designers to use this strategy to achieve the learning goal of improving peer feedback quality. The current findings tied in role-play with prompting questions that guided learners' feedback construction. While current intervention increases the frequency of problem identification in the comments, in the future, prompting questions can be expended to elicit other types of comments. That is, prompts can also guide learners to ask more probing questions and provide suggestions that address identified issues based on the role they play.

The results of this study shed light on training learners to overcome affective barriers of providing constructive peer feedback. Previous research has identified that learners do not feel comfortable critiquing peers' work (Ertmer, et al., 2007; Smith et al., 2002; Venables & Summit, 2003) and training on peer feedback or assessment has helped learners to form more positive attitudes toward this activity (Smith et al., 2002; Cheng & Warren, 1997). This study contributes to the existing research by demonstrating an additional strategy to train learners. That is, when training novices to provide peer feedback, having them play a role to evaluate peers' work can help them be concerned less about how they appear to others in a community where interpersonal relationships are valued and maintained. As shown in this study, learners can feel more comfortable critiquing peers' work by taking a stakeholder's role as it "frees" learners from the feeling of attacking peers.

The current finding also shows that not everyone perceived role-playing as helpful for generating peer feedback, which may be due to individual differences. The role-play strategy may not have the same impact on learners of different cognitive styles or different abilities. Research has found that learner cognitive style has an effect on the peer feedback they provided. In a study conducted by Lin, Liu, and Yuan (2001), they defined that learners with a higher executive learning style were more willing to follow instructional rules than those who emphasized independence and creativity. They found that learners with a high executive thinking style provided peer feedback of better quality than those with a low executive thinking style, where feedback quality was defined as high when it offered suggestions for the next step of modifying and explaining the peers' reading summary. Yu, Liu, and Chan (2005) found positive relations between levels of academic achievement and the peer assessment skill. Davis (2006) found that learners of lower performance tended to be less critical whereas learners of higher performance were more critical. As the current study did not take into account learner characteristics, future research may explore how the role-play strategy interplays with learner cognitive styles or academic achievement, so that more personalized intervention can target learners' diverse needs.

While peer feedback remains a challenging skill for some learners even with the role-play strategy, it may be worthwhile to couple this strategy with established effective intervention to better enhance learners' skills in providing constructive feedback. For example, Sluijsmans et al. (2004) found that training which engaged learners in defining assessment criteria positively influenced learners' peer assessment skills. Research on role-playing has suggested that an anonymous role-play activity may help participants engage with their roles so that they reply to roles rather than to their peers, which improves the freedom to speak in-role with honest disclosure (Cornelius, Gordon, & Harris, 2011). Future research may investigate whether peer feedback quality can be further improved by combining intervention that fosters learners' understanding of the assessment criteria and an anonymous role-playing environment.

Conclusion and Limitations

This study explored the impact of role-playing on the quality of peer feedback and learners' perception of this strategy in a case-based learning activity with VoiceThread in an online course. The findings revealed potential positive impact of role-playing on learners' generation of constructive feedback as role-playing was associated with higher frequency of problem identification in the peer comments. Sixty percent of learners perceived the role-play strategy useful in assisting them to compose and provide meaningful feedback. Multiple motivations drove learners in making decisions on role choice when responding to their peers, mostly for peer benefits. Finally, ninety percent of learners reported the peer feedback useful or somewhat useful. Based on the findings of this study, we discussed educational and instructional design implications and future directions to further the line of research using role-play strategy to enhance peer feedback activity.

In this study, we used multiple data sources, including peer comments posted on VoiceThread and students' responses to open-ended survey questions to explore how the role-play strategy impacted peer feedback, learners' perceptions, and decision-making processes in a case-based asynchronous online discussion using VoiceThread. However, the findings of this current study should be interpreted with caution due to the limited number of participants and specific learning contexts and tasks (e.g., adult learners in an online learning environment). Future research is encouraged to replicate this study in different learning contexts with learners of different characteristics. Research studies using experimental design need to be conducted to verify the current findings and to yield research results that can be generalized to broader educational contexts.

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THE INTERNATIONAL
REVIEW OF RESEARCH IN
OPEN AND DISTANCE LEARNING

Peer Assessment for Massive Open Online Courses (MOOCs)

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Abstract

The teach-learn-assess cycle in education is broken in a typical massive open online course (MOOC). Without formative assessment and feedback, MOOCs amount to information dump or broadcasting shows, not educational experiences. A number of remedies have been attempted to bring formative assessment back into MOOCs, each with its own limits and problems. The most widely applicable approach for all MOOCs to date is to use peer assessment to provide the necessary feedback. However, unmoderated peer assessment results suffer from a lack of credibility. Several methods are available today to improve on the accuracy of peer assessment results. Some combination of these methods may be necessary to make peer assessment results sufficiently accurate to be useful for formative assessment. Such results can also help to facilitate peer learning, online discussion forums, and may possibly augment summative evaluation for credentialing.

Keywords: Massive open online courses (MOOCs); peer assessment; formative evaluation; calibrated peer review; credibility index

In the past several years, massive spen online courses or MOOCs have erupted throughout the higher education landscape worldwide. These are typically audio, video, and textual instructional modules delivered via the internet and are free of charge. Enrollments in these courses have ranged from thousands to hundreds of thousands, typically from all around the world with about 1/3 of the enrollees coming from the United States and India (Waldrop, 2013). Numerous universities have developed and offered MOOCs on a trial basis. Hybrid degree programs that include a combination of traditional and MOOC courses, such as the master's degree in computer science program at the Georgia Institute of Technology in the United States, have emerged. Some companies that offer MOOC online platforms are attempting to license MOOC contents to be coupled with traditional in-class discussions and exercises provided by supportive instructional staff from traditional brick-and-mortar universities and offer the combination as blended courses. Many MOOCs are offering participants various recognitions for participation and completion, ranging from certificates of completion to online badges, to college credits. State legislators in the United States, such as those in California, are demanding universities accept MOOCs for credit. These rapid developments have given MOOCs the appearance of potentially replacing at least some of the traditional university resident instruction courses as well as some online courses.

Many observers have questioned whether these MOOCs can actually replace traditional brick-and-mortar instruction or even established online courses (e.g., Kauza, 2014). Others suggest that MOOCs 'cheapen' higher education and threaten the survival of high quality programs. Proponents, on the other hand, have complained that we might be asking MOOCs to meet a higher standard of quality than traditional instruction. Additionally, they cite the rising cost of tuition for higher education, coupled with the decreasing average annual income of families, as an unsustainable model that MOOCs might help address (e.g., Barber, Donnelly, & Rizvi, 2013).

Regardless of one's position, the general vision regarding MOOCs is that they constitute individual stand-alone, completely functional units that not only serve as another open educational resource, but can in fact lead to massive open learning.

From the Few to the Masses

It might be useful to pinpoint key differences between MOOCs and traditional university instructional modes, including those of large lecture classes as well as non-MOOC online courses. Perhaps the most obvious and also most critical difference between MOOCs and traditional classes is scale. While the largest of the traditional classes – large university classes in lecture halls – may have over 1,000 students, MOOCs typically have tens of thousands to over 100,000 students.

There may well be many social, economic, technological reasons for the emergence of MOOCs at this juncture. However, from a broad historical perspective, the development of MOOCs is a logical continuation of a trend in education, made possible currently by developments in communication technology and the internet. Historically, education as a social institution has moved in a single direction: from the education of the privileged few to the education of the masses. This is particularly the case for higher learning and technical training. We started from the few teachers with few disciples (e.g., Socrates, Confucius, Shakyamuni, instruction in the monastaries of Taxila in India) approach; evolved next to a system of many teachers each having very few students (e.g., masters and apprentices; tutors/imams/zen masters and students); to formal educational institutions for aristocrats and the privileged (e.g., European universities, U.S. Ivy League colleges, Guozijian [国子监] in China, madrasas [مدرسة] in Muslim countries); to finally mass compulsory basic education and mass higher education (e.g., land grant colleges, GI Bill in the U.S.) with many teachers each teaching many students. The next logical step in this evolution may very well be universal open education for either self-actualization or credentialing. MOOCs promise to be a part of this next step in education.

From Teaching to Broadcasting

As we move from education of the privileged few to education of the masses, the learner-to-teacher ratio is increased at every stage. Access to the teacher by students is reduced and the learning experience is correspondingly diluted. A most important loss is the reduction in the opportunity to interact with teachers. While many aspects of the teaching/learning experience can be approximated through technology, the opportunity to interact with the teacher is an inverse function of the learner-teacher ratio and cannot be approximated without cloning the teacher. Current large university lecture classes attempt to approximate this cloning via the use of teaching assistants. MOOCs are taking this learner-to-teacher ratio problem to yet another level.

What is so important about student-teacher interaction? This has to do with what constitutes a sound educational process. The process involves a 3-step cycle: teach-learn-assess/feedback (cf. Frederiksen & Collins, 1989). The formative assessment or feedback step is critical to guide subsequent instruction and to ensure learning. In the earliest Socratic/Confucius mode, feedback from and to each individual student occurs naturally and is constant and continuous. As we moved over the ages through the apprentice to mass education modes, feedback to each individual student has become more and more sparse. Attempts have been made by some to put individual feedback back into the cycle by designing what is known as dynamic assessment (cf., Feuerstein, Feuerstein, Falik, & Rand, 2000; Haywood & Lidz, 2007). However, what that does is attempt to force into the system of mass education the original few-teacher, few-student mode and has not been practical. Hence, this approach is found primarily in special education, where individualized educational plans are often used or even legally mandated. It is also found in second language learning to some degree (e.g., Lantolf & Poehner, 2011). Many large lecture classes in universities also attempt to put back some small degree of individual feedback by breaking the class up into smaller 'recitation' sessions with teaching assistants or tutors.

Feedback and assessment in open and distance learning are inherently difficult to begin with (Chaudhary & Dey, 2013; Letseka & Pitsoe, 2013; Suen & Parkes, 1996). The problem of the reduction of individual feedback from, and interactions with, instructors becomes extreme in MOOCs. Due to the scale of MOOCs, feedback to individual students from the instructor has become virtually impossible. Yet, teaching without assessing whether the student has learned and without giving students feedback as to whether they have indeed learned the material correctly amounts to a one-way information dump or broadcasting, not education. A MOOC, in that form, would be essentially not different from the thousands of free how-to Youtube videos on the internet or the various free instructional videos provided by the Khan Academy (http://khanacademy.org) and cannot be considered a complete teaching-learning experience.

Attempts at Remedies

The teach-learn-assess cycle is essentially broken in a MOOC. Various attempts have been or are being made to re-introduce some degree of formative assessment feedback into the process to prevent it from becoming a one-way information dump or broadcasting show.

Many methods are suitable for feedback in an open distance learning environment in general. These include (a) automated tutors; (b) peer feedback; (c) auto-scoring of assignments; (d) reflective networks; (e) written comments; (f) oral comments; (g) meta-verbal; (h) emoticons; (i) self-checks; and (j) ePortfolio (Costello & Crane, 2013). Additionally, many developments in ICT have enabled feedback and assessment activities analogous to those of feedback activities in a traditional classroom. However, only a limited subset of these methods and technology are applicable to the scale of MOOCs.

In terms of assessment, some MOOCs offer online multiple-choice quizzes that are machine-scored as progress checks and feedback to students. At the end of each instructional module, a number of multiple-choice questions would be posed to the student. These questions are intended to gauge the student's mastery of the concepts and other contents covered in that module. The scores on these tests would indicate whether the student has adequately learned the material and the scores are given to the student as feedback. Students who do not do well would be encouraged to return to the previous module to review the materials. This approach is basically an online version of the old programmed-learning approach (Bloom, 1971; Skinner, 1968), popular briefly in the 1960s and 70s and quite limited in applicability since it is appropriate only for certain types of course contents where abilities to recall or to differentiate concepts or to interpret or extract information from text or graphics related to the subject matter are the only important instructional objectives. It is also challenging to most instructors to develop good quality multiple choice test items to measure high-level cognition such as analysis, synthesis, and evaluation, in Bloom's taxonomy. It is not appropriate for courses in which the desired evidence of learning is to have students demonstrate an ability to generate ideas or produce a product, such as answer open-ended questions, write an essay, submit a report, design an artifact, engineer a process, or solve an ill-defined complex problem.

For open-ended writing assignments, automated essay scoring algorithms can be used (Balfour, 2013). These essay scoring programs have become more and more sophisticated and can detect many types of error in writing and can provide automated feedback to inform students of errors. An example of such an algorithm is the e-rater system used by the Educational Testing Services in the United States to score essays in the SAT test (see http://www.ets.org/research/topics/as_nlp). However, these programs are appropriate only when English writing ability is the construct of interest and are therefore appropriate only for MOOCs that teach English writing skills. Additionally, even when the objective of the course is writing ability, these programs can only detect errors in the more mechanical aspects of writing such as verb-noun agreement, run-on sentences and other grammatical or syntactical errors, and even organization to some extent, but are generally not capable of evaluating such abstract qualities as theme, humor, irony, coherence, and so on (Williamson, Xi, & Breyer, 2012; Zhang, 2013).

To provide feedback to students in general, in some cases instructors would provide answers to a limited number of most popular questions posted in the MOOC online discussion forum. The popularity of each question is often determined by a system of like/dislike votes similar to that used in Facebook. This, of course, is quite far from providing individual formative feedback and leaves the overwhelming majority of student questions unanswered. For the majority of the students, formative assessment and feedback would still be missing.

One solution that has emerged to address both the problem of the lack of formative feedback and that of a lack of revenue stream for the investment of resources in the development of MOOCs is to place MOOCs within a blended learning or flipped learning structure. This approach would have students view contents of a MOOC on their own and at their own pace. After learning the materials via the MOOC, they would attend local brick-and-mortar classes in which they would do assignments and participate in discussions with local instructors. While the MOOC portion may be free, the face-to-face sessions would be fee-based. Georgia Institute of Technology in the United States, for instance, has initiated a Master of Computer Science degree program for $6,000 to combine MOOCs with a large number of instructional tutors in a blended manner. Coursera is also attempting to license contents of existing MOOCs to be coupled with local instructional staff for credit-bearing courses at traditional universities.

This blended- or flipped-learning approach appears to be a workable alternative that would solve the central problems of assessment, feedback, and revenue. The flipped or blended learning mode is fundamentally quite similar to many advanced seminars in universities in which students are assigned take-home readings from textbooks or reference materials and are then to provide reports and participate in instructor-led discussions in class. This approach to the use of MOOCs would fundamentally change its nature and function from its original promise of offering massive free universal education to those of a free multimedia, interactive analog of a traditional textbook (see e.g., Krause, 2014).

Finally, the single approach that is widely applicable to most, if not all, MOOCs is to use peer assessment and peer discussion forums to provide formative feedback to students. In this approach, fellow students within a MOOC are asked to evaluate student assignments and to provide feedback to other students. Unlike the use of multiple-choice quizzes or automatic essay scoring, it is applicable to all contents and assignments. It is also the most economical approach without the need to hire a large pool of support instructional tutors as in the case of blended learning models. It allows a MOOC to be a complete stand-alone educational tool without reducing the role of the MOOC to that of a multimedia interactive textbook.

Peer Assessment and Issues

There is a large body of literature about various aspects and effective practices of peer assessment in traditional classroom instruction (see Falchikov & Goldfinch, 2000; Gielen, Dochy, Onghen, Struyven, & Smeets, 2011; Li, Xiong, Zang, Kornbaher, Lyu, Chung, & Suen, 2014; Norton, 1992; Topping, 2005). In traditional classroom instruction, peer assessment has been commonly used to facilitate class discussions, often in small groups or dyads, often under the supervision and guidance of the teacher, and augmented by instructor assessment (Gielen et al., 2011). Peer assessment in MOOCs, however, exists in a very different environment. First, and most obviously, is the issue of scale. For a single assignment within a single MOOC, there are tens of, to over a hundred, thousand potential peer raters evaluating up to over a hundred thousand submissions. The logistics of linking raters and assignments are considerably more complex (Balfour, 2013). The second difference is that, because of the scale, there is little to no instructor mediation, supervision, or guidance. (Note that for flipped learning, the supervision exists in the traditional portion of the course, not within the MOOC.) A third difference is that MOOC participants are international. There is a large variation in native language, culture, value, and worldview among peer raters. Without a teacher overseeing the process, there is also little sense of obligation or incentive for students to take the peer assessment process seriously. It is, for example, known that MOOCs which employ peer assessments tend to have lower course completion rates (Jordan, 2013). It is not clear whether this low completion rate is an effect of the use of peer assessment or the result of asking students to submit open-ended assignment tasks instead of just clicking multiple choice answers. Such tasks also concomitantly necessitate the use of peer assessment.

Because of these differences, peer assessment in MOOCs will need to be 1) simple and easy to understand for students; 2) efficient in execution without occupying much time; and 3) limited in that each student rater is asked to rate no more than a handful of other students' assignments. In other words, peer assessment methods in MOOCs need to be as scalable as MOOCs. These limitations would in turn lead to each assignment being rated by no more than a handful of peers realistically. The resulting assessment score data would then be one of a nested design with missing data in most cells. With a large enrollment for the course but only a handful of different peer raters per assignment, the distribution of rater abilities and knowledge for each assignment and between assignments will necessarily be uneven and imbalanced. Some assignments would be rated by excellent and knowledgeable raters while some would be rated by poor and uninspired raters.

In its most basic form, the process of peer assessment within a MOOC would be as follows: A scoring rubric is developed for an assignment, the latter usually in the form of a project, an artifact, or a written report, within an instructional unit in a MOOC. Students are instructed to complete the assigned project and submit it online. Each project is distributed to several randomly selected fellow students by asking the fellow students to view the project online. Each fellow student rater is then to rate the quality of the project based on the predetermined scoring rubric. Raters are also asked to provide some written comments. The mean or median rating score is taken as the score for the project. The score as well as the written comments are then made available to the original student who submitted the project. Through this process, each project is rated by no more than a handful of peer raters and each peer rater would rate no more than a handful of projects.

Accuracy of Peer Assessment Results and Remedies

Perhaps the most glaring problem with peer assessment is how trustworthy the results are. After all, within peer assessment, the performance of a novice is being judged by other novices. Is it possible that peer raters misjudge the quality of the submission even with the guidance of the predetermined scoring rubric? Is it possible that peer raters judge a submission highly because the raters and the submitter share the same set of common but erroneous misconceptions? Or equally troubling, is it possible that a peer rater judges a submission as poor due to the rater's own misconceptions about the subject matter? Without the mediation of an instructor, can erroneous peer assessment results actually harm learning? In spite of a few studies suggesting peer assessment results correlate well with instructor ratings in conventional classrooms as well as online courses for highly structured tasks with narrowly defined correct responses (e.g., Bouzidi & Jaillet, 2009), the doubt regarding the accuracy of peer assessment in general remains. Students, in particular, do not trust the results of peer assessment (e.g., Furman & Robinson, 2003). A similar problem exists for unmoderated peer online discussion forums.

To provide a glimpse of students' mistrust of peer assessment results or peer online discussions, below is a sample of comments from peer evaluators found in several MOOCs offered by the Pennsylvania State University in the U.S. in 2013 (Suen & Pursel, 2014):

> I hated the peer assessments as in some cases, their anonymity gave the peers an excuse to say mean-spirited things.
>
> Peer-to-peer evaluation can not replace the teaching by an expert. The evaluations are not deep and rich enough.
>
> Asking tens of thousands people to discuss online about anything is stupid. Letting three random Internet trolls (also known as peers) to decide whether one passes with distinction or not is moron.
>
> I really disliked the peer assessment. I worked very hard on my map and out of the reviews only one offered constructive criticism. The others I question if they even looked at my map rather than just the attached image of it. The comments that were made didn't even make sense.

A few approaches at various stages of development have been put forth to address the concern for accuracy of peer assessment results in MOOCs. These include connectivist MOOCs (cMOOCs), the Calibrated Peer Reviews (CPR™) system, a Bayesian post hoc statistical correction method, and a credibility index approach.

Connectivist MOOCs.

The approach used by connectivist MOOCs is to remove the concern for accuracy altogether from peer assessment and peer discussions by deliberately designing the course to welcome and encourage diverse perspectives from participants. Proponents of this approach view assignments, projects, and online discussions as opportunities for crowd-sourcing, leading to superior results that otherwise cannot be achieved individually by the students (or the instructor). The underlying orientation of this approach is what is known as the connectivist pedagogy, proposed by Siemens (2005) and others. The idea is that knowledge is gained experientially via connections a student makes among nodes. As such, peer perspectives provide the necessary nodes for the connections. The MOOCs with this basic orientation are referred to as cMOOCs. The idea of peer assessment is moot within a cMOOC paradigm, as peer connections are the very process of learning. This approach might be quite limited in terms of potentially applicable course contents. Further, the connectivist pedagogy remains controversial today (see, for example, Kirschner & van Merrienboer, 2013).

Calibrated Peer Reviews (CPR™).

Another approach is to evaluate the accuracy of the ratings provided by each student rater and assign weights to their ratings according to their relative degree of accuracy. The final rating score for the submission would be a weighted average of the rating scores from peer raters. This approach is exemplified by the Calibrated Peer Review (CPR™) developed at the University of California – Los Angeles. The CPR™ approach is a general purpose peer assessment approach that is readily applicable to MOOCs. It is inherently scalable and can be used in MOOC as well as non-MOOC settings. The general peer assessment process is similar to that of the basic peer assessment approach, with the addition of a calibration process. During calibration, each peer rater is to rate up to three standard essays or projects of known quality that had already been rated by the instructor. All peer raters would rate the same essays/projects. The proximity between a peer rater's rating score and that of the instructor of the same essay/project is used as an indicator of the accuracy of the peer rater. This indicator is then used as the weight for that rater's ratings of actual peer performances. The more accurate is the rater, the more weight is given to that rater's judgment of peer performance. The performance score for each student submission is the weighted average of peer judgment scores. Many studies have demonstrated that CPR™ is an effective instructional tool that can help to improve students' scientific writing skills, confidence in self-assessment, academic performance in physiology, patient note writing among medical students, and so on (e.g., Furman & Robinson, 2003; Hartberg, Guernsel, Simpson, & Balaster, 2008; Likkel, 2012; McCarty, Parkes, Anderson, Mines, Skipper, & Grebosky, 2005; Pelaez, 2002; Reynolds & Moskovitz, 2008). However, few studies have been conducted to demonstrate the system can produce reliable and valid assessment results.

Bayesian post hoc stabilization.

Piech, Huang, Chen, Do, Ng, and Koller (2013), Goldin and Ashley (2012), and Goldin (2011) developed a number of Bayesian models to improve peer assessment results by imposing standard prior distributions to the ratings. The process proposed by Goldin is fundamentally similar to an empirical Bayes estimation process by imposing a normal prior within-rater distribution of rating scores as well as a normal prior between-rater distribution of scores. This process would produce more stable posterior peer assessment results, but cannot actually correct systematic errors of judgment due to misconceptions. This approach is shown to produce peer ratings that are more accurate than those from the basic peer assessment approach. Goldin (2011) found that the Bayesian approach reduced error of predicting instructor rating by 19-30%. The Piech et al. method is slightly different, but follows the same basic logical orientation. Whereas the CPR™ approach, as well as Goldin's approach, define accuracy as proximity to instructor rating, Piech et al.'s approach defines accuracy as proximity to the mean or median of peer rater scores in either a unidimensional or multidimensional space.

Credibility index.

The credibility index approach (Suen, 2013a, 2013b; Xiong, Goins, Suen, Pun, & Zang, 2014; see http://tlt.psu.edu/2013/07/12/peer-assessment-in-moocs-the-credibility-index/) is an attempt to improve the accuracy of peer feedback by modifying and refining the CPR™ method. The basic premise of the credibility index approach is that errors in peer assessment results arise from at least three sources: basic error of judgment due to insufficient knowledge (inaccuracy), random judgmental error due to idiosyncratic situational factors at the time of judgment (inconsistency), and inability to maintain a constant level of accuracy from context to context (intransferability). Whereas the CPR™ method considers only the inaccuracy of the peer rater, the credibility index (CI) approach takes into consideration the accuracy of the rater, the consistency of the rater, and the transferability of the level of accuracy between contexts and assignments. The approach attempts to garner the needed additional information without adding much more to the rater's burden beyond what is already gathered in the CPR™ method. Theoretically, this approach should improve the accuracy of peer assessment results and there is preliminary evidence that is supportive of that claim (Xiong et al., 2014). Additional research is currently underway to confirm its efficacy. If proved to be effective, the CI can also be used to rank peer answers and comments in online discussion forums based on the CI value of each responder, and thus is potentially capable of moving the system away from ranking comments based on popularity to one based on knowledge.

Nature of Peer Assessment Errors

If MOOCs are to be a complete educational experience, and not just a free multimedia version of traditional textbooks, the key seems to be whether there is a viable and scalable built-in formative assessment and feedback process. Among the various options available, peer assessment is the most widely applicable method to date. In spite of the many studies showing the efficacy of peer assessment in promoting learning, skepticism remains as to whether peer assessment results can be trusted.

One source of ambiguity in evaluating the accuracy of peer assessment results seems to be the problem of determining what constitutes the true score. Most studies that attempt to evaluate accuracy have used instructor rating as the absolute standard and the quality of peer rating is determined by how far it departs from instructor rating. However, Piech et al. (2013) offer a different argument:

> For our datasets, we believe that the discrepancy between staff grade and student consensus typically results from ambiguities in the rubric and elect to use the mean of the student consensus on a ground truth submission as the true grade.

In the case of Piech et al.'s situation, the ground truth submission was rated by hundreds of peer raters. Given the large number of peer raters, their decision to use the mean of student ratings as the 'true score' may be a manifestation of the trust in crowdsourcing.

While the majority of studies continue to consider proximity to instructor rating as the gold standard of accuracy, Piech et al.'s reasoning does reflect the complexity of the situation. There are at least six types of discrepancies in a peer assessment situation. These include: A) the discrepancy between the rating given by a peer rater and rating by the instructor on the same piece of work; B) the random situational fluctuations of the ratings to that same piece of work given by that same peer rater under different conditions; C) the inconsistency of ratings given to other similar pieces of work with similar quality but may differ in context or style; D) the random discrepancies between different peer raters on the same piece of work using the same set of criteria or rubric; E) the systematic discrepancy between different raters on the same piece of work due to difference in rater competence or rater leniency/stringency; and F) the random situational fluctuations of the ratings to the same piece of work given by the same instructor under different conditions. The situation is analogous to a moving archer on horseback shooting at a moving target.

Rater training and a carefully constructed rubric can help reduce some of the errors from all sources. However, in addition to rater training and good rubrics, the different approaches to peer assessment discussed earlier can be viewed as attempts to tackle different combinations of these sources of error. The CPR™ is designed to minimize errors A and E in general, but the existence of other sources of error can render this effort ineffective for a given assessment. The Bayesian approach is designed to minimize error D. The CI approach is designed to minimize errors A, B, C, & E, but does require slightly more information from the rater than otherwise collected by other methods. No method has been developed to minimize error F, except for the desirable practice of developing clear rubrics. The cMOOC approach would not consider these to be errors at all, but part of the diversity of views upon which knowledge is to be gained.

It is theoretically possible to combine these approaches into a single most effective composite approach in which raters are calibrated after training via the credibility index approach and the resulting ratings are further refined via a Bayesian or empirical Bayes approach.

Finally, one remaining problem with peer assessment in MOOCs is the probability of an assignment being rated by all poor raters. This problem may be minimized if the peer rater distribution algorithm uses a stratified sampling process based on prior knowledge, or credibility index value, or performance as a peer rater in previous assignments, instead of the current random assignment process.

It should be noted that peer assessment, whether the results are accurate or not, is considered valuable as an instructional tool in its own right. Indeed, Topping (2005) folded peer assessment as part of a larger category of peer learning. However, accurate peer assessment results would further enhance this learning experience, as well as serve the purpose of assessment. Additionally, if can be made reasonably accurate, peer assessment results can be used for purposes beyond formative assessment. One such potential use is to facilitate online discussion forums by putting more weight on opinions of student raters whose judgments of peer performances are close to that of the instructor's. Another potential use is to use student raters' performance-as-raters to supplement final summative evaluations of each student for the purpose of credentialing. The feasibility of the latter purpose, even if peer assessment results are made accurate, is not clear at this time – at least not clear in the United States. Based on the 2002 US Supreme Court unanimous ruling on the *Owasso Public Schools v. Falvo* case (2002), peer assessment as formative evaluation does not violate the 1974 U.S. law known as the Family Education Rights to Privacy Act (FERPA). The key basis of the judgment seems to be restricted to the idea that peer assessment results for formative purposes do not constitute part of the student's school record. At this time, whether peer assessment results can be used as part of a summative grade, including credentialing and certification, and still not violate FERPA is not clear.

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IRRODL THE INTERNATIONAL REVIEW OF RESEARCH IN OPEN AND DISTANCE LEARNING

Leadership Notes Editorial

Distributed Leadership for Distributed Learning

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Embedded in common notions of leadership practice are perceptions of power, authority, and responsibility. Questions about who does what and under whose authority are the underpinnings of much debate about the everyday workings and activities of organizational leaders and the projects that make up the work of such organizations.

This focus on leader activities in organizations provides a view of leadership as a phenomenon embodied in the actions of those identified in a particular role, assigned by the organization and provided appropriate power and authority to lead. More recently, discussions on leadership broaden this perspective beyond individuals in legitimate roles to the more pervasive and variable distribution of power, authority, and responsibility in the network of people who carry out the everyday activities of organizational life.

For Graetz (2000), distributed leadership involves "a group of experienced and trusted individuals operating at different levels of the organization [who lead using] integrated thinking and acting at all levels" (p. 566). The roles of leader and follower become less distinctive and work proceeds with extensive communication and collaboration. This model provides the opportunity to consider leadership as a post-modern discourse in the process of the social construction of multi-local context and appropriate distributed action (Hosking, 2007).

Distributed learning environments can be considered as tangential to, but more concrete than, distributed leadership. At least two ideas can be shared across these two contexts, where something is 'distributed.' First, in both the case of distributed learning and distributed leadership, assumptions about the boundaries between commonly held significant roles are less fixed and more negotiable. Power and authority then are considered to be a shared resource. Second, these roles are defined more by the processes that constitute their activities rather than outcomes with which they are charged.

Jalovcic, McCloud-Bondoc, and Ralston describe a case of a mobile, distributed learning program where leadership appears to have diminished before the need for the program did. They discuss the context in detail and argue in favor of distributed leadership models as a remedy for what could be seen as a failure of leadership. We share this presentation to consider the following, overarching question: Can a model of distributed leadership be of valuable use in distributed, open, and distance models of education delivery?

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THE INTERNATIONAL REVIEW OF RESEARCH IN OPEN AND DISTANCE LEARNING

Leadership Strategies in Mobile English as a Second Language Training

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Abstract

This paper reviews a pilot mobile learning project for English as a Second Language implemented by a unimodal distance education institution to present an argument favouring the use of a distributed leadership approach for sustainability of the project. The authors' position is grounded in the literature which suggests that distributed leadership in mobile and distance learning can provide a framework for sustainability of this project.

Keywords: Distributed leadership theory; mobile learning; distance learning

Leadership Strategies in Mobile ESL Training

Imagine you are a newly arrived immigrant working in Alberta's oil fields. You know some English, but when your co-workers start to joke around, you can't follow the conversation. More importantly, when you need to write a report for the next shift or to your boss, fill out a form for health insurance, or send an email to a government agency, you are not sure you are communicating clearly. You would like to improve your grasp of English, but you are working long hours, and you don't have internet access in your apartment, which eliminates online courses as an option.

This was the kind of problem that the team at a unimodal distance education institution set out to solve when they designed the English as a Second Language (ESL) mobile learning (mLearning) project, a pilot project using mobile devices as the ESL training delivery mode to non-native English speakers who required grammar skills to improve their English.

In this paper, the authors will argue that the social need that prompted the creation of this project still exists and, thus, there is a need to continue it and make it sustainable. Further, we will argue that distributed leadership (DL), with its emphasis on collaboration, skill sets, and recognition of leadership regardless of formal position, is a model that lends itself to distance learning projects in general and to extending and sustaining this project in particular.

To provide a basis for our argument, we describe the background to the pilot project including the learning environment, its audience, and the methodology of the delivery used. Secondly, the constructs related to distributed leadership theory are explored, including definitions and examples from the literature on the effectiveness of this leadership approach. Its potential application to this project is discussed. Thirdly, this investigation of the pilot project includes evidence from the literature as to the utilization of mobile learning and associated methodologies that form the framework for learners' access to flexible learning. Finally, the authors discuss opportunities in distance education and the properties of distributed leadership.

The ESL M-Learning Project

The Social Need

For decades now, Canada has been an increasingly popular destination for immigrants and foreign skilled workers. However, not all immigrants have the ability to speak English or French. In fact, Statistics Canada (2011) reports that among the recent immigrants that arrived to Canada between 2006 and 2011, 9.0% were not able to converse in either of the official languages.

At the same time, newcomers are under pressure to find jobs quickly, and integrate economically and socially; the key to their successful integration is their ability to speak English. Those who do not have basic English grammar skills have difficulties developing their listening, speaking, and writing skills, consequently limiting their ability to communicate on the job and in social situations. In addition, faced with pressures of settlement in a new country, new jobs, *and* learning English, many newcomers do not have time to devote to improving their language skills. This poses a social problem, as without basic English language skills, opportunities for new immigrants and skilled workers to fully contribute to and participate in Canadian society remain limited.

An mLearning Solution: Delivering ESL Grammar Training

In order to address this problem and test the viability of mLearning as a solution, a project was initiated by a unimodal distance education institution. This education institution offers programs where faculty and students are distributed geographically. The institution itself has a bicameral governance structure with a Board of Governors sharing academic governance with a governing body called the General Faculties Council. However, many projects, like this one, are undertaken by small teams that function with relative autonomy without a clearly defined leadership structure or strategic plan (M. Ally, personal communication, February 2, 2014). In the last 10+ years, the institution has been in transition from a correspondence stage of distance education to a networked education model (Beaudoin, 2003) which includes developing e-learning resources such as the one under discussion.

It is within this institutional context that this mLearning ESL training program was developed. The project was implemented in collaboration with community partners, including a small community college, a faith-based newcomer organization, and a local church community, all of whom already offered face-to-face ESL classes to newcomers. The team also included members from the university's distance education academics, its library, and its research centre. This research team, led by the institution's associate vice president, research, included a content expert, computer expert, researcher, team leader, and editor. It worked as a virtual team. The project had very good institutional support under the leadership of the AVP Research (M. Ally, personal communication, February 2, 2014).

The main purpose of the project was to develop and assess the effectiveness of ESL learning by using mobile devices in helping newcomers and ESL learners acquire English grammar, and to share the results with a wide audience. The program was designed to allow ESL learners to use their mobile phones, tablets, and computers to access ESL lessons and improve their knowledge of English grammar. Eighty-six lessons posted at the education institution website were based on one of the best selling English grammar and exercise books released as open source (Ally, Schafer, Cheung, McGreal, & Tin, 2007). The website had a device recognition system built in, so the program automatically recognized the device and enabled learners to use the appropriate version, and access it anytime, anywhere. Learners did not need to take time off work to take English lessons as they were able to access the program on their mobile devices while travelling, on the job, or at home on their computers.

The program was open access, flexible, asynchronous, highly interactive, individualized, and self-paced, with built-in self-assessments and immediate feedback for learners to evaluate their own progress. The lesson design was informed by behaviourism with skill-and-drill, self-assessed learning methods aimed at improving language skills. In a follow-up review of the project, Ally et al. (2007) reported that participants improved their English grammar skills from 15/20 in pre-test to 17.7/20 and 18/20 in a post-test and retention test respectively. Ninety-four percent of participants agreed or strongly agreed that this technology provided flexibility for them to learn anywhere and at any time, while 78% agreed or strongly agreed that the use of this type of technology could increase access to learning materials, and that it is easy to access and navigate the course materials (Ally et al., 2007).

Years after the pilot project was completed the traffic on the project website is still monitored by using an online database tracking system. Statistics were collected that measured a number of factors including student use, type of device, length of time, and geographical region. One of the project leaders provided a site-metrics report on downloads and worldwide use of the ESL website that showed that in 2012 over 57,000 visitors visited the website 65,721 times (1.15 visits per visitor) during which they downloaded 142,708 pages (2.17 pages per visit) and had 699,568 hits (10.64 hits per visit). The biggest number of pages was downloaded by visitors from the United States (27,964 pages), Canada (11,870 pages), and the Philippines (6,921 pages), followed by Great Britain, Spain, Turkey, Mexico, and Denmark. The results after the project had officially ended indicate that 83% of students used a Windows operating system and less than 1% of students used a mobile device to access the learning material.

In addition to ongoing use of the website, a number of other mLearning, ESL projects were developed based on this one (M. Ally, personal communication, February 2, 2014) making this project a success from the point of view of initial uptake and use of the learning tool.

However, although the project was a success, review of the project also suggests further opportunities for distance education. For example, the Edmonton Journal (2007) published an article by Gerein about the project and stated that “nearly 70 per cent of the immigrants who tried the technology in the pilot project said they found it improved their learning experience, although they indicated it would never serve as a substitute for a teacher in a classroom” (para. 7), suggesting that students did not see it as the only tool for ESL learning. In addition, the metrics report suggests that after the project was completed only one out of five students who visited the site actually accessed the lessons and that most students accessed the site through their PC rather than from a mobile device (J. Dutton, personal communication, March 5, 2014). This review, then, suggests opportunities to 1) draw more students into the site and 2) help students make full and independent use of the mobility offered by this learning tool by sustaining this project.

The project concluded and presently does not have long-term financial, administrative, or institutional support to sustain its continuation. However, after its completion, this learning tool was left in cyberspace to live its life more or less on its own. The project team addressed a social problem and tested a solution that worked, but, as with many other research projects, that meant the end of active engagement. Responsibility to translate this knowledge to action, other than in conference presentations and journal papers, and maximize the potential of the project for students by making it sustainable currently rests with knowledgable users. Arguably, the lack of a long term vision for the post-piloting period and the lack of planning and leadership strategies have impacted the sustainability of the project. As it stands now, then, it provides an opportunity to make it sustainable over the long-term by using a different leadership model.

Thus, the social problem of helping new immigrants improve their English was addressed in part by this mLearning project, but more can be done. There still remain opportunities to improve students' full use of the learning tool, and to make the project sustainable in its current form. However, these distance education opportunities can only be realized with a form of leadership that can bring together the right leaders and team members from various disciplinary backgrounds and from varying institutional cultures, gain their buy in and collaboration, plan for sustainable funding, implementation, and administration, and provide more extensive research on the effectiveness of the learning tool.

The Constructs of Distributed Leadership

This section will define and provide examples from literature regarding distributed leadership and its relation to distance education, as well as its potential application to this project to ensure its sustainability. First it will define distributed leadership, give examples from the literature, and finally recommend future uses of the distributed leadership theory in relation to the ESL pilot project.

The distributed leadership theory as it relates to distance education is commonly defined as an approach that includes networking, collaboration, instilling a common vision, allowance for member-leader actions, and empowering members to adopt new paradigms of working (Jameson, Ferrel, Kelly, Walker, & Ryan, 2006; Keppell, Dwyer, Lyon, & Childs, 2001; Fahlman, 2012). In academic, distance education institutions, distributed leadership is defined as a collective approach in which leaders encourage all team members to contribute to a strategic vision (Jameson et al., 2006; Keppell et al., 2001; Fahlman, 2012).

Humphreys (2010) draws our attention to the work of Spillane and Duignan, two eminent researchers on the topic. Spillane, as referenced by Humphreys (2010), is of the opinion that distributed leadership can take place with different people at different times and is not reliant on the traditional top-down model. The workplace setting for this type of leadership is dependent on interplay between all the members of the organization or department involved in the project(s). On the other hand, Duignan points out that a distributed model in a traditional hierarchical paradigm should include an emphasis on trust that is furthered through a culture that allows people to be leaders. Palmer, Holt, Gosper, Sankey, and Allan (2013) also remind us that a useful generic definition of distributed leadership is provided by Harris (2009):

> Distributed leadership essentially involves both the vertical and lateral dimensions of leadership practice. Distributed leadership encompasses both formal and the informal forms of leadership practice within its framing, analysis and interpretation. It is primarily concerned with the co-performance of leadership and the reciprocal interdependencies that shape that leadership practice. (p. 5)

Siemens (2006) speaks about the online learning environment as one where "Organizational structures are becoming increasingly decentralized, instruction more learner-centered and self-directed, as traditional campuses are giving way to for-profit institutions and partnerships" (p. 1). Leaders in administrative positions are facing the ever increasing need to develop and communicate a vision to the institution. The effective distributed leader will focus on how staff do things and how they interact rather than what a leader does. He goes on to state that any advocacy for this leadership approach involves roles and responsibilities that are divided equally amongst the staff in order to create a democratic environment. This approach to leadership is further supported by Gressick and Derry (2010) in a study that finds leadership is a social activity that involves work by group members that will influence or motivate other group members.

In the case of distance education, the use of a distributed model in distance learning or e-learning presents a unique set of circumstances when it comes to leadership (Jameson et al., 2006). These authors form their options based on e-learning development settings where teamwork, collaboration, and projects that have multiple concurrent timelines can benefit from a more common approach rather than a transactional or conservative philosophy of leadership. The authors claim that distributed leadership can offer the flexibility required to adapt to distance learning delivery. They emphasize that coordination and collaboration approaches in a team-based environment where the realities of distance learning demands that constant communication and self-leadership.

The use of a distributed leadership approach for online learning is typified by Palmer et al. (2013) in their discussions surrounding online learning environments (OLEs). They maintain that leadership is paramount given the nature of online learning. Specifically, the intersection of IT systems, centres for teaching, and faculties associated that connect with OLEs results in complicated organizational structures and therefore a distributed model would provide an environment whereby all the differing stakeholders could be brought together under collaborative and information sharing themes. In the case of OLEs, the authors claim that distributed leadership may be a more effective method to deal with the realities of the need for a high level of collaboration amongst parties who are responsible for online learning albeit technical or content aspects.

Further evidence from Fressa (2009) who states that distributed leadership has increased in popularity, but with overlapping terminology and synonyms such as shared leadership, democratic leadership, or collaborative leadership. Regardless of the terminology used, this approach can create opportunities for increased capacity through leadership activities extended across different people and positions within organizations, thus the resulting synergy is stronger than the individuals themselves.

Keppell et al. (2001) also define distributive leadership as an approach that focuses on collaboration, shared purpose, responsibility and recognition of leadership irrespective of role or position within an organization. The authors described a project where distributive leadership had been utilized as a change agent. Teachers embarked in a professional development activity associated with building capacity for re-designing courses for a blended delivery. The study noted that the teachers took on the roles of distributed leaders resulting in a more effective process for change in curriculum design.

Distributed Leadership and ESL mLearning: Building Bridges

Opportunities.

Distributed leadership theory suggests that DL is capable of creating collaborative networks and bringing leaders together under one strategic vision. Thus, this kind of model is ideal to extend the mLearning ESL project because it would allow leaders from a number of institutions and organizations to work together, creating bridges among existing and potential partner institutions. In addition, with its focus on self-leadership and distributed responsibility, and its ability to create synergies, DL would provide a way for partner institutions to collaborate to meet the needs of learners by bringing administrative, technical, and teaching resources together from a variety of disparate organizations. A leadership model such as DL that emphasizes collaboration and leverages the strengths of individuals would help to establish the necessary organizational structures, both inside and outside the partner organizations, to make this project sustainable. Since a DL model defines leadership in terms of what people do rather than people's positions (Spillaine, Halvorsen, & Diamond, 2001), it provides an opportunity to draw on the most appropriate people from all organizations, whether or not they hold formal leadership positions.

The flexibility of DL makes it suitable for this project, as it would facilitate the strengthening of existing ties between the lead distance education institution and the partner organizations by recruiting the same people from the partner organizations engaged in the original project. It would allow easier recruitment of team members from smaller organizations that might not otherwise have the leadership resources to make this project sustainable. This flexibility would enable community organizations that already deliver ESL instruction to use their expertise and knowledge of their own students to contribute to the design and delivery of the program. At the same time, it would allow leaders at the unimodal distance education institution who have expertise in mLearning and distance education to contribute.

A DL model would also suggest specific qualities that leaders would need to make this project sustainable over the long term. For example, DL's emphasis on empowering numerous leaders to work collaboratively and build engagement suggests that all leaders in this project need to be chosen for their flexibility and ability to adapt. The DL model makes different demands of leaders depending on the situation and circumstances (Spillane, 2010) and may even demand that leaders adopt different roles throughout the project. The positive side of this approach is that it can result in shared responsibilities and allow a more democratic flow of power, but leaders who participate in this project must also be prepared to adapt to the needs of the situation, adopt different roles, and share responsibility and power.

In the extension of this project, then, with the need for leaders in a number of disparate institutions, a DL model suggests what kind of leaders are needed for this project to succeed: ones who have well-developed interpersonal skills, a proven ability to work collaboratively, and who can function with a high level of cooperation in an atmosphere where members contribute knowledge and experience (Fahlman, 2012), and where leaders possess the skills and flexibility to fill a number of roles.

Challenges.

In addition to suggesting the specific qualities needed in leaders, the DL literature review above also suggests a number of challenges that these leaders may encounter in making this project sustainable. For example, while DL can integrate leadership and create "reciprocal interdependencies" (Harris, 2009, p. 58) it is necessary for authority and decision-making to be distributed along with the leadership role. This can be a challenge for traditional organizations because, to introduce DL, hierarchical organizational models must adapt to more "lateral, flatter decision-making processes" (Hargreaves, 2007, as cited in Harris & Spillane, 2008, p. 31). In fact, some researchers suggest that the DL approach includes an inherent danger of devolving leadership responsibilities without also devolving political power (Maxcy & Nguyen, 2006). Thus, if leaders on this project without formal leadership roles are not invested with authority by their institution or organization, there is a danger that they could be disrespected and ignored (Timperley, 2005), thus threatening the success of the project.

There is also the danger that leadership shared across organizations could present challenges to institutional/organizational buy in. Jones and O'Shea (2004, as cited in

Jameson et al., 2006) suggest that educational institutions are slow to change leadership styles to accommodate the distributed, flexible, and democratic partnership requirements of e-learning projects trialing new software, tools, and learning innovations, such as this project. In this case, where leadership within the lead unimodal distance education institution and other partner organizations is hierarchical, there could be conflicting loyalties between internal and external structures. In other words, in extending this project, the distributed leadership could challenge existing lines of authority both within the lead distance education institution and within partner organizations and, thus, endanger buy in from partner institutions.

A DL model suggests that to sustain the use of this mobile, ESL grammar resource, team members from all partner institutions and organizations should be selected carefully, based on their areas of expertise and their abilities to share a vision, leadership, and authority. This model also highlights the need for each organization to buy into the project, this model of leadership, and to invest their team members with the authority and resources necessary to complete the project.

mLearning and distributed leadership.

Some researchers see mLearning, that is, the "use of mobile or wireless devices for the purpose of learning while on the move" (Park, 2011, p.79), as the ideal solution to overcome barriers such as those faced by the immigrant group at the centre of this project. For example, Ally (2012) suggests that mLearning can overcome barriers to learning such as distance, poverty, and lack of resources by making education more accessible and affordable in part because "mobile technologies allow people who do not have computers to access education" (p. 4). Park (2011) affirms these advantages of mLearning, arguing that mobile technology makes ubiquitous, or "u-learning" (p. 81), possible by freeing learning from any particular location, device, or setting. Mobile learning can also decrease isolation between learners and help them to create personal learning environments (PLE) by combining various Web 2.0 technologies and allowing users to share knowledge and interact (Attwell, Cook, & Ravenscroft, 2009). Thus, mLearning has the advantages of delivering learning in a flexible, individualized manner, where and when students want and need it. It includes a wide range of flexibilities in the kind of device used, the platform used to deliver learning, and the learning context, reducing barriers of time, cost, and technical expertise.

However, if mLearning has advantages, it also has disadvantages. For example, Ally (2012) identifies a number of barriers to mobile learning, including a lack of open educational resources (OER) and a lack of expertise in mobile learning. In addition, in his evaluation of this project, Ally (2012) found that students "indicated that the use of mobile technology for ESL would be a good *supplementary* medium for learning" (p. 5) (emphasis added). For this project, this finding suggests that mLearning would be suitable for informal learning, but not for formal, credentialed learning and suggests that a lack of learning support could be a barrier to learning.

Park (2011) also suggests some limitations of mobile devices and mLearning, including small screen size, distractions in the environment, and limitations of the software. This author's work in creating a typology for mLearning suggests that, in order to benefit from mLearning, students have to be highly motivated and independent learners because there is little instructor-learner interaction while the learner has a great deal of control over the delivery of the content. In this situation, Park (2011) suggests that technical support is important to the success of such projects and that "instructional designers or institutional distance learning support staff should pay special attention to the creation and management of a knowledge database, including well-organized learning materials such as lecture (audio or video) files, reading materials, and vocabulary databases" (p. 93). In other words, any mLearning project must include technical and instructional designer support, and adequately designed learning objects, databases, and learning materials.

Mobile learning comes with a distinct set of circumstances, such as distributed learners and workforce, a lack of face-to-face communication, and a need for more and varied departments and disciplines to work together. For example, an online learning environment might require the collaboration and coordination of various areas of expertise, such as technical, administrative, design, and organizational. Organizations, particularly those involved in distance and distributed education, are becoming more decentralized. Thus, in distance education as a whole, there is a need for collaboration and flexibility in roles which suggests a move away from traditional top-down leadership models.

Mobile learning then adds to the usual demands of an online environment because of the increased anytime-anywhere nature of the learning. Administration, technical, and teaching departments have to be collaborative to create and maintain such environments. Learning objects have to be designed for new audiences who can only begin to access learning materials when they are delivered on mobile devices. M-learning objects have to be intelligible not only to traditional distance delivery students but also across a greater variety of nationalities, cultures, and possibly even languages. This added level of complexity makes flexibility and collaboration with people "on site and on the ground" even more essential in implementing an m-learning project. In sum, then, distance education in general, and m-learning in particular, can benefit from a leadership model that emphasizes collaboration, flexibility, and a move away from a traditional top-down power structure.

Some of the features of DL when it is successfully implemented make it suitable to provide this flexibility. This model offers the ability to

- allow leadership roles to cross traditional departmental, cultural , disciplinary, and professional boundaries;
- invest authority and control in people according to the demands of the project and not according to their formal positions;

- include both formal and informal power structures;
- avoid top-down power structures;
- connect the responsibility for successful leadership with practical and professional expertise;
- move team members in and out of leadership roles as the project requires.

The pilot project was successful in demonstrating that mLearning was a good solution for newcomers to Canada to learn English grammar skills anytime, anywhere. In order to sustain it, further involvement of participants in the pilot project is required at both leadership and technical levels. We have argued that by using the DL model this could be achieved. If extended, it is expected that ongoing changes to the content and technology upgrades will be required. Therefore, continuous involvement of a technical team of IT specialists, mLearning instructional designers, and content experts will be necessary to support learners. A leadership team will ensure that the technical team is involved as well as all other partners. Because DL is a model where leadership can take place with different people at different times and is not reliant on the traditional top-down model (Spillane, as cited in Humphreys, 2010), it has the potential to bring together a technical team to support learners and a leadership team to reach out to more learners in order to sustain this multi stakeholder program.

Conclusion

Immigrant workers continue to flood into the Canadian labor market. However, their inability to communicate clearly in English constitutes a social problem because it tends to isolate them socially and to make them more vulnerable to exploitation (Barneston, 2012). And while the mLearning ESL project examined in this paper is a partial solution to this problem, to fully realize its potential, a new project team needs to be assembled to reach more of these workers on a long-term basis and to realize further educational opportunities identified by the pilot project.

In this paper, we have argued that a DL model would promote the necessary buy in from a variety of institutions and bring together the key parties in order to create a strategic plan to carry the project forward. In particular, we argue that a DL model is especially useful when mLearning is involved since these kinds of projects require a high degree of leadership from many stakeholders in a collaborative effort to reach the necessary goals of the projects at hand. The research on this leadership model suggests practical considerations to make this project sustainable, such as consideration of the interpersonal qualities that the distributed leaders would need to support collaboration and of the composition of a team that includes content experts, learning designers, internet technology experts.

A distributed leadership (DL) approach is meant to be non-hierarchical in nature and therefore promotes collaboration and ethical practice. In the context of mobile learning such as the English as a Second Language project, a DL model promotes leadership as an element of a group or network of interacting individuals. The complexities of mobile learning and distance learning demand high levels of collaboration, stakeholder management, quality control mechanisms, and a managed infrastructure of technology.

Considering this distance form of delivery mode, a DL model, by nature, suggests a degree of open and transparent communication strategy in terms of leadership, a project management strategy that outlines the design, development, and delivery of learning on mobile devices, and the fostering of an organizational dynamic which conveys the philosophy that the sum of the parts is greater than the individual, but includes room for leadership action by all individuals in the project. In addition, the DL approach would seek to draw on the expertise and strengths of the organizational group involved in mobile learning thereby cultivating a shared common view of both the purposes of the team and its means of working.

If all partner organizations in this project can move away from a top-down, hierarchical decision-making model, invest team members with authority to make decisions, and engender trust among team members and partner organizations, then the DL model is well suited to making this project sustainable. It would provide an environment whereby leadership would be fostered in teams that would collaborate in order to innovate and then implement the designs necessary for mobile delivery to workers, who would benefit from such a project.

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