INTERNATIONAL JOURNAL OF INSTRUCTIONAL TECHNOLOGY AND DISTANCE LEARNING

November 2015
Volume 12 Number 11

ISSN 1550-6908

PUBLISHER'S DECLARATION

Research and innovation in teaching and learning are prime topics for the *Journal of Instructional Technology and Distance Learning* (ISSN 1550-6908). The Journal was initiated in January 2004 to facilitate communication and collaboration among researchers, innovators, practitioners, and administrators of education and training involving innovative technologies and/or distance learning.

The Journal is monthly, refereed, and global. Intellectual property rights are retained by the author(s) and a Creative Commons Copyright permits replication of articles and eBooks for education related purposes. Publication is managed by DonEl Learning Inc. supported by a host of volunteer editors, referees and production staff that cross national boundaries.

IJITDL is committed to publish significant writings of high academic stature for worldwide distribution to stakeholders in distance learning and technology.

In its first decade, the Journal published more than 600 articles; 7,500 pages of research and theory by over 1,000 authors. It logged over ten million page views and more than a million downloads of Acrobat files of monthly journals and eBooks. Many authors benefited from refereed publication for retention, promotion, tenure, and advancement in their profession

Donald G. Perrin, Executive Editor

Elizabeth Perrin, Editor in Chief

Brent Muirhead, Senior Editor

International Journal of
Instructional Technology & Distance Learning

Vol. 12. No. 11.

ISSN 1550-6908

Table of Contents – November 2015

Return to Table of Contents

Editorial

Global reach

Donald G. Perrin

The Internet has changed the rules for many businesses. Frequently the leader with the legacy business model is eclipsed by its Internet competitor. Consider the Sears Catalog. For over a century, rural communities could buy thousands of items from the mail-order catalog. Since people could not try them in the store, Sears was ingenious in developing ways to do things at a distance - like charts for clothing size and a self-test for eyeglasses.

> Richard Sears (in) his 1894 catalog declared it … the "Cheapest Supply House on Earth," claiming that "Our trade reaches around the World." … He made every effort to assure the reader that Sears had the lowest prices and best values.

With the advent of the Internet, Sears lost its leadership role. The new leader is Amazon with millions of competitively priced products you can order online with next day delivery in the United States. Amazon will ship anywhere in the world.

Real estate is another example where the Internet renders the traditional mode obsolete. In days gone by, realtors spent innumerable hours defining buyer needs, finding and showing homes, and guiding the process through funding, purchase and closing. The Internet provides user friendly tools that enable the buyer to do these things faster, at lower cost, and without assistance. Since people cannot physically visit the home, walk-through videos expedite comparison and selection.

Academic adoption of the internet has been slow, primarily because of the capital outlay required for computers, labs, servers, networks, software, courseware and technical support. The Open University demonstrated how distance learning with multimedia could achieve excellent results at a distance with large student populations. Academic courses and programs from open universities and distance learning programs are now globally available from numerous universities. The Internet penetrates the remotest places on earth, opening up informal and formal learning opportunities in almost every language. Distance learning, with its learning management systems, has replicated almost every aspect of admission, registration, sign-up for courses, curriculum design and development, production of materials for teaching and learning, evaluation, record keeping, and graduation. The quality of these programs is determined by the level of learner support including access to instructors and tutors, learning assistance from information and communication technologies. Instead of live tutorials, students can learn difficult to navigate subject matter from interactive multimedia.

As schools, colleges and universities add distance learning programs, there are benefits for both the institution and the learner. The institution can extend its programs without the need to construct and maintain additional classrooms. Students benefit because they can take courses anytime and anywhere they can get access to the Internet. (Some learning resources can be downloaded and used offline.) The Internet is itself a treasure house of information for research. The institution can add courses using adjunct faculty – persons with current experience in the areas taught; and it can extend its curriculum by adding courses from collaborating institutions. Savings in personnel and administrative cost are offset by technology expenses to develop and maintain courses and supporting services on the Internet. Overall, more students have access to a greater variety of courses and program options.

An unexpected value of distance learning is that the technologies and materials developed for remote learning can also be used to enhance on-campus teaching and learning.

Return to Table of Contents

Editor's Note: This study enhances our understanding of developing trust between prospective e-mentees and e-mentors in e-mentoring relationships and maintenance of trust throughout these relationships

Triggering Trust in e-Mentoring

Eman Walabe and Joanne D. Leck
Canada

Abstract

The role of trust in traditional face-to-face mentoring has been investigated in several research studies; however, to our knowledge, very few studies have examined how trust is established in electronic-mentoring relationships. The purpose of this study is to examine how e-mentees perceive a prospective e-mentor's trustworthiness and how these perceptions influence the decision to be mentored by a particular e-mentor. The survey employed the Behavioural Trust Inventory (Gillespie, 2003) and the Factors of Perceived Trustworthiness (Mayer et al., 1995) to assess 253 prospective e-mentees' perceptions of a prospective e-mentor's level of trustworthiness. Quantitative analysis revealed an adequate fit with the e-mentoring model after accounting for some correlated error terms. Tthe Mayer et al. (1995) model appears to be a suitable device for the measurement of trust in e-mentoring relationships at the initiation phase.

Keywords: Mentoring, electronic mentoring, trust, ability, integrity, benevolence, Behavioural Trust Inventory

Introduction

For many years, mentoring has been recognized as a valuable tool for passing on knowledge and wisdom from an experienced senior individual, called a mentor, to another less experienced individual, called a mentee (Scandura & Pellegrini, 2007). Currently, mentoring in the workplace does not only take the form of traditional face-to-face mentoring relationships, but also takes the form of long-distance associations known as electronic-mentoring (e-mentoring) relationships. E-mentoring is becoming increasingly popular for numerous reasons, including the geographical flexibility and safe context it provides for building relationships between people from different regions and cultural backgrounds (Bierema, & Merriam, 2002; Bierema & Hill, 2005).

Previous research has demonstrated that for mentoring to be effective, mentees must trust their mentors (Akili, 2013; Bouquillon, Sosik & Lee, 2005; Chun, Litzky, Sosik, Bechtold & Godshalk, 2010; Hezlett & Gibson, 2007; Kram, 1985; Leck & Robitaille, 2011; Leck & Orser, 2013; Palmer & Schoorman, 2011). Potential mentees looking to engage in traditional face-to-face mentoring relationships have a plethora of information about prospective mentors to inform them of mentor trustworthiness and assist them in their mentor selection; this, however, is not the case in the initiation stages of e-mentoring, where information about prospective e-mentors is often limited. Despite the increasing prevalence of e-mentoring, little is known about the process by which e-mentoring relationships are initiated, and the role that factors related to trustworthiness play in this process.

The Mayer, Davis and Schoorman (1995) model of trust provides a popular framework describing how trust is formed between individuals. Though the Mayer et al. (1995) model highlights the factors of trustworthiness that are likely important in e-mentoring relationships (ability, integrity, and benevolence), the applicability of the model to these relationships has not yet been examined: it is unknown whether the information contained in the online profiles of prospective e-mentors conveys a sense of trust and whether it has an impact on their selection as an e-mentor. As the first partial test of the Mayer et al. (1995) model in an e-mentoring environment, the purpose of the current study is to examine how e-mentees evaluate prospective e-mentors' trustworthiness and how these perceptions influence the decision to initiate an e-mentoring relationship.

E-mentoring

Ensher and Murphy (2007) define e-mentoring as "a mutually beneficial relationship between a mentor and a protégé, which provides new learning opportunities as well as career and emotional support, primarily through e-mail and other electronic means (e.g., instant messaging, chat rooms, social networking spaces, etc.)" (p. 300). Similarly, Bierema & Merriam (2002) define e-mentoring "as a computer-mediated, mutually beneficial relationship between a mentor and a protégé which provides learning, advising, encouraging, promoting, and modeling, that is often boundaryless, egalitarian, and qualitatively different than traditional face-to-face mentoring" (p. 214). E-mentoring can occur between peers, between individuals, or in a group environment where one e-mentor works with a group of e-mentees (Bierema & Merriam, 2002). It can be a supplement to traditional face-to-face mentoring or stand alone (Goldman, 1997; Haggard et al., 2011; Janasz. & Godshalk, 2013; Petidou, 2009).

The first step of an e-mentoring relationship consists in establishing communication via the internet (Bierema & Merriam, 2002). E-mentors and e-mentees familiarize themselves with various internet resources including search engines, chat groups, and social networking sites. E-mentees typically seek e-mentors who have the expertise and qualifications they desire; virtual strategies to identify such e-mentors include contacting the potential e-mentor by email, joining or submitting postings on an existing list server, tapping into existing professional associations, or conducting a search on the World Wide Web for resources and contacts. Some e-mentoring programs have formal facilitators, who assist in introducing the e-mentors and e-mentees and provide ice-breaking techniques as a means to better acquaint both parties.

Both traditional and electronic forms of mentoring have particular benefits and challenges. Traditional mentoring has been identified as one of the most valuable practices to help employees navigate the workplace and advance their career in business, industry, and education (Hopkins & Grigoriu, 2005). Throughout the last few decades, organizations have recognized the benefits of mentoring and incorporated mentoring programs into their developmental training plans (Daloz, 1999; Douglas, 1997; Hopkins & Grigoriu, 2005).

Unlike traditional mentoring, however, e-mentoring provides access to a greater number of mentors, offers greater flexibility in establishing and sustaining relationships, and reduces demographic and personal obstacles (e.g. discrimination) which are evident in traditional mentoring (An & Lipscomb, 2010; Bierema & Hill , 2005; Ensher & Murphy, 2007; Haggard et al., 2011; Hamilton & Scandura, 2003; Headlam-Wells, 2004; Headlam-Wells et al., 2005; Headlam-Wells et al., 2006; Homitz & Berge, 2008; Petriduo, 2009). Bierema & Merriam (2002) have broadly categorized the benefits of e-mentoring to be its ‘boundaryless structure’ (i.e. the independence of e-mentoring relationships from participants’ places of residences, allowing time, geographical, and cultural boundaries to be crossed) and the ‘egalitarian nature of the interaction’ (i.e. the virtual medium’s propensity to conceal cultural differences, providing a safe context for building relationships between people from different cultures).

Other advantages of e-mentoring include the multiple resources available to participants on the internet that facilitate the development of e-mentoring relationships, such as websites, chat programs, social networking sites, and computer conferences (Bierema & Merriam, 2002; Bierema & Hill, 2005; Hamilton & Scandura, 2003). E-mentoring programs support both formal and informal mentoring for individuals of all ages and fields of work and for cases where face-to-face mentoring is inapplicable (Bierema & Merriam, 2002). Accessibility to e-mentoring programs is greatly increased, as they require only internet access and an email account; e-mentoring requires a minimal amount of investment in time and resources, while maximizing the exchange of large amounts of information between e-mentors and e-mentees (Bierema & Merriam, 2002). Furthermore, e-mentoring provides more flexibility than face-to-face mentoring,

as emails can be exchanged at any time, subject to each party's availability (Bierema & Hill, 2005; Headlam-Wells et al.,2005; Headlam-Wells, 2004; Headlam-Wells et al., 2006; Homitz & Berge, 2008; Quintana & Zambrano, 2014).

E-mentoring is not without its challenges, however. It has unique drawbacks, applying particularly to the use of technology, which may influence the mentoring relationship (Ensher & Murphy, 2007). For one, e-mentoring raises the probability of misunderstandings occurring, as both e-mentors and e-mentees rely on largely faceless and asynchronous communication (i.e. sending emails to each other at any time; Ensher & Murphy, 2007). Furthermore, e-mentoring relationships typically take longer to develop than face-to-face mentoring relationships (Ensher & Murphy, 2007). Other challenges include differences in written communication style and technical skills of both e-mentors and e-mentees; internet connectivity problems; discomfort with the technologies used; and digital divide issues (Ensher & Murphy, 2007). Bierema and Merriam (2002) suggest that the main challenges of e-mentoring stem from seeking the right e-mentor, developing a relationship with the e-mentor, and establishing trust and confidence. Little information, however, is available about the establishment of trust in e-mentoring relationships (Buche, 2008).

Trust

Trust is defined as "the willingness of a party to be vulnerable to the action of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control the other party" (Mayer et al., 1995, p.712). Trust is considered an essential element of all social interactions between individuals, as it allows the parties to shape their expectations towards each other (Gefen, 2002).

Several research studies have shed light on the importance of trust in mentoring relationships (Akili, 2013; Bouquillon et al., 2005; Buche, 2008; Chun et al., 2010; Elliott, Leck, Orser & Mossop, 2007; Hezlett & Gibson, 2007; Kram, 1985; Leck & Orser, in press; Leck & Robitaille, 2011; Leck & Orser, 2013; Palmer & Schoorman, 2011). According to Burke's (1984) research, trustworthiness is one of the most important characteristics that a well-reputed mentor should possess; in addition, Bouquillon et al. (2005) found that mentees need to trust their mentors to improve the quality and effectiveness of the mentoring relationship.

Promoting familiarity and trust is also considered an essential factor of e-mentoring success (Bierema & Merriam, 2002; Elliott, Leck, Orser & Mossop, 2007; Leck & Orser, 2013; Risquez, & Sanchez-Garcia, 2012). Still, only one study was found that examined the role of trust specifically in e-mentoring relationships. Buche's (2008) study, in an exploration of the barriers to trust in e-mentoring relationships, proposed a model focusing on the impact of trust in e-mentoring relationships. Although Buche's (2008) work sheds some light on how trust is formed, it focuses more on the form of communication itself than the reaction of one individual to another. For this reason, we turn to Mayer et al. (1995)'s popular framework that outlines how trust is formed between individuals.

The Mayer et al. (1995) model of trust

The theory of trust proposed by Mayer et al. (1995) involves two specific groups: a trusting party called the trustor, and the party to be trusted called the trustee. Mayer et al. (1995) argue that trust is affected by various factors, such as the trustor's propensity to trust and their perception of the trustworthiness of the trustee (see Figure 1). Mayer et al.'s research indicates that there are three characteristics that predict a trustor's perception of trust in a trustee: ability (i.e., the group of skills, competencies, and characteristics that enable a party to have influence within a specific domain), benevolence (i.e., the extent to which a trustee is believed to want to do good to/for the trustor, aside from an egocentric profit motive), and integrity (i.e., the trustor's perception that the

trustee adheres to a set of principles that the trustor finds acceptable). Figure 1. A model of trust (Mayer et al., 1995)

The model is well aligned with mentoring relationships, as its emphasis is on the actions and behavioural characteristics of the person who is the recipient of trust (Colquitt, Scott & LePine, 2007; Palmer & Schoorman, 2011). As such, Mayer et al.'s (1995) model has been applied to better understand trust in mentoring relationships; however, it has not been applied to the e-mentoring context, in which information about prospective e-mentors is greatly diminished. Whether ability, benevolence, and integrity are important attributes when selecting an e-mentor from an online profile and whether these predict trustworthiness and desire to be e-mentored is unknown.

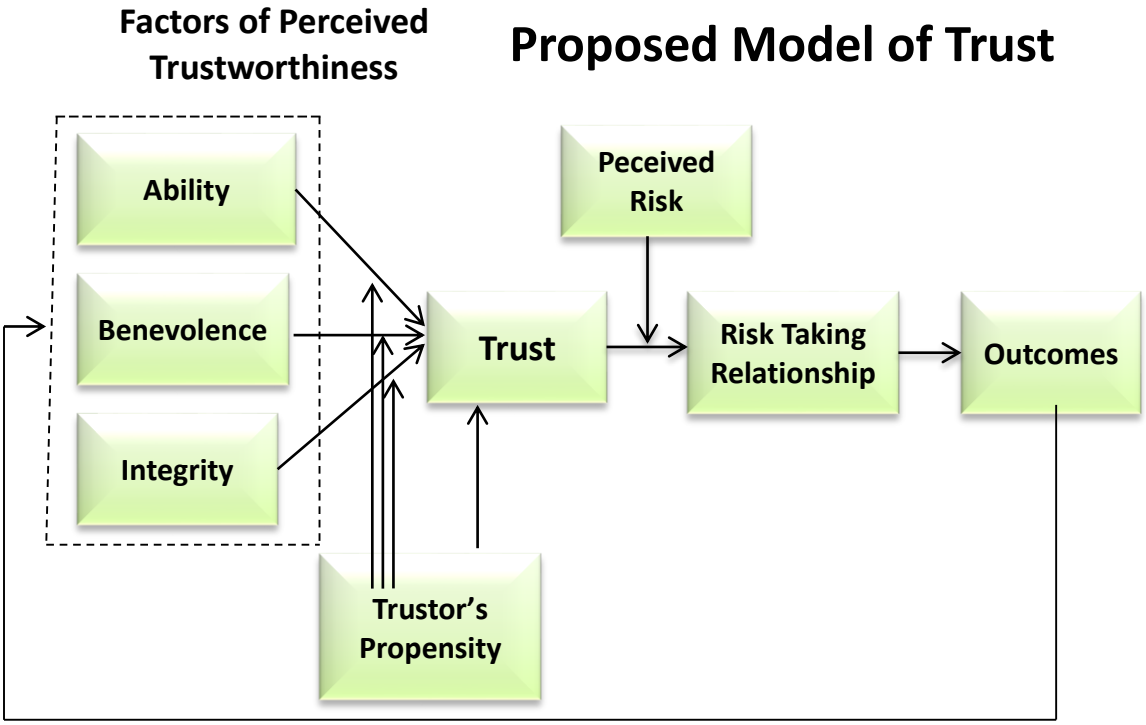

Figure 1. A model of trust (Mayer et al., 1995)

Research Method

Sample

A total of 705 undergraduate and graduate students enrolled in courses offered by the University of Ottawa's Telfer School of Management were asked to participate in the current study. In all, 256 students agreed to participate in the study, representing a response rate of 36%. Of those 256, three students failed to respond to any of the items included in the survey. Hence, the final sample was composed of 253 students ranging from 16 to 47 years of age with a mean age of 20.2 (s.d.=3.7). Of these, 145 (57.3%) were men and 96 (37.9%) were women. The number of completed years of university experience ranged from 0 to 12 with a mean of 1.2 (s.d.=1.5), and a slight majority of respondents were enrolled in an undergraduate commerce program (129; 51.0%). Most respondents (218; 86.2%) indicated that they were not currently being mentored and ninety-seven (97; 8.3%) indicated that they intended to seek a mentor.

Procedure

Potential respondents were invited via short presentations in their classes. Those interested were first asked to read and sign a consent form approved by the Ethics Committee of the University of Ottawa to indicate their wish to participate. Participants were instructed to keep a copy of the consent form for their records, and then asked to review an e-mentor's profile. To simulate the behaviours of e-mentees as realistically as possible, a profile of an e-mentor was selected from the site http://www.horsesmouth.co.uk/index.publisha, a free and popular social network for informal e-mentoring.

The e-mentor profile was selected because the e-mentor had business experience, provided a description of life experiences, and recommended external sources of information providing career advice. The prospective e-mentor was a male in his mid-30s who worked as an HR manager for a large media organization in the field of employee branding. The profile included a brief description of the prospective e-mentor's struggle with anxiety issues, his time management experience with two children, and his hope to help others advance their careers through e-mentoring. The prospective e-mentor also provided short sketches of several external resources, recommending them for career development in business.

After reviewing this profile, subjects were asked to assess the prospective e-mentor's trustworthiness using the Behavioral Trust Inventory (Gillespie, 2003) as well as the e-mentor's perceived ability, benevolence, and integrity using an established measure (Mayer et al., 1995). Next, subjects were asked whether or not they trusted the e-mentor and to indicate whether or not they would ask this individual to be their e-mentor. Finally, demographic information about the respondents, including age, sex, program of study and years of university experience, was gathered.

Measures

Factors of Perceived Trustworthiness. Validated scales measuring mentor trustworthiness (Leck & Robitaille, 2011), based on Mayer et al.'s (1995) research, were modified slightly to measure ability, benevolence, and integrity (see Table 1). For instance, because the mentoring relationship had not yet been initiated, instead of "My mentor is well-qualified," the statement was reworded as "This mentor is well-qualified." Each of the three attributes was measured by 6 items on a 7-point scale ranging from 1-"strongly disagree" to 7-"strongly agree".

Behavioral Trust Inventory (BTI; Gillespie, 2003). The ten items of the BTI are designed to measure the level of a subject's willingness to be vulnerable (an indication of trust). Leck and Robitaille (2011) found that the BTI is an effective tool for measuring willingness to trust in mentoring relationships; it has been applied in the current study to measure the potential e-mentees' willingness to trust their e-mentor. Potential e-mentees were asked to respond to each item on a 7-point scale ranging from 1-"strongly disagree" to 7-"strongly agree". Items 1 to 5 are classified as the "reliance" factor and items 6 to 10 are classified as the "disclosure" factor. Reliance measures a potential e-mentee's willingness to rely on an e-mentor's ability, skills, knowledge, and judgment, and disclosure measures an e-mentee's readiness to share personal information with an e-mentor. See Table 2 for all items included in the Behavioral Trust Inventory.

Table 1
Unstandardized estimates - Factors of perceived trustworthiness measure

Variables	Est.	SE	P value
This mentor is very capable of performing his/her job (Ability 1)	1.00[a]	--	--
This mentor is known to be very successful at the things he/she tries to do (Ability 2)	1.07	.09	<.001
This mentor has much knowledge about the work that needs to be done (Ability 3)	1.16	.09	<.001
I am very confident in this mentor's skills (Ability 4)	1.22	.10	<.001
This mentor has specialized capabilities that could increase my performance (Ability 5)	1.17	.10	<.001
This mentor is well qualified (Ability 6)	1.14	.10	<.001
This mentor has a strong sense of justice (Integrity 1)	1.28	.17	<.001
I never have to wonder whether or not this mentor would stick to his/her word (Integrity 2)	1.46	.20	<.001
This mentor would try hard to be fair in his/her dealings with others (Integrity 3)	1.14	.15	<.001
This mentor's actions and behaviours would not be very consistent (Integrity 4 reversed)	-0.02	.14	.91
I like this mentor's values (Integrity 5)	1.00[a]	--	--
Sound principles seem to guide this mentor's behaviour (Integrity 6)	0.77	.10	<.001
This mentor would be very concerned about my welfare (Benevolence 1)	0.83	.09	<.001
This mentor would not knowingly do anything to hurt me (Benevolence 2)	0.99	.10	<.001
This mentor would really look out for what is important to me (Benevolence 3)	1.06	.09	<.001
This mentor would go out of his way to help me (Benevolence 4)	0.97	.09	<.001
My needs and desires would be very important to this mentor (Benevolence 5)	1.00[a]	--	--

Note. [a]Fixed parameter. SE=Standard errors. Est.=Unstandardized estimates.

Table 2
Unstandardized estimates - Behavioural Trust Inventory measure

Variables	Est.	SE	P value
I would rely on this mentor's work-related judgments (Reliance1)	0.52	.09	<.001
I would rely on this mentor's task-related skills and abilities (Reliance2)	0.75	.11	<.001
I would depend on this mentor to handle an important issue on my behalf (Reliance3)	1.43	.17	<.001
I would rely on this mentor to represent my work accurately to others (Reliance4)	1.45	.17	<.001
I would depend on this mentor to back me up in difficult situations (Reliance5)	1.00[a]	--	--
I would share my personal feelings with this mentor (Disclosure1)	1.00[a]	--	--
I would confide in this mentor about personal issues that are affecting my work (Disclosure2)	1.11	.08	<.001
I would discuss with this mentor how I feel about my work, even negative feelings and frustrations (Disclosure3)	0.74	.07	<.001
I would discuss with this mentor work related problems that could potentially be used to disadvantage me (Disclosure4)	0.67	.08	<.001
I would share my personal beliefs with this mentor (Disclosure5)	0.69	.08	<.001

Note. [a]Fixed parameter. SE=Standard errors. Est.=Unstandardized estimate.

Data analysis

Internal Consistency. Before analyzing the path model, the internal consistency of ability, benevolence, and integrity from the Factors of Perceived Trustworthiness measure and reliance and disclosure from the BTI were examined using Cronbach's alpha.

Confirmatory Factor Analysis. A confirmatory factor analysis (CFA) to assess the factor structure of the BTI and the Factors of Perceived Trustworthiness was conducted in order to ensure they were adequate to use with the current sample. More specifically, a three factor model of Factors of Perceived Trustworthiness and a two factor model of willingness to be vulnerable (trust) in e-mentoring relationships were tested.

Model Testing. The model was tested using structural equation modeling (SEM) with the Amos 16.0 program. This approach allows us to test the relationship of ability, benevolence, and integrity to willingness to trust, and the relationship of trust to the decision to be e-mentored by prospective e-mentors, simultaneously. In addition, this approach allows for the inclusion of latent variables, which are unobserved variables (e.g. trust) made up of observed variables (e.g. indicators such as 'I would rely on my mentor's work-related judgments'). However, including latent variables rendered the model underidentified, so only observed variables were modeled. Three exogenous variables (independent variables; no prior causal variable) were included in the model: ability, benevolence, and integrity. Willingness to trust and decision to be e-mentored by prospective e-mentors were included as endogenous variables (dependent variables).

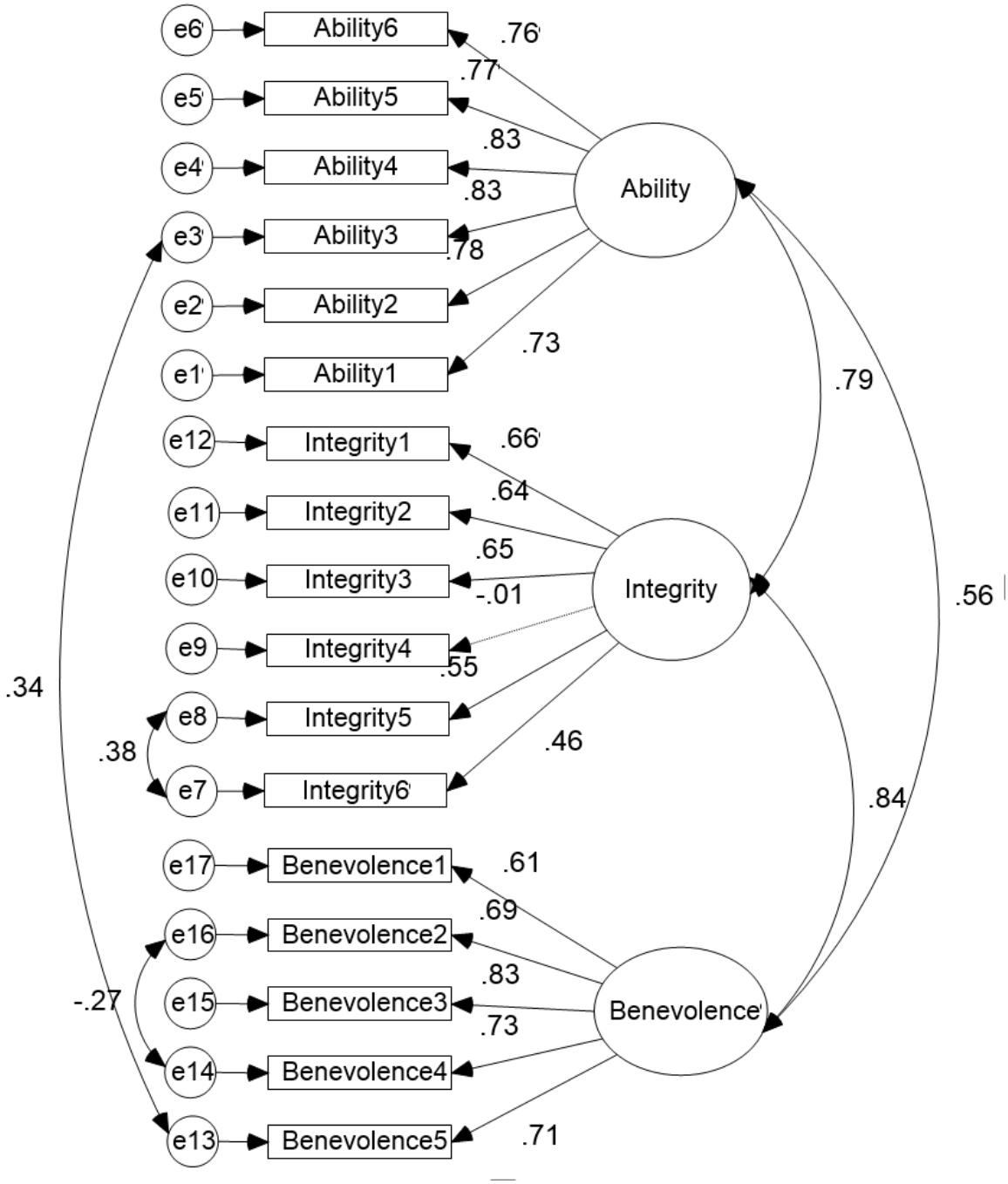

Figure 2. Three factor model of the Factors of Trustworthiness Measure

Note. Dashed lines represent nonsignificant regression paths. Squares represent observed variables. Circles represent latent variables. Single headed arrows represent regression paths. Double headed arrows represent covariances.

Structural equation modeling also allows us to examine the fit of the model using the χ^2 likelihood ratio with the degrees of freedom and p-values, the Comparative Fit Index (CFI), and the Root Mean Square Error of Approximation (RMSEA) with the matching confidence intervals. CFI values greater than 0.95 are indicative of an acceptable fit (Hu & Bentler, 1999) and RMSEA values that are less than 0.05 represents a good fit, while values up to 0.08 represent a reasonable fit (Byrne & Campbell, 1999; Hu & Bentler, 1999).

Cases with missing values on all items were deleted. Cases with some missing values were not deleted from the sample: rather, full information maximum likelihood, which is recommended over other conventional missing data techniques, was used. The availability of full information maximum likelihood (FIML) missing data analysis is another advantage of using SEM over other data analysis approaches. However, in order to analyze data with missing values, means and intercepts must be estimates, and when means and intercepts are estimates, modification indices are not available. Modification indices are very useful when testing structural equation models, as they provide information that can help improve the fit of the model. Therefore, the models were estimated with missing values deleted first in order to examine the modification indices and then again using FIML data analysis.

Results

Factor structure and internal consistency: factors of perceived trustworthiness

The hypothesized confirmatory factor analysis of the Factors of Perceived Trustworthiness measure suggested that the fit of the model could be improved. Modification indices (MI) indicated that covariances between the error terms for integrity items 5 and 6 (MI = 28.15, standardized expected parameter change = 0.29), benevolence item 5 and ability item 3 (MI = 15.80, standardized expected parameter change = 0.20), and benevolence items 2 and 4 (MI = 7.64, standardized expected parameter change = -0.18), would increase the fit of the model. The final three factor model, with three correlated error terms, represented an adequate fit to the data (see Table 3). See Figure 2 for an illustration of the factor model with standardized estimates). See Table 1 for all unstandardized factor loadings, standard errors, and p-values. Cronbach's alphas were 0.90, 0.62, and 0.83 for ability, integrity, and benevolence, respectively.

Researchers suggest that, in CFA, factor loadings of less than 0.50 on respective latent variables should not be considered to be a meaningful contribution to that latent construct and thus should be removed (Kline, 2005). As shown in the three factor model, all six items making up the latent construct ability had loadings ranging from 0.73 to 0.83. For integrity, the loading for items 4 and item 6 had loading of -0.01 and 0.46, respectively. These loadings indicate that item 6 has close to meaningful contribution to integrity, but item 4 does not. For benevolence, the five items had loading in the range of 0.61 to 0.83.

Table 3
Goodness of fit statistics

Model	Df	χ2	P	CFI	IFI	RMSEA	90% Confidence Interval	
							Lower	Upper
Factors of Perceived Trustworthiness								
Hypothesized Model	116	277.28	<.001	.92	.92	.074	.063	.086
Final Model	113	212.66	<.001	.95	.95	.059	.047	.07
Behavioural Trust Inventory								
Hypothesized Model	34	169.47	<.001	.86	.86	.13	.11	.15
Final Model	32	76.26	<.001	.95	.96	.074	.053	.096
Path Model								
Final Model	8	55.18	<.001	.92	.92	.15	.12	.19

Note. CFI = comparative index fit; IFI = Incremental Index of Fit; RMSEA = root mean square error approximation.

Factor structure and internal consistency: behavioural trust inventory

The hypothesized confirmatory factor analysis of the Behavioural Trust Inventory suggested a poor fit to the data. Modification indices (MI) indicated that covariances between the error terms for items 1 and 2 (MI = 49.00, standardized expected parameter change = 0.40) and items 8 and 9 (MI = 39.41, standardized expected parameter change = 0.61), would increase the fit of the model. The final two factor model, with two correlated error terms, represented an adequate fit to the data (see Table 3). See Figure 3 for an illustration of the factor model with standardized estimates). See Table 2 for unstandardized factor loadings, standard errors, and p-values. Cronbach's alphas were 0.62, and 0.83 for reliance and disclosure, respectively.

All five items of the latent variable disclosure had loading ranging between 0.52 and 0.88. However, for reliance, the loading of item 1 was 0.43.

Model test

A path model with three observed exogenous variables (ability, integrity, and benevolence), four observed endogenous variables, and four unobserved exogenous variables (error terms) was tested. Covariances between ability, integrity, and benevolence, and between the error terms of reliance and disclosure were included.

According to the model, ability was significantly related to both reliance and disclosure. Higher ability was associated with both higher reliance and higher disclosure. Higher benevolence was associated with higher disclosure, but benevolence was not related to reliance, and integrity was significantly related to neither reliance nor disclosure. Reliance and disclosure were positively associated with trust, such that individuals who perceived the e-mentor as high on reliance and disclosure were also more likely to report trusting the e-mentor. Finally, individuals who trusted the e-mentor were also more likely to report wanting to be e-mentored by the e-mentor (see Figure 4 for an illustration of the model with standardized estimates). See Table 4 for unstandardized estimates, standard errors and p-values and Table 3 for fit estimates.

Table 4
Unstandardized estimates for the initial trust path model

Regression paths	Estimate	SE	P value
Integrity→ Disclosure	0.095	0.11	0.41
Benevolence→ Disclosure	0.36	0.10	<0.001
Ability→ Disclosure	0.22	0.07	0.002
Ability→ Reliance	0.36	0.05	<0.001
Benevolence→ Reliance	0.084	0.07	0.23
Integrity→ Reliance	0.089	0.08	0.29
Reliance→ Trust	0.025	0.006	<0.001
Discloser→ Trust	0.019	0.005	<0.001
Trust→ Mentor	0.630	0.06	<0.001

Discussion

The objective of this research was to apply Mayer et al.'s (1995) model to examine how e-mentees evaluate prospective e-mentor's trustworthiness and how these perceptions influence the

decision to be e-mentored by potential e-mentors. Before testing the model, the internal consistency and factorial structure of the measures was examined in order to make sure these were appropriate to use with a sample of university students in the context of e-mentoring.

The CFA of the Factors of Perceived Trustworthiness suggested an adequate fit of the three factor model in an e-mentoring environment: the Cronbach's alpha was high for ability and benevolence but slightly below the .70 cut-off for integrity. Still, correlated error terms were added between three pairs of items, suggesting some overlap between the items. A closer examination of the wording of the items indicated a high possibility that those items convey the same idea. The covariances between integrity item 5 and item 6, between benevolence item 2 and item 4, and between benevolence item 5 and ability item 3 suggest strong similarity between these items. Even though there were covariances between items from different constructs (ability and benevolence), a closer look at the two items indicates that both are related to the mentor's level of awareness and knowledge. Integrity item 4 ('This mentor's actions and behaviours would not be very consistent) was not significantly related to its respective integrity factor; however, being the only item on the Factors of Perceived Trustworthiness measure that was reversed, it is highly probable that some respondents failed to notice this reversal, potentially explaining the item's failure to load on its factor. Future research should reverse the wording of the item in order for all the items to be worded in a positive format (e.g. this mentor's actions and behaviours would be very consistent).

Similarly to the Factors of Perceived Trustworthiness model, the factor analysis for the Behavioural Trust Inventory suggested an adequate fit to the data after accounting for correlated error terms: the Cronbach's alpha was high for disclosure, but slightly below the 0.70 cut-off for reliance. The covariance between item 1 and 2 is consistent with Leck and Robitaille's (2011) finding, which suggests that these two items are very similar and might be redundant. Both items 8 and 9 measure negative feelings and work-related problems about the e-mentor, also suggesting redundancy. Correlated error terms between items 8 and 9 were not added in Leck and Robitaille's (2011) study, which is likely due to the different sample used in the current study. Further research could explore whether removing the redundant items would be warranted. However, deleting items based solely on the current findings would not be recommended, given that our results may be sample specific.

The final path model demonstrates how Mayer et al.'s (1995) framework can be applied to explain initial trust in e-mentoring relationships: the current study suggests that only ability and benevolence, not integrity, are related to the e-mentee's willingness to be vulnerable in e-mentoring relationships. Still, Mayer et al. (1995), Mayer and Davis (1999) and Gefen (2002) report that, depending on the particular empirical context to which the model is applied, only some of the three attributes enhance a trustor's willingness to be vulnerable in relationships. For example, Gafen (2002) applied Mayer et al.'s (1995) model to predict consumer trust towards online vendors, finding that consumers were affected by their perception of the vendor's integrity and benevolence, but not by their perception of the vendor's ability. It is possible that integrity may not be as important to include in e-mentoring profiles; however, future qualitative research may provide more insight into integrity's role in fostering trust within the e-mentoring context.

Ability was positively related with both reliance and disclosure, suggesting that e-mentees who perceive the e-mentor as competent are also more likely to rely on the e-mentor's ability, skills, knowledge and judgment, and will be more likely to share personal information with the e-mentor. Benevolence, on the other hand, was related only to disclosure, suggesting that e-mentees who perceive the e-mentor as benevolent are also more willing to share personal information with the e-mentor. These results highlight how including information about the e-mentor's ability and benevolence in his/her profile plays an essential role in triggering the e-mentees' willingness to trust the prospective e-mentor in the initiation stage of mentoring relationships. As such,

emphasizing characteristics indicative of a potential e-mentor's ability and benevolence will aid designers of e-mentoring programs in producing e-mentor's profiles more effective in triggering the e-mentees' trust.

The results also demonstrate that the e-mentees' willingness to rely on the e-mentor's abilities, skills, and knowledge (measured by the reliance factor) and their readiness to share personal information with the e-mentor (measured by the disclosure factor) are highly related to their decision to trust that e-mentor. That is, e-mentees who indicated being willing to rely on the e-mentor's abilities and being willing to share their personal information with the e-mentor were also more likely to report trusting the e-mentor.

Previous research has also demonstrated the centrality of developing familiarity and trust to the success of mentoring relationships (Bierema & Merriam, 2002; Elliott, Leck, Orser & Mossop, 2007; Leck & Orser, in press). One way to foster familiarity between mentors and mentees is for mentors to share their personal life stories and experiences with their mentees; the profile used in the current study included information about the e-mentor's life and experience, likely significantly enhancing e-mentees' perception of his trustworthiness (Bierema & Merriam, 2002). This suggests that the designers of e-mentoring programs should also highlight the e-mentor's experience and personal stories when designing his/her profile.

Lastly, e-mentees who report trusting the e-mentor are also more likely to indicate wanting to be e-mentored by that person. This finding aligns with Buche's (2008) work which found that e-mentees who report trusting the e-mentor and wanting to be e-mentored by the e-mentor are also more likely to contact the e-mentor with an expression of interest to be e-mentored by him/her; they were also more likely to report having a satisfying e-mentoring relationship. Trust seems to be a motivating factor behind the initiation of e-mentoring relationships, as well as a factor contributing to the success of e-mentoring relationships.

Study limitations

The current application of the Mayer et al. (1995) model to the initiation phase of e-mentoring has several limitations that should be noted. Firstly, while the Mayer et al. (1995) model focuses on building mutual trust between two individuals in order to develop a successful relationship, the current research focuses solely on how subjects evaluate the e-mentor's trustworthiness. Secondly, this study recruited students and not professionals as potential e-mentees; recruiting professional e-mentees might have resulted in different conclusions. In addition, latent variables are excluded from this study, as their inclusion renders the model underidentified.

Claims of causation should not be made with the current model: it is cross-sectional, making it impossible to know the directionality of the variables. For example, although the model suggests that the ability, integrity, and benevolence predict trustworthiness, it is also possible that reliance and disclosure in fact predict ability, integrity, and benevolence.

The study's final limitation is its use of a paper version, and not the online version, of the e-mentor's profile. An earlier attempt to gather data in this way proved unsuccessful due to problems with Wi-Fi and access to computers. Therefore, in order to improve the response rate and sample size, a paper version was selected. Future research should examine how prospective e-mentees choose and evaluate their e-mentors in an online context.

Recommendations for future research

The topics hereunder are recommendations for future research with a view to enhancing understanding of the development of trust between prospective e-mentees and e-mentors in e-mentoring relationships. As this research did not consider how the e-mentor learns to trust his or her online e-mentees, future research should consider how e-mentors and e-mentees develop

mutual trust in an e-mentoring environment. A longitudinal design is also recommended in future research to examine all the factors in the model of Mayer et al. (1995), including perceived risk and how risk taking influences the outcomes of relationships throughout Kram (1983)'s phases of mentoring (initiation, cultivation, separation, redefinition).

In order to ascertain more detailed and nuanced information surrounding the factors influencing trust within an e-mentoring context, qualitative studies such as interviews and focus groups are also recommended. The role of gender in e-mentoring relationships, as compared to its role in face-to-face mentoring, also represents a compelling object of future study.

Conclusion

This study is amongst the first to measure trust in e-mentoring when relationships are being initiated between e-mentors and e-mentees: hopefully these findings will assist the designers of e-mentoring programs in creating e-mentors' profiles that instill a sense of trust in e-mentees. Further research, however, is undoubtedly needed to examine how e-mentors' profiles can be designed in order to maximize potential e-mentees' perceptions of the e-mentors' trustworthiness based solely on reading their online profiles.

The current study suggests that Mayer et al.'s (1995) model can be applied to e-mentoring relationships; however, only part of the model was tested, highlighting the need for further research in this area. Furthermore, the current study is limited to shedding light on the factors most likely to be associated with e-mentors' trustworthiness when relationships are first formed between e-mentors and e-mentees. Enhancing our understanding of the development of trust between prospective e-mentees and e-mentors in e-mentoring relationships, as well as of the maintenance and role of trust throughout these relationships, will require multiple approaches in future research.

References

Akili, W. (2013). On mentoring relationships: How to become a good mentor. 2013 IEEE Frontiers in Education Conference (FIE), 710-716.

An, S., & Lipscomb, R. (2010). Instant Mentoring: Sharing Wisdom and Getting Advice Online with E-mentoring. *Journal of American Dietetic Association, 110* (8), 1148-1155.

Bierema, L., & Hill, J. (2005). Virtual Mentoring and HRD. *Advances Developing Human Recourses, 7* (4), 556- 568.

Bierema, L., & Merriam, S. (2002). E-mentoring: Using Computer Mediated Commutation to Enhance the Mentoring Process. *Innovative Higher Education,* 26 (8)*,* 211-226.

Bouquillon, E., Sosik, J., & Lee, D. (2005). It's only a Phase': examining trust, identification and mentoring functions received a cross the mentoring phases. *Mentoring and Tutoring, 13* (2), 239-258.

Buche, M. (2008). Development of Trust in Electronic Mentoring Relationships. *Int. J. Networking and Virtual Organizations, 5* (1), 35- 50.

Burke, R. J. (1984). Mentors in organizations. *Group & Organization Studies, 9* (3), 353-372.

Byrne, B. M. & Campbell, T. L. (1999). Cross-cultural comparisons and the presumption of equivalent measurement and theoretical structure: A look beneath the surface. *Journal of Cross-Cultural Psychology, 30* (5), 555-574.

Chun, J., Litzky, B., Sosik, J., Bechtold, D., & Godshalk, V. (2010). Emotional Intelligence and Trust in Formal Mentoring Programs. *Group & Organization Management, 35* (4), 421- 455.

Colquitt, J., Scott, B., & LePine, J. (2007). Trust, Trustworthiness, and Trust Propensity: A meta-analytic test of their unique relationships with risk taking and job performance. *Journal of Applied Psychology, 92* (4), 909-927.

Daloz, L. A. (1999). *Mentor: Guiding the Journey of Adult Learners.* San Francisco: Jossey-Bass.

Douglas, C. A. (1997). *Formal Mentoring Programs in Organizations. An annotated bibliography.* Greensboro, NC: Center for Creative Leadership.

Elliott, C., Leck, J.D., Orser, B., & Mossop, C. (2007). An exploration of gender and trust in mentoring relationships. *Journal of Diversity Management, 1*(1), 1-11.

Ensher, E. A., & Murphy, S. E. (2007). E-mentoring: Next-generation research strategies and suggestions. In B. R. Ragins & K. E. Kram (Eds.), *The handbook of mentoring at work: Theory*, *research, and practice*: 299-322. Thousand Oaks, CA: Sage.

Frontiers in Education Conference (FIE), 710-716.

Gefen, D. (2002). Reflections on the Dimensions of Trust and Trustworthiness among Online Consumers. *ACM SIGMIS Databases,* 33 (3), 38-58.

Gillespie, N. (2003). Measuring trust in working relationships: the behavioural trust inventory. Paper presented at the Academy of Management Meeting, Seattle, August 2003.

Goldman, M. (1997). Perspectives on Telementoring and Mentor Center. *National School Network Telementoring and Mentor Center.* Retrieved June26, 2011, from http://alpha.musenet.org:81/telementor_wrkshp/goldman.html

Haggard, D., Dougherty, T., Turban, D., & Wilbanks, J. (2011). Who is a Mentor? A review of evolving definitions and implications for research. *Journal of Management,* 37 (1)*,* 280-304.

Hamilton, B., & Scandura, T. (2003). E-mentoring: Implications for organizational learning and development in a wired world. *Organization Dynamics*, 31(4), 388-402.

Headlam- Wells, J. (2004). E-mentoring for Aspiring Women Managers. *Women in Management Review 19* (4), 212- 218.

Headlam-Wells, J., Gosland, J., & Craig, J. (2005). "There's magic in the web": e-mentoring for women's career development. *Career Development International,* 10 (6-7)*,* 444-459.

Headlam-Wells, J., Gosland, J., & Craig, J. (2006). Beyond the Organization: the design and management of e-mentoring systems. *International Journal of Information Management,* 26 (1), 372-385.

Hezlett, S., & Gibson, S. (2007). Linking Mentoring and Social Capital: Implications for Career and Organization Development. *Advances in Developing Human Resource,* 9 (3), 384- 412.

Hopkins, R., & Grigoriu, E. (2005). Mentoring Community College Faculty and Staff: Balancing Contradictions of Informal Program Components and Formal Program Structure. *Community College Review,* 32 (4)*,* 40- 56.

Hu, L. & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Structural Equation Modeling, 6* (1), 1-55.

Janasz,S. & Godshalk, V. (2013). The Role of E-Mentoring in Protégés' Learning and Satisfaction. *Group & Organization Management, 38* (6), 743–774.

Kline, R. B. (2005). *Principles and Practice of Structural Equation Modeling.* The Guilford Press, NY.

Kram, K. (1983). Phases of the Mentor Relationship. *Academy of Management Journal,* 26 (4)*,* 608-625.

Kram, K. (1985). *Mentoring at work: Developmental relationship in organizational life*. Glenview, IL: Scott Foresman.

Leck, J. & Orser, B. (2013). Fostering Trust in Mentoring Relationships: An Exploratory Study. *Equality, Diversity and Inclusion: An International Journal, 32* (4), 410-425.

Leck, J.D., & Orser, B. (in press). Fostering Trust in Mentoring Relationships: An Exploratory Study, *Equality, diversity and inclusion: An international journal.*

Leck, J.D., & Robitaille, A. (2011). Psychometric properties of the Behavioral Trust Inventory for measuring trust in mentoring relationships. *The journal of American Academy of Business, 17* (1), 119-124.

Leck, J.D., & Wood, P. (in press). Forming Trust in E-mentoring: A Research Agenda, *American Journal of Industrial and Business Management.*

Mayer, R., & Davis, J. (1999). The effect of the Performance Appraisal System on Trust for Management: a field quasi-experiment. *Journal of Applied Psychology, 84* (1), 123-136.

Mayer, R., Davis, J., & Schoorman, F. (1995). An Integrative Model of Organizational Trust. *Academy of Management Review,* 20 (3), 709- 734.

Palmer, M., & Schoorman, F. (2011). Trust as a moderator of the Relationship between Mentoring and Knowledge Transfer. *Journal of Leadership & Organizational Studies, 18* (3), 334- 343.

Quintana, M. & Zambrano, E. (2014). E-mentoring: The effects on pedagogical training of rural teachers with complex geographical accesses. *Computers in Human Behavior, 30* (1), 629-636.

Risquez, A. & Sanchez-Garcia, M. (2012). The jury is still out: Psychoemotional support in peer e-mentoring for transition to university. *The Internet and Higher Education, 15* (3), 213-221.

Scandura, T. A., & Pellegrini, E. K. (2007). Workplace mentoring: Theoretical approaches and methodological issues. In T. D. Allen & L. T. Eby (Eds.), *Handbook of mentoring: A multiple perspective approach.* Malden, MA: Blackwell.

Wood, P., & Leck, J. (2008). Dysfunctional Mentoring. The International Journal of Diversity in Organizations, Communities and Nations, 8 (4), 19- 2.

About the authors

Eman Walabe is a PhD student in the University of Ottawa's E-business program, Canada. Her research interests are mainly focus on e-learning in educational and business contexts. Email: ewala103@uottawa.ca

Dr. Joanne D. Leck is a full professor at the University of Ottawa's Telfer School of Management. Her research interests include employment equity, managing diversity and e-mentoring. Email: leck@telfer.uottawa.ca

Return to Table of Contents

Editor's Note: Many years ago I visited Apple Computer in Cupertino, California where employees worked hard to earn the "sweatshirt of the week". These colorful shirts were desired by all and worn with pride. This paper explores badges as symbols of success within an academic learning environment.

"Badge"-ring students to learn technology integration

Jason Paul Siko
USA

Abstract

Achievement badges can be used as an external motivator for students. In this paper, the author details how achievement badges were used to not only motivate students but also to organize content in a pre-service technology integration course. Students earned badges by completing assignments in alternative ways, usually consisting of submitting assignments where the content for the assignment was displayed with a Web 2.0 tool. The badges were an optional part of the course, yet over three-fourths of the students earned at least one badge. Students earned an average of two badges each. While there were inter- and intra-class competitions with respect to the badges, many students indicated that competition was not a motivating factor.

Keywords: badges, gamification, online learning, teacher education, Web 2.0, motivation, educational technology, technology integration.

Introduction

It is difficult to engage future educators in a pre-service technology integration course that embraces a student-centered approach to technology integration (Palak & Walls, 2009). Educational technology courses must find a balance between teaching the "tools of the trade" and the issues, trends, and theories in the field. With respect to tools, we must give our students practical knowledge they can apply during their pre-service practicums and beyond. If we ignore this, students will be ill prepared and unaware of what technologies exist for use in their classroom. Unfortunately, instructors must also combat the ever-changing landscape of tools available, as services disappear and new "apps" appear on an almost daily basis. Beyond the hardware and software, we must show our students how to use these technologies in a purposeful manner incorporating the latest in learning and media theory. In addition, we must address the issues of the digital divide, cultural awareness, and educational technology policy. These ideas could make up individual courses; yet, educational technology instructors are often given the task of covering all of them in a single three-credit course.

In this paper, I detail one attempt to find a balance between teaching theory and practice in a pre-service technology integration course using gamification strategies. For this course, I created a system where students were awarded badges for submitting assignments using a variety of Web 2.0 tools. I review the literature concerning achievement badges, describe the details of how the course was set up, participation of the students, and the student perceptions about the badge system.

Background

The concept of achievement badges is nothing new. Anyone familiar with the Boy Scouts of America can attest to the process of earning and displaying badges to show progression through the ranks of that system (Deterding, Antin, Lawley, & Paharia, 2012). At the other extreme, we have the potential in the future for badges to represent an alternative pathway to college (Goligoski, 2012). A public badge system requires the creation and validation of the criteria for badges, a method for verifying achievement, and a venue for public display. Currently, there is a dearth of research into the use of achievement badges in the classroom (Abramovich, Schunn, &

Higashi, 2013). Regarding motivation, extrinsic rewards can have a negative effect on intrinsic motivation (Deci, Koestner, & Ryan, 1999). Further, too much assessment can lead to a mastery of the "system" rather than the intended mastery of the technique or process (Abramovich et al., 2013).

However, studies have shown that context plays a key role in the benefits of external motivators. Deterding and his colleagues (2012) noted that for this type of reward to be successful, there must already be at least some intrinsic value already, and that adding game-like elements (i.e., "gamifying") to learning should provide students with meaningful choices as they proceed through a difficult course. Kumar (2012) found that college students were receptive to gamification as a part of the educational experience. By examining survey responses from over 200 computer science students, Kumar found that students acknowledged the problems with the current pedagogies in programming and were interested in newer pedagogies for learning, including games. Given the relationship between computer science and games (i.e., the field is responsible for video games), adding game elements to a programming course, where much of the introductory material is taught through textbook tutorials and practice, the context appeared to be a good match for gamification.

With respect to pre-service educators, Khaddage, Baker, and Knezek (2012) noted that a badge system would benefit teachers in multiple ways. First, and most important, earning badges would hopefully foster the transfer to teachers' classroom practices. Second, the authors stated that teachers often feel underappreciated, and that a badge system would help to promote acknowledgement of their hard work and professional development. In terms of context (i.e., intrinsic value), Hare, and Howard, and Pope (2002) found that pre-service teachers felt more confident about their ability to use technology when they were exposed to various technologies and saw those technologies modeled by their instructor. The authors observed statistically significant differences in pre-course and post-course survey results using an instrument measuring confidence in technology.

Thus, a system where pre-service educators earn badges based on technologies they are encouraged to use in the field has intrinsic value, would provide ways to attain technical competency with the technologies, and would increase their confidence in using these tools in their student teaching and beyond.

Methods

Since the issue being discussed is one of finding ways to fit both theoretical and practical content into a technology integration course, this study examined the following questions:

> How much student participation would occur in an optional "badge" competition that would require extra work on the part of the student?
>
> What are the students' perceptions of providing incentives to encourage students to submit assignments using alternative methods?

To answer the first research question, statistics regarding the number of students earning badges, and the aggregate number of badges earned were collected. For the second research question, students completed an anonymous survey at the end of the semester containing Likert-style questions as well as open-response questions regarding their perceptions of the badge system.

Setting

The course, titled, "Technology in Education," is currently offered as a three-credit course. It is a required course for all students in the teacher preparation program at a large, public, mid-western

liberal arts university. The course is only offered in a hybrid-online format, where the course has two face-to-face meetings, one at the beginning of the semester and one at the end of the semester. The rest of the course content and communication is provided online. The university uses Blackboard for their learning management system, and the students utilize Google Apps for email and document sharing.

The course covered a variety of topics in educational technology, such as cultural issues, the digital divide, media integration, assessment and evaluation with technology, and online learning. The major course assessment is a technology-based lesson plan that follows the ASSURE model (Smaldino, Lowther, & Russell, 2012). In addition to the lesson plan, there were several online discussion assignments as well as reflection papers on each of the topics in the course.

The study focused on three sections of the course. Each section contained 16-17 students in the teacher certification program (overall N=50). The course is generally taken concurrently with their teacher assisting (i.e., a practicum before their student teaching experience). Due to the order of the teacher education curriculum, students in the course are generally taking 14-17 credit hours during this semester, with a handful of students exceeding that amount in order to graduate with their peers. The students in the course were not segregated by major or level; thus, the students in the course were working on either their elementary or secondary certification in any content area. The only category of student absent from the course was special education majors, who are placed in a separate section for scheduling reasons.

Procedure

During the first face-to-face session, the badge concept was introduced along with the typical procedural discussions that take place at the first class (i.e., syllabus review, expectations, etc.). It was stressed to the students that the badge system was meant to encourage them to try various Web 2.0 tools, while not pressuring the students to do so. It was made clear that the badges were not part of their overall grade, and that there would be inter- and intra-class competitions.

The reflection paper assignments were the opportunities where students could earn badges. For these assignments, students were given a choice. The students could submit the assignment in a traditional manner (i.e., they could submit a paper, usually one or two pages in length, and upload the document to Blackboard), or they could attempt to earn one of several badges by submitting the assignment in an alternative manner. Badges could be earned by utilizing some Web 2.0 tool, such as a wiki, online presentation, or a blog.

In order to access the requirements for earning badges, students had to score a passing grade on a quiz that covered basic content on Web 2.0. This quiz was administered through Blackboard, and once the students passed the quiz, folders containing information about the badges were "unlocked" using Blackboard's adaptive release function. Each folder contained information about the tool, examples of how to use it in the K-12 classroom, and a document with specifications for what was required to earn the badge. These specifications were mostly technical in nature. For example, to earn the blogging badge, students had to create the blog, spread the content of their assignment over multiple blog entries, include hyperlinks, and embed images or video into the postings. Further, they needed to include an additional paragraph about how they could use blogs in their future classroom. The content of the posts had to include the material for the actual assignment. For example, one of the assignments required the students to conduct a learner analysis based on previous classroom experiences in preparation for their final project. Thus, a student could create a blog with separate postings on fixed learner characteristics, entry competencies, and stages of cognitive development, in addition to a post on how they saw themselves using blogs in their future classroom.

When students submitted assignments, content was examined separately from the badges. Thus, after reviewing the actual content of the assignment and posting a grade, the instructor would

check to see if the student had met the specifications for the badge. Because it was not part of the course grade, a "leaderboard" was posted in Blackboard (i.e., a link to a Google spreadsheet) showing who had earned which badges after every unit. Through class email updates, the instructor would post statistics for all three sections (e.g., how many had completed the quiz, how many different badges were earned, number of badges per student for each class) followed by my ranking of the three sections. There were a total of five assignments for which student could earn badges. There were seven possible badges: blog, wiki, animated movie (e.g., Xtranormal), interactive PowerPoint (i.e., a slideshow utilizing action buttons), online presentation (e.g., SlideShare, Prezi, VoiceThread), online poster (e.g., Glogster), and a WebQuest. The wiki badge was the only badge where working in a group of three or more was required, as part of the specifications included interaction using the chat or discussion feature in the wiki for communicating.

At the end of the term, students who earned at least one badge were given a certificate acknowledging their accomplishments, which could be used in a teacher's portfolio during potential interviews. The student with the most badges in each section was given a small prize (n.b., the instructor spent no money on these prizes; they were items deemed useful to a new teacher but were no longer useful to the instructor). A small party was held for the section with the highest participation (i.e., the section that earned the most badges per capita).

Results

At the end of the term, 76% of the students had earned at least one badge, and the overall average was around two badges per student. Ten percent of the students earned the maximum number of badges possible. These results are summarized in Table 1, showing how participation evolved over the course of the semester. It became clear that there was a steep leveling off of participation toward the end of the semester.

Table 1

Indicators of participation with badges over the course of the semester

	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
Percentage of Students Completing Quiz	86	92	96	98	100
Number of Different Badges Earned at Least Once	5	6	7	7	7
Total Badges Earned	26	49	76	90	97
Badges/Student	0.52	0.98	1.52	1.80	1.94
Percentage of Students with at Least One Badge	52	62	70	76	76
Failed Badge Attempts (cumulative)	0	1	2	3	3

Table 2 shows the breakdown of students with respect to the number of badges earned. The only outlier with respect to which badges students chose was the wiki badge, and this was the only badge that needed to be completed as a group.

Table 2
Breakdown of students with respect to number of badges earned

Number of Badges	Number of Students
0	12
1	10
2	11
3	9
4	3
5	5
Total	**50**

These data represent all three sections combined. Participation was not consistent between the three sections. One section averaged 1.3 badges/student, another averaged 1.8 badges/student, and the final section averaged 2.7 badges/student. It should be noted that while not a focus of this study, the class averages were roughly equal (i.e., within two percent of each other).

In addition to the completion rates, additional data were collected in the form of an anonymous survey completed by students at the end of the course. This survey was in addition to the traditional end-of-course evaluations. For students completing at least one badge, the overwhelming majority felt that the requirements were not difficult (i.e., on a rating scale of very easy to very difficult, only 8% rated them as difficult, with no one rating them as very difficult). Table 3 summarizes the results of three Likert-style questions from the survey. While the students seemed to like the possibility of different options (including not participating in the badge attainment at all), many were not motivated by the competitive aspect of the badges. Further, many were opposed to the idea of making the use the tools for the reflective assignments mandatory.

Table 3
Student Responses to Likert-style Survey Questions (N=47)

Question	Strongly Agree [5]	Agree [4]	Neutral [3]	Disagree [2]	Strongly Disagree [1]	M	SD
Overall, I thought the concept of badges for Web 2.0 tools was a good way to allow for variety and individual choice in exploring different classroom tools.	15 (32%)	25 (53%)	5 (11%)	2 (4%)	0	4.13	0.77
The public display of badge achievement (i.e., showing who has earned badges and how many) motivated me.	5 (11%)	7 (15%)	16 (34%)	13 (28%)	6 (13%)	2.83	1.17
I wish the badges were not optional and part of my course grade.	3 (6%)	11 (23%)	10 (21%)	13 (28%)	10 (21%)	2.66	1.24

The above data were supported with comments provided in the open-ended portion of the survey, where most of the feedback was positive. While many expressed some initial confusion at the

concept, many enjoyed the process. Those who completed multiple badges stated that it was difficult but very rewarding.

> I didn't understand them and couldn't see what the incentive was for doing them. However, I completed them, because I know nothing about technology or how to integrate it into the classroom and it is the BIG thing employers are asking about and looking for. Going through them was difficult and time consuming BUT extremely beneficial to my learning. The tools I developed for the badges are things that I will use for my classroom and have been implementing in all of my lesson plans since learning about them. THANK YOU!!!!

> Initially, I thought it was a joke. I had a hard time taking it seriously. It turned out to be pretty neat though.

> When I first heard of badges I was excited to see the different things on the web, but was not excited about the "work load' that would come with them. After completing the badges, I really enjoyed them and found them to be the best part of this class. There were many online resources I was unaware of that I used in my placement because of the badges.

> Neat idea, I liked that they were optional to the traditional paper response. Definitely keep them.

> I thought it was cool that we were given options to explore these tools without being required to so we didn't have to do them if we didn't feel comfortable.

Comments were mixed regarding the competitive aspect of the badges, in line with the results from the Likert-style questions. While no one disliked it, some students were motivated by it, while the rest were ambivalent. Students also had mixed opinions about whether the additional work should simply be required.

> I was excited due to the competition and to be exposed to the new technologies.

> I thought that they were a good idea, but I didn't think there were enough of an incentive to complete them.

> I thought the badges were a really cool addition to the course. I would not made them part of the course grade unless something was cut from the course. Or maybe just require that at least 1 or 2 are completed to give some flavor for those programs.

> I really liked the idea of badges, but I feel that a lot more students would use them if they were required. They took a lot more time and we really don't have the time in this semester.

> I initially did not like this concept and thought that most students would not participate because it was optional. I think part of this also comes from the fact that many students our age consider themselves technology savvy and do not think they need assistance using online tools. I found some of the information in the couple I did do to be interesting and definitely something I will use in the future even though I did not think I would learn anything from it. I also found myself wishing to use a wiki for another project and discovered I had no idea what to do so the badge information was very helpful even though I didn't use it for this class because of the need for group interaction.

Of those who did not earn any badges, some simply said they did not have the time because of the course load and other commitments. Due to the structure of the teacher preparation program, the semester that students take this course is often the semester where many of them take either 14 or 17 credit hours, which includes fieldwork in preparation for their student teaching.

> To be honest, I never completed a badge. I just wasn't motivated to do them as extra course work. If I had a lighter schedule, I probably would have attempted to do them. Maybe extra credit points or some other incentive would encourage others to complete them.
>
> I feel bad saying this but honestly I did not do them because they were not required. I did not have time to spend on completing something that was not required. I had two preps and taught everyday of the semester starting week two. On top of that I had a full load of classes and therefore did not have time. I think if you required one or two it would have been good for me to do. I think it would help to have them replace some of the readings or discussions. At the same time it is my own fault for not participating in the blogs therefore it is on me and not you.
>
> I really liked the idea when I first heard about the badges. However, once the semester started picking up I really lost interest in the badges. I only ended up doing 2 of them and did not feel motivated to do any more when there was a time crunch.

Finally, several students stated their disapproval over the fact that the class was delivered in an online format. Some stated that this fact prevented them from wanting to participate, especially with the wiki badge that required students to work in a group.

> Within reference to group badges, I would not suggest having them only because this is an online class. Therefore finding time to meet or to communicate among various other projects/group projects for something that is not worth a grade most students will ignore.
>
> It was difficult to do group badges since students complete assignments at different times during the week.
>
> This class would have been better everyone all together now in a computer classroom. It would have been cool. We would have learned a lot.
>
> The badges would have been great if we had a face-to-face class. It would be cool to be in a computer lab doing education technology together. Students wouldn't put it off too much.

It should also be noted that in the official student evaluations, there are many comments regarding the format of the course. For students in the teacher preparation program, this course is often their first course offered in a primarily online format, so discomfort with online learning has been an ongoing issue.

Conclusion

This study examined the use of badges to encourage exploration of Web 2.0 tools in a pre-service technology integration course. Overall, student participation in the badge system was high, with over three-quarters of the students participating and an average of two badges per student. Student perceptions were generally positive regarding the opportunity to earn badges, yet the public display of the badges and the competitive aspect did not seem to be a motivating factor. For those not participating, time constraints and class load (i.e., factors not related to the course itself) seemed to play a large role in non-participation.

More research needs to be conducted on the transfer of these skills to practice. As Kay (2006) noted, many studies on pre-service education courses are rife with methodological limitations and a heavy reliance on anecdotal evidence. This study is no different, but it is an important first step in developing a more rigorous examination of the use of badges in technology integration courses. Additional research is currently being conducted on analyzing the statements made by students in their reflections on how they could use a particular tool in their future classrooms to

see whether students are understanding the full range of use of Web 2.0 tools for collaborative purposes and learner-centered activities, or if they are simply planning on using them as a substitute for more traditional instructional techniques (e.g., a blog for teacher announcements, using Prezi instead of PowerPoint for lectures, etc.).

References

Abramovich, S., Schunn, C., & Higashi, R.M. (2013). Are badges useful in education? It depends upon the type of badge and expertise of learner. *Educational Technology Research and Development, 61*(2), 217-232.

Deci, E.L., Koestner, R., & Ryan, R.M. (1999). A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin, 125*(6), 627-668.

Deterding, S., Antin, J., Lawley, E., & Paharia, R. (2012). Gamification: designing for motivation. *Interactions, 19*(4), 14-17.

Goligoski, E. (2012). Motivating the Learner: Mozilla's Open Badges Program. *Access to Knowledge: A Course Journal, 4*(1). Retrieved from http://ojs.stanford.edu/ojs/index.php/a2k/article/viewFile/381/207

Kay, R.H. (2006). Evaluating strategies used to incorporate technology into preservice education: A review of the literature. *Journal of Research on Technology in Education, 38*(4), 383.

Khaddage, F., Baker, R., & Knezek, G. (2012). *If Not Now! When? A Mobile Badge Reward System for K-12 Teachers*. Paper presented at the Society for Information Technology & Teacher Education International Conference 2012, Austin, Texas, USA. Retrieved from http://www.editlib.org/p/40029

Kumar, B, & Khurana, P. (2012). Gamification in education: Learn computer programming with fun. *International Journal of Computers and Distributed Systems, 2*(1), 46-53.

Palak, D., & Walls, R.T. (2009). Teachers' beliefs and technology practices: A mixed-methods approach. *Journal of Research on Technology in Education, 41*(4), 417-441.

Pope, M., Hare, D., & Howard, E. (2002). Technology integration: Closing the gap between what preservice teachers are taught to do and what they can do. *Journal of Technology and Teacher Education, 10*(2), 191-203.

Smaldino, S.E., Lowther, D.L., & Russell, J.D. (2012). *Instructional technology and media for learning.* (10th ed.). Upper Saddle River, NJ: Prentice Hall.

About the author

Jason Siko, Ph.D. is Assistant Professor of Educational Technology at Grand Valley State University in Grand Rapids, MI. His research interests include pre-service teacher preparation, K-12 online learning, and game design as an instructional strategy. Prior to this appointment, he taught secondary biology and chemistry for 10 years.

sikojp@gmail.com

Return to Table of Contents

Editor's Note: We pay lip service to adapting curriculum for individual differences. The same may be true for educational methods, especially where group activities and sociological factors are involved. This case history highlights several areas for improvement.

Failure to Collaborate? A Reflective Narrative Inquiry

Nirupama Akella
USA

Abstract

Written in the format of a critical reflective inquiry, this case study presents Suman's story of a failure of an online collaborative learning team (CLT). The critical reflective inquiry allows subjectivity enabling various interpretations as to the failure. Suman's story occurs in Walt University, in the College of Education, which is a hub of educational technology. Suman finds herself involved in an online CLT as part of her course requirements. Her narrative of what happened, how and when it happened takes the reader on a journey of close reflection and introspection. Suman is confronted with a wall of non-responsiveness, and the online CLT tapers down to a cooperative vertical division of labor group effort. Suman wonders why this happened. The narrative follows a structured path allowing the reader to make connections, and come to logical conclusions. The case, based on journal and email excerpts, provides the evidentiary basis and gives a factual flavor to the narrative. A short but comprehensive literature review allows a critical analysis and discussion followed by possible discussion questions.

Keywords: collaborative learning, online team, academic performance, deep learning, class discussion, learning and teaching pedagogy, schema.

The case: organizational background

Located in the South-East region of USA, Walt University is a popular internationally-acclaimed university. Walt University had grown in size and function starting as a regional four-year undergraduate traditional college to a contemporary technologically advanced higher educational institution. It now offered bachelor, master, doctoral, vocational certificate, traditional, and non-traditional academic degrees in more 25 academic fields of study, which all spheres of social, natural, medical, and health sciences. The University also has vocational diploma courses including special interest certificate programs in foreign languages, extracurricular activities, and vocational occupations. In the early 1970s, the University began to channel all growth and advancement efforts into the nascent field of educational technology. It established the online learning cell to develop e-learning systems in the teaching and administrative fields. It aggressively recruited faculty well-versed in online learning systems. Its vast resources were channeled into educating and training faculty, graduate assistants, and administrative staff in online learning mechanisms and processes. This investment duly paid off, and in early 2000s the University was hailed as the pioneer of e-learning in higher education. In 2001, the University solidified its base and widened its academic reach and potential with online learning programs, LMS technologies, virtual learning environments, distance learning technologies, and blended teaching and learning solutions. Enrollment numbers doubled and then tripled on the national and international stage as the University began to achieve great strides in engineering effective online teaching and learning pedagogies.

In 2010, Walt University adopted a new resolution of e-learning officially opening its new e-learning center known as the 'Innovation in Learning Center (ILC). It was the function and responsibility of the center to concentrate all e-learning efforts of faculty together under one roof. The center, led by veteran Instructional Design professor Dr. Jack Dunstan, loaned its facilities and staff to nearby corporate and educational institutions. In the spring of 2010, Dr. Dunstan was

declared the Director of the ILC. Under his able guidance, the University conducted many faculty and student workshops, seminars and conferences on e-learning tools, LMS systems, blended learning methods, e-learning theories, and online collaborative teaching and learning activities. Along with his administrative duties, Dr. Dustan also had a teaching load. He taught two core Instructional Design courses, often trying out new e-learning methods in the course. A successful implementation of the e-learning method leading to sound academic performance gave him the ammunition to initiate a University-wide implementation. In the summer of 2011, Dr. Dunstan was designing the Instructional Design course of Cognitive Strategies, a core course in the Instructional Design foundation track. The course was designed to be intensive requiring a lot of hard work, coordinated team effort, active class participation, and online collaborative learning.

The case: setting the stage

Suman Rao walked down the corridor of the Education Department towards the graduate computer lab to check her emails. It was a bright sunny Tuesday afternoon on 22nd June 2011, but Suman was not in the least bit feeling happy and relaxed. Far from it, she was bothered, tensed, and angry. But above all, she was thoroughly fed up of her online collaborative group for her Instructional Design class. She had no idea how to get through to them – she did not feel a part of the online collaborative group. She entered the computer lab and seated herself; she logged in and checked her messages on the electronic messaging system specially designed for online collaborative teamwork. She frowned and bit her lip – there were no messages – what was going on? This was not how a collaborative team functioned-- she shook her head.

The class

In the summer semester of 2011, Suman enrolled for the 3-hour core graduate course in Instructional Design called *Cognitive Strategies*. This course was a completely online class offered every summer. This summer, the online course was scheduled to meet every Wednesday. It had 20 students, all belonging to the Education track of Curriculum and Instruction. *Cognitive Strategies* aimed to provide the basic foundation of the theories of information processing, metacognition, and lead into the various types and importance of cognitive strategies used by learners. The course provided opportunities for individual and group problem solving, collaboration, critical and creative thinking. The highlights of the course were short individual research assignments and a collaborative project at the end of the semester. The course did not have any examinations. Assessments were to be done on the basis of participation, weekly quizzes, individual assignments, and the final collaborative team project.

The course began with an introductory week of social exchanges, whereby Suman got to know her 20 other classmates and professor. Each student was encouraged to keep a journal and/or a record of personal observations, opinions, and drafts of assignments to aid active learning, transfer of knowledge, and reduce cognitive load. Suman thought it to be an excellent idea and started an online journal from the first day of class.

Course outline

Week/ Class	Topic	Assignments
Week 1 – Class 1	Information Processing Theory Metacognition	Upload VITA in Document Sharing under VITA folder ASAP (vita should have photo) 1. Webquest on Working Memory 2. Research Paper on Metacognition - Importance/role, link to Working Memory 3. Discussion Participation Due next week-- upload into DropBox last day of week 1
Week 2-- Class 2	Cognitive Strategies-An Introduction Organizational Cognitive Strategy	1. Chapter Summaries 2. Research Paper on Implications of Cognitive Strategies 3.Webquest on organizational Cognitive strategy use in classroom (5 examples) Due next week- upload to Dropbox last day of Week 2
Week 3-- Class 3	Frames	1. *Research paper on bridging cognitive strategies (20-25 pages, APA referencing)- due in week 5 2. PowerPoint presentation using Camtasia on Frames-- 10 slides 3. Discussion Participation Due next week- upload to DropBox last day of week 3 (*research paper not included)
Week 4—Class 4	Concept Maps	1. Draw concept maps for process, relationship, location, time- use Inspiration 2. Work on research paper 3. Develop instruction on a history topic of your choice for 3rd graders-- use concept maps as the instructional cognitive strategy – write a report and also have it in a table with appropriate headings Due next week- upload to DropBox last day of week 4
Week 5-- Class 5	Advance Organizers	1. Chapter Summaries 2. Annotated Bibliography on Educational Taxonomies and Advance Organizers 3. Develop 5 advance organizers for a graduate class of public speaking 4. Submit research paper *5. Start work on collaborative final project with your team Due next week-upload to Dropbox last day of week 5
Week 6-- Class 6	Metaphors & Imagery	1. Research paper on Imagery-- give 2 examples of negative and positive imagery 2. PowerPoint presentation on metaphors 3. Discussion Participation 4.*Work on Online Collaborative Activity with your teams Due next week- upload to DropBox last day of week 6
Week 7- - Class 7	Mnemonics	1. Webquest on types of Mnemonics 2. Discussion Participation 3. *Work on final collaborative project Due next week-- upload to Dropbox last day of week 7
Week 8-- Class 8	VLE & Cooperative/ Collaborative Learning	1. End of Class assessment paper 2. Online Discussion 3. Final Project Due end of week 8/final day of class

Excerpts from Suman's journal

> "Met everyone online... have a feeling this class is going to be great... lots of support and room for creativity in all assignments. Of course, it is hard work and very fast with an assignment due each week but everything is so exciting... there are all these online tools which help us to meet online since we all work and cannot meet in person...

We have individual assignments on metacognition, VLE, frames, concept maps, mnemonics. For the final, we work in collaborative teams... Dr.Dunstan will assign us... each team will research a topic, develop a presentation, and give a performance demonstration... it sounds fun!"

The semester began with a lecture about the information processing theory and model. This was followed by a discussion.

> "It (the discussion) made me think about what I understood, and was saying... everyone had views and it was a great debate...discussion...Dr. Dunstan was answering all our queries...we all have been given passwords to access the online collaborative tools... I like GroupTweet and Edmodo best... they allow you to keep in touch with everyone and the professor so that he knows what's going on all the time. There is Whiteboard, Review Basics which allows you read and edit stuff written by other people...."

But, despite an upbeat attitude Suman did not feel completely at ease.

> "I don't know why I am doing these webquests...taking part in discussions... there are all these tools but why am I using them? I dont know... maybe he (Dr.Dunstan) knows..... I can send emails... I don't really need these things.... just complicates everything"

June passed with individual assignments, and the mandatory weekly short quizzes.

The task:

In July first week, the class was informed of the project for the final on GroupTweet.

Journal Excerpts--

> "I have my team... donkeys... that is a funny name but the other teams also have funny names. Dr. Dunstan has a weird sense of humor, or maybe the names mean something... donkeys, goats, rhinos, monkeys! Well... Dr. Dunstan has posted five topics on Whiteboard and each team has to sign up for one by next week I think... I like creativity topic... I think we can do something fun and innovative with it"

The project topics assigned were, Teams-Games-Tournaments, Creativity in Teaching and Learning, Metacognition and Technology, and Avatars in 3D VLE. Each team had to choose a topic within a week i.e. by 10th July and the details of their project by 12th July. The final project was due by 25th July.

Project criteria:

The final project for 150 points has to be a collaborative team effort. The report will have two well-defined parts of the written report and the actual project/ model or presentation. The specific criteria for each section are listed below:

a) Written Report should be 20-25 pages in length, double-spaced in APA with correct spelling, punctuation, and grammar. It should have a cover page with project title, date, name of online CLT, roles/ contributions of online CLT members. It should have:

    1) A literature review section

b) -a methodology section

1) A performance demonstration section explaining name, type, importance/ purpose of project. What is the project going to be on and what artifact is your team presenting – describe whether it is a model, a simulation, a graphic interface, a video-audio presentation,

b) The Artifact: This is the second part of the project and should be submitted with the written report. The artifact should visibly illustrate/show the importance of your research. The artifact should be dynamic in nature with a performance aspect. EXAMPLE, if developing a model, it should be functional and demonstrate your grasp of the subject/ if developing a presentation, the presentation should have elements of video, audio, and interaction.

The team:

Suman's team, "Donkeys" had two male members and three female. Both male members were White Caucasian with one female Afro-American and one white female learner. Suman was the sole Asian female member of the team. The male Caucasian members tended to communicate with each more, even in a team communication environment. Similarly the female Caucasian and Afro-American team members were more conversant and informal with each other. Team members were supposed to regularly communicate with each other to develop symmetry of purpose, and knowledge. The electronic collaborative messaging system of oovoo was inputted to enable team members to engage in private chats with each other. Suman spent the first few hours after team assignment, chatting with team members. In the beginning, things seemed just fine, though it did seem to Suman that her team members were very brief in their exchanges with her. But, things started to fall apart after a week.

Journal excerpts

> "My team has chosen Teams-Games-Tournaments... nothing wrong with it... though I would have liked a discussion about it before choosing anything... but strange, despite my messages on oovoo and the email tool on course website, no one wanted to talk... and who made Ron the leader.... I didnt"

Then again:

> "this is too much... I am going to ask Dr. Dustan to step in...even I am a team member and I should have a say... its like I am a..... sleeping partner.... those four are doing everything..."

Email excerpts *(sent by Suman on oovoo to her team members)--*

> *"*Hi,
>
> What is happening? Maybe we should meet. How about this weekend?"

Then,

> "Hello,
>
> Haven't heard from any of you in a week now and the deadline is fast approaching. How are we planning this project – let's meet this Friday evening at McDonalds near the dept. and talk about it OK? Please shoot me a reply..."

And then two days later, Suman received a very brief email message which left her in no doubt about her role in the team

> "You have been assigned to do the lit. Review for T-G-T-- what is it, its importance, contribution... type it and email it back to me, Ron"

The case: the end of a failure

"Donkeys" team was collapsing as an online collaborative team. And he had just smiled and pointed the finger at her. Suman shook her head, close to frustrating tears. What could she do? No one was answering her emails, but work had to be done and whatever the situation, she would not fail her team as they had failed her. For the next week, Suman researched, read, wrote, rewrote, and finally put together a comprehensive literature review. She posted it on WhiteBoard, and also emailed it to Ron, who was the "leader" of the team.

She kept checking the WhiteBoard to see if any of her teammates had responded, and were editing her review. But after a period of three days of waiting, the review was erased. And Suman finally gave up. She received an A grade for the team research project. The semester was over, and Suman Rao sought an appointment with Dr. Dunstan. During the meeting, she told him how the online CLT team had functioned during the semester.

Journal excerpt

> "I told him (Dr. Dunstan) everything and he said he was sorry... he said that maybe I was to blame... maybe I had not taken the initiative enough...maybe in the future online CLT members should belong to same culture... see I was the only Asian in this team and only my team had had problems... other teams had all Americans and they had had no problems... maybe just having the technology isn't enough... making sure that it is being used properly by everyone should also be seen..."

Case description

Using a qualitative research design of narrative reflective inquiry, the author puts forth her personal experience and interactions within an online CLT. Narrative inquiry focuses on human experience and holism contending that personal stories have to be considered broadly in relation to other perspectives to gain meaningful insights (Connelly & Clandinin, 1990: 2). Based on Dewey's three-dimensional criteria of narrative reflective enquiry, comprising of experience, interaction, and continuity, the author tells her story as a team member of an online CLT (Downey & Clandinin, 2010: 387). What really happened and why? The author provides a description of the class, the task, and the online CLT supplemented with autobiographical journal and email excerpts. Narrative inquiry is a factual story based on empirical data (Connelly & Clandinin, 1990). Narrative enquiry has an "aesthetic quality" which blends with the insightful and continuity element of the factual story to give it credence (Spence, 1982: 31).

The author begins her story by describing the scene and the time, elements which are critical to the narrative inquiry format. She provides evidence of collaborative negotiation, possible causality through her comments, journaling and email excerpts. Each element in the narrative can be construed as a "narrative segment" which when taken together provides meanings, and a lesson to listeners/ readers (Jackson, 1987: 2). The author provides details about Walt University, the course, the assignment [space element] and the time of the incident. Her journal and email excerpts give the much-needed empirical flavor laced with elements of continuity and interaction. Here the concept of "topsy-turvy hermeneutic principle" comes in (Crites, 1986:168). Suman Rao is detailing a series of related experiences which only make sense when looked at in retrospect. Narrative inquiry as a research method gathers seemingly irrelevant data which only has value as a whole; when looked at from backward (Crites, 1986). Further, narrative reflective inquiry has the benefit of "multiple interpretations" by readers or listeners (Downey & Clandinin, 2010: 391). The narrative mirrors actual experience supported by factual data, and leaves a question at the end. This query is relevant in the development of the reflective inquiry method, as the storyteller (author) is telling a story and at the same time reflecting why it happened (Downey & Clandinin, 2010: 392). Narrative reflective inquiry lends a kind of empowerment to the storyteller and story

listener, as it does not provide a conclusive end to the story (Noddings, 1986: 510). Hence, the story leads to the development of theory and practice. Suman's experience also follows the same path leading to reflection and creation of a new understanding.

In brief, the story unfolds at Walt University, located in Southeast USA. The attention shifts to Dr. Dunstan's Cognitive Strategies class, which is an online class. A follower and believer of online education, Dr. Dunstan equips his online class with various online tools, and sets about teaching the class. The class has 20 students, with individual and group assignments. But, things start to go awry during the time of the final project. Protagonist Suman wonders what went wrong with the online CLT team, and after the semester seeks a meeting with the professor. Her journal excerpt indicates that even Dr. Dunstan is at a loss, and thinks aloud that having the technology isn't enough; one needs to ensure that the learners are capable of using it.

Current challenges facing the organization

The case presents a technological challenge for higher education institutions. Suman's story acts as an eye-opener, and begs the question as to why this happened. Was Suman at fault, or was it a failure of the institution?

Narrative reflective inquiry method allows for multiple interpretation. Suman did not have the advantage of hindsight, and lived through the experience. But, her professor, Dr.Dunstan is provided this benefit by Suman. It is not enough to implement technology as an educational aid, simply because it is the latest fashion. Every situation has to be handled on a case-by case basis. Dr. Dunstan learnt this when his student, Suman Rao apprised him of the situation after the completion of the semester. In short, this experience by one student presents a host of challenges:

Challenge I: the learners

Suman is an Asian, and Dr. Dunstan wonders if her cultural orientation could have influenced the collapse of the online CLT. This is something to be considered seriously. Contemporary education system is changing focus with increasing international enrollments. It has become common to come across students belonging to different countries and cultures in an American classroom. This increases the scrutiny on educational institutions to ensure that programs and courses are suitable to every learner in the classroom. Hence, it is imperative to know the learner population, their needs, learning styles, and cultural orientations.

Dr. Dunstan designed his class without analyzing the students in his class. His lack of ignorance comes to light at the end of the semester when Suman's online CLE collapse is drawn to his attention by Suman herself. His thoughts put forth a common issue in higher educational institutions today. Study your learners before implementing anything. What could suit one learner may not suit another learner. Online collaboration suited the American team member, but caused tension between Suman who is an Asian with a different outlook and cultural orientation, and her American team members.

Educational institutions have to develop educational content on the lines of the classic instructional educational model of ADDIE i.e. analyze, design, develop, implement, and evaluate. Educational institutions have to begin with a comprehensive learner, learner context, and performance context analysis. This ought to be followed by a technological analysis, design and development of the e-learning programs. A critical factor, which was not done in Suman's story, was the aspect of formative evaluations. Instructional designers and educators have to evaluate the instruction in a test run, before finally implementing it. Here, ADDIE transforms into the rapid prototyping model.

Challenge 2: the technological issue

This narrative inquiry presents a contemporary example of implementing an online technology because it is the latest fashion. In her story, Suman remarks that Dr. Dunstan is a believer of e-learning and its tools. This might be construed as a good strategy to attract and retain non-traditional students. But, this means that the developer and implementer of this technology be aware of the importance, uses, and role of such technology. Suman did not know why the class was engaging in online collaboration. Perhaps, educational institutions should consider explaining the technology; laying a foundation for learners. This could go a long way in developing task ownership and task relevance increasing learner motivation. Suman's experience explores the issues of explaining and 'owning' the technology being used in class to direct their learning.

Analysis and discussion questions

During the late 1980s, collaborative learning emerged as an important teaching and learning pedagogy in higher education, secondary, and elementary education (Brufee, 1995, Slavin, 1990, Goodsell, Maher & Tinto, 1992). Collaborative learning is described as a situation in which two or more learn or attempt to learn something together. Collaborative learning is different from cooperative learning and competitive learning. The former denotes sharing, networking, communication among individuals belonging to similar levels of subjective expertise to solve common problems, and reach mutual goals. Collaborative learning generates better and faster knowledge comprehension, knowledge acquisition, and application leading to superior academic performance (Kirschner, Paas & Kirschner, 2009). It restructures the traditional teacher-centered classroom dividing the class into small groups and teams requiring intensive and extensive interaction between students and faculty (Bruffee, 2000: 20). Through constant interaction, and completion of group projects learners are able to engage in reflection build on personal experiences and learn actively (Slavin, Karweith & Madden, 1989: 20). Collaborative learning is categorized as prescriptive or descriptive. According to the prescriptive perspective, collaborative learning occurs when two or more people come together to learn a task with a mutual common objective efficiently; while, the descriptive perspective holds collaborative learning is a mechanism, wherein two or more people get together to learn knowledge, skills, or attitudes and accomplish a common goal (Dillenbourg, 1999: 4). He further elaborates that peers or groups do not learn by simple being together. Rather, it is the interaction, explanation, disagreement, reflection, and mutual comprehension which lead to learning. Collaborative learning is a "social contract" where the rules are explicitly laid out, and mutual goals are set (Dillenbourg, 1999: 4). Two or more individuals enter into a verbal agreement to share knowledge and information to accomplish common objectives.

It is defined as "a coordinated, synchronous activity that is the result of a continued attempt to construct and maintain a shared conception of a problem" (Roschelle & Teasley, 1995: 70). According to this definition, collaborative learning can only occur in the presence of four factors: common mutual goals, interaction to construct common knowledge schema, symmetry of knowledge, and a coordinated situation that allows a group to get together (Roschelle & Teasley, 1995).

a) Common Mutual Goals - Collaborative learning involves "achievement of a mutually shared goal..." (Roschelle & Teasley, in press). Roschelle and colleague state that group has to set its own boundaries and arrive at a mutually acceptable goal.

b) Interaction to construct common schema - Collaborative learning is a learning method where two or more individuals share knowledge through interaction to construct common knowledge schema (Roschelle & Teasley, in press). It is crucial for group members to interact and engage in verbal explanations, arguments, critical reflection, and abstract conceptualization to be able to apply shared knowledge to the problem or activity at hand.

Interaction leads to knowledge synthesis and transfer of learning (Roschelle & Teasley, in press).

c) Symmetry of knowledge. Group members need to possess symmetry of knowledge and skills (Dillenbourg, 1999). Group members have to be at the same academic level to communicate and coordinate their problem solving efforts. Collaborative learning cannot occur if the group members are on an unequal foundation, for instance a teacher and a student group of three (Roschelle & Teasley, in press). The teacher is an authority figure with more subject expertise, skill and experience (Miyake, 1986).

d) The Situation. A group and activity make a situation collaborative, and not the other way round. A situation is not collaborative. It is the individuals who work in coordination to interact and communicate for the achievement of a goal, who make a collaborative learning situation or environment (Dillenbourg, 1999). If group members engaging in cooperative learning have different levels of expertise, they may not adequately share or coordinate their work efforts, especially if they are prone to completing sub-tasks individually and then fitting their task into the whole (Dillenbourg, 1999). Cooperative learning is task-centered where the work boundaries and goals are established by a third party (Brody & Davidson, 1988). Cooperative learning is dependent on extrinsic motivation; where the group member does his/her task to get a tangible return. Cooperative work groups are highly structured with roles rigidly classified (Lee, 1997). Slavin explains that in a group situation with a common goal, individuals organize themselves into different hierarchical roles to perform various functions to achieve the goal. Such groups are characterized by reward interdependence, task interdependence, individual accountability, teacher imposed structure, and a hierarchical division of labor (Slavin, 1980: 322). On the other hand, collaborative learning is an unstructured, loose and fluid group, where the group members are in-charge (Lee, 1997). Collaborative work groups are student-oriented, and intrinsically motivated. They engage in deep learning which eventually leads the group to conceptualize in abstract terms, transfer learning, and solve their problem (Lee, 1997).

Deep learning is defined as the comprehension, evaluation, critical reflection of the information presented to propel the learner in a search for "truth" – "material is embraced and digested in search of learning" (Garrison & Cleveland-Innes, 2010: 136). They further elaborate that deep learning is a function of collaborative learning environments. Collaborative learning environments enable group members to interact, argue, criticize, question assumptions, construct knowledge, and search for truth. Such learning environments foster deep learning including processes of scaffolding and guiding group members into the zone of proximal development (Garrison & Cleveland, 2010). Blaye described the difference in terms of structure and function (1988). He states that collaborative learning results in a horizontal division of labor, whereas cooperative learning leads to a vertical division of labor. Panitz explains that the former happens as group members share symmetry and work in coordination to accomplish a goal mutually established by them (1995).

Research investigations into collaborative learning groups in engineering, sociology, and math courses found that initially students react well to collaborative learning with increased quality class discussion participation and superior academic performances (Mourtas, 1997, Rinehart, 1999 & Johnson, 1990). But, collaboration soon gives way to cooperation and vertical division of labor when team members find that constant communication is actually proving a hindrance to quick and efficient functioning (Mourtas, 1997). Students prefer collaboration in class discussions, but want to work individually for projects and assignments (Rinehart, 1999). Collaborative learning is influenced by dimensions of race and gender (Anderson & Adams, 1992). Based on their research they concluded that White Caucasian learners are apt to collaborate and learn together as a cohesive unit. Minorities, particularly Asians, prefer a teacher-

centered classroom, and deviate away from collaborative learning activities (Anderson & Adams, 1992). Further, female learners, irrespective of culture and race, are more receptive to collaborative learning (Moch, 1995). In his qualitative study in a private female Midwestern university, Moch found that women learners were more inclined to interact and collaborate only with other female learners (Moch, 1995: 23). This occurred as all women learners possessed feminine traits of empathy, interaction, and collaboration, trust, and problem-solving through mutual agreement (Moch, 1995).

White Caucasian preferred traditional teacher-oriented classroom structures when given a choice between mixed teams and lecture formats (Moch, 1995). Masculine traits of authoritarianism, and rigidity were more suited to hierarchical team structures (Hofstede, 1986: 22). Moch further argued that white men favored interaction with white males (1995). People belonging to equal status and function preferred to collaborate together (Vogt, 1997).

The online CLT: a reflective inquiry

The online CLE ran into problems, and failed to deliver as evidenced by Suman's critical narrative. The failure could be attributed to Suman herself, who perhaps lacked the initiative and drive. Her inertia to engage in the online CLE directly could have been a causal factor. When Suman realized that her emails were not inducing the desired response, why didn't she involve the professor and seek his advice? She could have talked with her professor about what was happening. Suman's Asian cultural orientation, perhaps unconsciously could have contributed to her half-hearted efforts to connect with her team members. When she realized that things were falling apart, why didn't she make an effort to meet them in person? She could have sought the help of her instructor, and fixed a meeting time. But she did not do so. The team members would have responded to a Professor's call and met with Suman face-to-face. Thus, it would appear that Suman made all efforts to meet with her team members, but she did not. Related to this is the issue of ethnicity and gender. Males of same gender and status collaborate more effectively and efficiently with each other. Both male team members were white, and so tended to interact more with each other. Suman interacted well with the other two female members of the team, as they all shared similar feminine traits.

The benefit of the critical reflective inquiry is its ability to have different interpretations to the same story. Thus, if on one end the failure of the online CLE could be attributed to Sunman herself, the failure could be attributed to Dr. Dustan. Dr. Dunstan developed and implemented the online CLT equipping it with various tools, but did not enquire/ engage in any activity to find out if the CLTs were functioning properly? Hence, he failed to engage in formative assessment, which perhaps could have modified the structure of the online CLT. Perhaps the formative evaluation would have led Dr. Dunstan to assume a visible online social presence. Dr. Dunstan could have worked with ILC and conducted a formative evaluation. This would have indicated to him that his online CLT team concept was not faring well. Accordingly he could have revised and modified the online collaborative technology.

It would seem that Dr. Dunstan was more concerned with the end result i.e. the project completion, and not the process of online collaboration amongst the team members. This begs the question whether Dr. Dunstan was interested in generating effective learning, or successful performance?

The online CLT became a cooperative activity of vertical division of labor. This again goes back to the lack of a formative assessment. The formative assessment would have indicated that the concept of collaboration was, in fact, losing its essence. Students were more interested in performance than in actual deep learning. But the absence of a formative evaluation simply paved the way of the online CLT to cooperative vertical division of labor. What had started out, at the beginning of the semester as a collaborative learning team effort, dwindled down to cooperative

learning and a vertical division of labor. Suman no longer felt a member of a collaborative team, but a member of a cooperative learning team engaging in vertical division of labor. This is similar to Rinehart's belief that collaborative learning teams function well when students have to collaborate on class discussions. But, the collaborative learning team seems to collapse when students have to engage in assignments and projects. The success of an online CLE team depends on the four factors of collaboration which are, that learners develop their own group and establish their own conditions. When a third party organizes the collaborative learning group, it does not work. In the above case, the instructor physically divided the entire class into teams setting up guidelines and goals. This restricted learner freedom to explore and choose group members. Further, the establishment of a common goal to be accomplished within a time frame severely limited learner ability to experiment, reflect, disagree, conceptualize the issue at hand. The goal had to be achieved efficiently and effectively. This sort of opens up the team to become a cooperative learning team built on the lines of vertical division of labor. The team becomes a structured machine, where roles, duties, and functions of each team member are clearly defined. It can also be stated that the collaborative learning team becomes a hierarchical team structure, where each team member is only concerned with the completion of his/her sub task.

Suman's team had to achieve a goal within a set time limit. This could have hampered interaction, synchronicity and consistent coordination. The team had to perform under duress, and accomplish the target efficiently and effectively. The team had to engage in vertical division of labor. Suman became a cog in the team efficiency machine, where she was directed to perform a sub-task, and contribute to the team effort. There was interdependence as without the literature review the team could not have completed the project. But collaboration means symmetry of knowledge, action, and tasks. Suman did not seem to have symmetry of knowledge, tasks, or action. She was relegated to only a small sub-task, and had no idea about the entire project. This indicates a lack of knowledge about the entire project including actions and tasks. She was ignorant about the tasks and communication, if any existed, between other team members. Suman was not involved in the process of project development and presentation as a whole. She was rewarded for her effort and accomplishment of writing the literature review. This seems a form of hierarchy based on vertical division of labor, where Suman was at the lowest hierarchical level. Collaboration is sharing, making a concerted and coordinated effort to share conceptual space to solve problems and achieve targets. It is not only cooperation, but a blend of cooperation and interaction. It is interaction which brings about symmetry in the team.

Going back to Rinehart's observation, perhaps collaborative learning teams work well for class discussions as in those situations there is no immediate set goal. The team members can share, experiment, criticize, disagree, reflect and present different perspectives about the same issue. In fact, presentation of different perspectives can earn the team class points. But, the situation is reversed in a project. The goal has to be accomplished within an established time. There is no room for discussion, experimentation, and reflection. Team members have to do be assigned sub-tasks to do, and then these sub-tasks have to be combined to finish the project.

Discuss possible reasons behind the unsuccessful functioning of the CLE team?

Why was the concept of a CLE introduced? Comment on the theory behind its development?

How does a CLE transform into an environment of mechanistic vertical division of labor?

How could this transformation of collaboration into division of labor environment been prevented?

What could Dr. Dunstan have done to prevent such a failure?

What can higher educational institutions do to prevent similar failures? Discuss.

Further Reading--

a) Bruffee, K. (2000), Collaborative learning: Higher education, interdependence, and the authority of knowledge, (2nd ed.), Baltimore: John Hopkins University Press

b) Dillenbourg, P. (1999), What do you mean by collaborative learning? In P. Dillenbourg (Ed.) *Collaborative learning and Computational Approaches* (p. 1-19), Oxford: Elsevier.

c) Goodsell, A., Maher, M., & Tinto, V. (1992), Collaborative learning: A sourcebook for higher education, National Center on Postsecondary Teaching, Learning, & Assessment, Syracuse University: The Pennsylvania State University: NCTLA

d) Grossack, K. M. (1954), Some effects of cooperation and competition upon small group behavior, *Journal of Abnormal & Social Psychology,* 49, 341-348.

References

Anderson, J. A., & Adams, M. (1991). Acknowledging the learning styles of diverse student populations: Implications for instructional design, *New Directions for Teaching and Learning,* 49, p. 19-33

Blaye, A. (1988). Confrontation socio-cognitive et résolution de problèmes. Doctoral dissertation Centre de Recherche en Psychologie Cognitive, Université de Provence, 13261 Aix-en-Provence, France

Beckman, M. (1990). Collaborative Learning: Preparation for the workplace and democracy, *College Teaching*, 38 (4), 128-133.

Brody, C.M., & Davidson, N., (1998). *Introduction: Professional development and Cooperative learning in Brody and Davidson (Eds.)*. Professional Development for Cooperative Learning- Issues and Approaches, State University of NY Press; Albany NY

Brody, C.M. (1995). Collaboration or cooperative learning? Complimentary practices for Instructional reform. *The Journal of Staff, Program & Organizational Development*, 12 (3), 133-143.

Bruffee, K. (2000). Collaborative learning: Higher education, interdependence, and the authority of knowledge, (2nd ed.). Baltimore: John Hopkins University Press

Bruffee, K. (1995). Sharing our toys- Cooperative learning versus collaborative learning, *Change*, Jan/Feb. 1995, 12-18.

Crites, S. (1986). Storytime: Recollecting the past and projecting the future. In T.R. Sarbin (Ed.). *The storied nature of human conduct*, (pp. 152-173). New York: Praegar.

Connelly, M. F. & Clandinin, J. D. (1990). Stories of Experience and Narrative Inquiry, *Educational Researcher*, 19 (5): 2-14.

Dillenbourg, P. (1999). What do you mean by collaborative learning? In P. Dillenbourg (Ed.) *Collaborative learning and Computational Approaches* (p. 1-19), Oxford: Elsevier.

Dillenbourg, P., Baker, A., Blaye, A., & O'Malley, C. (1996). The evolution of research on collaborative learning, In E. Spada & P. Reiman (Eds) *Learning in Humans and Machine: Towards an Interdisciplinary learning science* (p. 189-210), Oxford: Elsevier.

Downey, C. A. & Clandinin, J.D. (2010). Narrative Inquiry as Reflective Practice: Tensions and Possibilities. In N. Lyons (Ed.), *Handbook of Reflection and Reflective Inquiry: Mapping a way of Knowing for Professional Reflective Inquiry.* Springer Science & Business Media: LLC.

Goodsell, A., Maher, M., & Tinto, V. (1992), Collaborative learning: A sourcebook for higher education, National Center on Postsecondary Teaching, Learning, & Assessment, Syracuse University: The Pennsvylania State University: NCTLA

Grossack, K. M. (1954). Some effects of cooperation and competition upon small group behavior, *Journal of Abnormal & Social Psychology,* 49, 341-348.

Hofstede, G (1986) Cultural differences in teaching and learning, *International Journal of Intercultural Relations,* 10, 301-320.

Jackson, P. W. (1987). On the place of narration in teaching. In D. Berliner and B. Rosenshine (Eds.), *Talks to teachers* (pp. 307-328). New York: Random House.

Johnson, D. W. (1990). Using cooperative learning in math, chapter in Cooperative Learning In Math. Neil Davidson ed. 1990

Johnson, D .W. Johnson, R. T., & Holubec, E. J. (1991), Cooperation in the Classroom, Interaction Book Co: Edina, MN.

Johnson, D. W., Johnson, R. T., & Smith, K. A., (1991). Active Learning: Cooperation in the College Classroom, Interaction Book Co.: Edina, MN

Johnson, D. W., & Johnson, R. T. (1991). Learning Together and alone- Cooperation, competition, and individualistic learning, 3rd ed. Allyn & Bacon.

Jones, S. C., & Vroom, V. H. (1964). Division of labor and performance under cooperative and competitive conditions, *Journal of Abnormal and Social Psychology,* 68 (3), 313-320.

Kirschner, F., Paas, F., & Kirschner, A. P. (2009). A Cognitive Load Approach to Collaborative Learning: United Brains for Complex Tasks, *Educational Psychology Review,* 21, 31-42.

Lee, G.S (1997). Internet communication, Institute for Distance Education Universiti Pertanian Malaysia.

Miyake, N. (1986). Constructive Interaction and the Iterative process of Understanding, *Cognitive Science*, 10, 51-177.

Mourtos, J. N. (1997). The nuts and bolts of Cooperative Learning in Engineering, *Journal of Engineering Education*, Vol.86 (1), p. 35-37.

Myers, M. (1991). *Cooperative Learning* (July Ed.), 11 (4).

Noddings, N. (1986). Fidelity in teaching, teacher education, and research for teaching, *Harvard Educational review,* 56 (4): 495-510.

Panitz, T. (1997). Collaborative Versus Cooperative Learning- A Comparison of the two Concepts which will make us Understand the Underlying Nature of Interactive Learning, *Cooperative Learning and College Teaching,* 1-15: http://home.capecod.net/tpanitz/tedsarticles/coopdefinition.htm

Roschelle, J., & Teasley, D. (1995). The construction of shared knowledge in collaborative problem solving. In C.O'Malley (Ed.), *Computer supported collaborative learning* (pp. 69-97). Berlin: Springer-Verlag.

Schroeder, C. C. (1994). Developing learning communities. In C. C. Schroeder & P. Mabel (ed.) *Realizing the potential of residence halls* (p. 148-162), San Francisco: Jossey-Bass

Slavin, E. R., Karweit, N. I., & Madden, N. A. (1989). Effective programs for students at risk, Boston: Allyn & Bacon

Slavin, E. R. (1990), Cooperative learning: Theory, research, and practice, Englewood Cliffs, NJ: Prentice-Hall

Slavin, E. R. (1980), Cooperative Learning, *Review of Educational Research*, 50 (2), 15-342.

Smith, A. K. (1996), Cooperative Learning: Making Groupwork Work, *New Directions for Teaching and Learning*, 67, 71-82.

Spence, D. P. (1982). Narrative Truth and historical method. New York: Norton & Company.

Vogt, P. V. (1997). Tolerance and education: Learning to live with diversity and difference, London: Sage

About the author

Nirupama Akella has a Masters in Instructional Design, and Communication. She is currently pursuing a PhD in Educational Leadership with a focus in Curriculum and Instruction from the University of Phoenix. Her accomplishments include several national and international journal publications, review committee member, mentor for instructional design competition at AECT, and publication of two books. Residing in Albany, Georgia, Nirupama works full-time at the Phoebe Putney Memorial Hospital as an instructional design analyst.

Email: nakella2008@hotmail.com

Return to Table of Contents

Editor's Note: This is a detailed study of the plan to integrate information and communication technologies (ICTs) into the online resources and e-learning implementation (OREI) framework in Tanzania. The focus is a sustainable plan for a feasible e-learning model for secondary education.

An evaluation of online resources and e-learning implementation (OREI) framework using SWOT analysis: case of Tanzania

Patrick D. Kihoza, Khamisi Kalegele and Irina Zlotnikova
Tanzania and Botswana

Abstract

In Tanzania, there is a research gap report on the individual and organization factors that enhance, and those hinder the sustainability of e-learning initiatives. In this study, an online resources and e-learning implementation (OREI) framework which proposed planning, implementation, and monitoring and evaluation of ICT in education initiatives as potential attributes, was evaluated using SWOT(Strengths, Weaknesses, Opportunities, and Threats) analysis. The framework is assessed using data collected from policy makers, teachers, tutors, teacher trainees and school students, and the findings reported. Finally, implications for research and framework practice are presented. This study makes two contributions. First, prior research on e-contents and e-learning are synthesized by identifying related empirical literatures. In doing so, adoptability of the empirical findings of prior researches in e-learning success is stressed. Second, the study offers theoretical evidence that may account for the use of the designed OREI framework by specifying the simultaneous role played by both internal and external factors. Results explored external environment for online resources and e-learning implementation together with strong internal drivers towards e-learning that would in general lead to a sustainable plan for a feasible e-learning model useful for secondary education.

Keywords: E-learning, SWOT analysis, E-learning implementation, ICD4E, Tanzania, Secondary education

Introduction

In recent years, the move towards ICT use in education in developing countries has increased side-by-side with dominantly traditional approaches. The current digital native learners' environment is expected to include technology; the past never included laptops, projectors, interactive whiteboards, and mobile devices but had books, pencils, chalkboards, and erasers (Warger, Dobbin, Initiative, & others, 2009). However, computers may not increase students' performance, but they are still more important to any level of the education system (OECD, 2015). Among the key technology use trends reported by Johnson et al.(2013) and Nagel (2013) that have obstructed the education system are (1) increased shift toward blended learning (a model of e-learning), online-learning, and technology-driven collaborative learning, (2) the growth in potential of social networks, (3) the value of openness in educational resources and technology and, (4) the challenges educators' face as resources become more accessible on the Internet. The success of educational systems and student achievements are principally based on how students learn through interactions with people (teachers and peers) and instructional resources (textbooks, workbooks, instructional software, web-based content, homework, projects, quizzes, and tests) (Chingos & Whitehurst, 2012; Robertson, 2003). The gap for technology use requires a support framework to identify, fulfill and integrate core curriculum technology relevance for secondary education (Hooker, Mwiyeria, & Verma, 2011, p. 20; Olson et al., 2011, p. iii). In order to have effective use of classroom technology, many aspects must overlap, among them being ICTs strategic plan, teaching and learning methods, flexible curriculum, and building

human capacity and commitment (Baker, Bliss, Chung, & Reynolds, 2013; Niemi, Kynäslahti, & Vahtivuori-Hänninen, 2013; Olson et al., 2011). When teacher and teacher trainee characteristics or qualities are leveraged, technology resources and meaningful application becomes positive (Ertmer & Ottenbreit-Leftwich, 2010; Midoro, 2013; So, Choi, Lim, & Xiong, 2012). A number of internal and external factors that drive this study have positive or negative effects on the ICT in education enhancement. The ability to identify strengths, weaknesses, opportunities, and challenges of ICT use in education bring forth the baseline for the online resources and e-learning implementation framework linked to this study. In the Internal-External Model presented by Zhang & Goel (2011), internal factors are referred to as individual's knowledge and skills to use ICTs, general attitude towards information technology, personal innovativeness with information technology, and prior experience with using online resources for teaching and learning. External factors are ease of use of technology, organization support and the government support. In Tanzania, the education sector faces lack of power supply in schools, lack of resources (hardware, software, internet connections), teachers lack of competences in technology classroom use, and shortage of localized e-contents (Andersson, Nfuka, Sumra, Uimonen, & Pain, 2014; Farrell & Isaacs, 2007; Tanzania Institute of Education (TIE), 2009; United Republic of Tanzania (URT), 2008, 2013). Planning and deciding on the level of e-learning should focus on utilising existing opportunities while working on challenges (Cavus, 2013; Conde et al., 2014; Ismail, 2001; Varlamis & Apostolakis, 2006). The current development of e-learning in Tanzania draws on the rapid procurement of ICT resources (hardware and software) in education, heavily supported by the ICT policy in basic education as a leading policy and funded by the government through the Ministry of Education and Vocational Training. This study is intended to assess online resources and e-learning implementation frameworks using a SWOT (strengths, weaknesses, opportunities, and threats) analysis based on ICT use in secondary education in Tanzania. The SWOT analysis is an analytical method used to identify and categorize significant internal factors (strengths and weaknesses) and external factors (opportunities and threats) that could influence the success of OREI frameworks in ICT education initiatives in Tanzania.

Background

Online educational resources

There are libraries of online educational resources that could be stored and shared as learning objects. A digital content repository is a space where digital content can be stored, accessed, and shared amongst a group of people (O'Carroll et al., 2013). On the Internet, for example, digital content can be copied, edited, uploaded, published, downloaded, and transmitted in different formats. However, true digital content involves more than simply replicating the format of a print textbook online (Baker, 2011). Online resources are not a printout or an ad hoc collection of links to Web pages. True digital content restructures the text and images from print, and then adds video, rich media and interactive activities in a way that is optimized for learning. They can be acquired as in-house built or designed, subscribed, mixed or modified and or accessed as open educational resources freely available online (Watson et al.,2013). Project Tomorrow (2013) reported a list of online classroom educational resources that are mostly used by teachers as animations, games, e-books, real-time data, self-created videos, videos found online and virtual field trips. Among the first steps for enhancing technology use in education should be availability and accessibility (Norris, Sullivan, Poirot, & Soloway, 2003).

E-learning implementation

E-learning (or eLearning, or elearning) is a learning approach in which the interactions between learners and teachers are online and depend of the internet connection. E-learning is instruction delivered using a personal computer or mobile device, Internet or intranet, that use media

elements such as words, pictures and videos for building knowledge and skills linked to individual learning goals or an education system (Clark & Mayer, 2011, p. 27). There are two time-based modes of e-learning: synchronous and asynchronous. In asynchronous online, instructors provide materials, lectures, tests, and assignments that can be accessed at any time. Usually students given a timeframe during which they need to connect at least once or twice and they are free to contribute (Hrastinski, 2008). Synchronous e-learning is referred to as virtual classrooms, Web conferences, Webinars, and online presentations; they all use of web conferencing software to support live, interactive (more or less) learning events delivered on the World Wide Web (Hyder, Kwinn, Miazga, & Murray, 2007, p. 9). Synchronous requires students and instructors to be online at the same time where lectures, discussions, and presentations occur at a specific hour, including participating online (Beyth-Marom, Saporta, & Caspi, 2005). Implementation of e-learning should be approached as a strategic plan that involves developing projects, tasks, activities, dependencies, resources, and timelines for moving forward (Moore, 2007, p. 22). E-learning is free from limitations of space and time while reaching learners in a global context (Kidd, 2010, p. 5). According to Kaplan & Zhu (2011, p. 238), four major components enhance positive ICT use: the student, the instructor, the course content, and relevant technology tools. Content Management Systems (CMS), Learning Management Systems (LMS), and Learning Content Management Systems (LCMS) often compete for managing e-learning resources (Grant, 2010; Greenberg, 2002; Mijatovic, Cudanov, Jednak, & Kadijevich, 2013). Institutions planning to implement e-learning should carry out a SWOC (strengths, weakness, opportunities and challenges) analysis to specify business or service requirements before making decisions about relevant e-learning systems (Naik & Shivalingaiah, 2009; Ryan, Toye, Charron, & Park, 2012; Smart & Meyer, 2005). Each of the three applications have considerable and specific strengths and facilities that may complement each other, but no one often is the best fit for the particular organization (Ninoriya, Chawan, & Meshram, 2011; Varlamis & Apostolakis, 2006).

SWOT framework

The SWOT framework is a strategic analysis tool used to identify and evaluate the strengths, weaknesses, opportunities and threats of a project (Zhang & Goel, 2011). It is a business tool for planning purposes intended to yield strategic insights (Helms & Nixon, 2010; Valentin, 2001). A central idea in SWOT analysis is to identify a primary objectiveor desired end state of the project. This widely used as a preliminary step in planning processes for many types of organisation (Miles, Keenan, & Kaivo-Oja, 2003, p. 75; Nisheva, Gourova, Ruskov, Todorova, & Antonova, 2008). For most institutions that undertake e-learning initiatives, the desired outcome for SWOT analysis would result into successful adoption of e-learning (Zhang & Goel, 2011). The SWOT analysis combines analysis of external drivers and of internal resources of organizations for determining to what extent the actual strategy is suitable and appropriate to meet challenges and changes in the organizations' internal and external environment (Nisheva et al., 2008; Sambuu, 2005; Valentin, 2001). There are many ways to use ICT in an education framework, but not all are practical in all situations. SWOT analysis can enhance the localisation of a framework with reasonable information for the existing strengths, opportunities, weaknesses and challenges (Robertson, Webb, & Fluck, 2007, p. 24). For any investment to be made in technology use in schools or teacher training institution, focus should not only be on materials and resources, but users' readiness and necessary adjustments in the teaching and learning environments (Roy Barton & Haydn, 2006).

Research questions

Two research questions were used in this study.

RQ1: What are the individual users' characteristics that are considered as inputs to the design of online resources and the eLearning implementation framework?

RQ2: What are the strengths, weaknesses, opportunities, and threats (SWOT) Tanzania has regarding the use of ICT in secondary education?

Research method

Research design and procedure

This study applied mixed-methods approach to make use of qualitative and quantitative data that have the advantages of complementing each other and providing deeper understanding of the issues under the study. This research was carried in the secondary education domain as a case study. The study collected data from four secondary schools, teachers' training college (TTC), one University, Ministry of Education and vocational Training and the Tanzania Institute of education. The study targeted to identify participants' perceptions about ICT use in teaching and learning, the use of online resources and e-learning, challenges faced, and opportunities.

During the study, teachers first completed a short survey about the status of classroom ICT use, e-contents accessibility and availability, perceived readiness, and their own knowledge, skills and experience in ICT use for teaching. After completing the questionnaire, teachers and tutors focus group discussions took place (separately). The participants were asked to discuss how they perceive the SWOT of integrating and implementing online educational resources in classrooms, their perceived benefits and limitations and the skills.

To solicit the attitudes of teachers, tutors, curriculum development experts and MoEVT officers; they filled out a questionnaire and later participated in a focus group interviews of roughly 15 minutes on the factors that influence ICT use in secondary education. The research team recorded and took notes during the focus group interviews. Data from the survey (including the open questions) and the questionnaires were analyzed. The case study was carried out on individuals with influence on the government's decision to use ICT in education and those considered as principle beneficiaries supposed to have relevant competences, knowledge, skills, and readiness to support e-learning implementation in schools. The practices and actions of individual participants could lead to factors affecting the present and future state of online educational resources and eLearning implementation in public schools. The study evaluated participants' abilities, knowledge, skills, attitudes, and digital contents practices in the OREI framework dimensions based on SWOT analysis.

Participants

Data for the present study came from 542 participants. The study collected data from four secondary schools (from both teachers and students in year two and three of study), teachers' training college (TTC) (tutors and teacher trainees in Science and Mathematics), University students (specialized in education), Ministry of Education and vocational Training officers (secondary education unit, teacher training unit, commissioner's office and inspection unit) and the Tanzania Institute of education (curriculum developer experts). To avoid any personal conversations or topics outside the study at hand, researchers tried to stick to issues related to teaching practices with pedagogical ICTs and e-contents knowledge that could enhance e-learning implementation. The research used questionnaires and interviews as the primary instruments for data collection. Students' participation was organized with approximately 35 students from each year of study selected randomly. All Science and Mathematics teachers who

were available participated. In addition, approximately 50 Science and Mathematics teacher trainees from each year of study participated. All available tutors in science and mathematics were freely allowed to participate in the study.

Table 1
Description of the study participants

Research participants	N	Percent
Teachers(Schools)	24	4.5
TTC Tutors	12	2.2
School Students	295	54.4
Teacher Trainees (University Bachelor in Education students)	36	6.6
Teacher Trainees (TTC)	158	29.2
Tanzania Institute of Education (TIE)	10	1.8
Schools inspectors	4	0.7
MoEVT (Teacher training unit, Commissioners' office and Secondary Education Unit)	3	0.6
Total	542	100

Students participants were second year 160 (54.2%) and third year 135 (45.2%) with age range of 12-17 years. Schools were presented by 69 (23.4%) from Mongola, 70 (23.7%) from Kipera, 73 (24.7%) from Kilakala and 83 (28.1%) from Lupanga. Teachers were 6 (25.0%) from Mongola, 5 (20.8%) Kipera, 9 (37.5%) Kilakala, and 4 (16.7%) Lupanga. The questionnaires to the Tanzania Institute of Education were distributed by the director of human resources and collected after two weeks to allow them fill out the questionnaire without pressure because of their tight work schedules. The participating MoEVT officials were from the secondary department, commissioner's office, and teacher education department. Science and mathematics tutors and teacher trainees were free to participate if they were willing to attend. School heads invited teachers and the teachers on duty invited students.

Instrument

The survey comprised questions for teachers, tutors, students, school inspectors and Tanzania Institute of Education officers to determine their experiences with online resources, their attitudes, self-perceived ICT use knowledge, skills, and the availability of ICT infrastructures that could enhance blended learning as a preferred model of e-learning. For the structured questions, a Likert scale of 1–5 was used. The demographic information of the participants (age, gender, year of study, subject of teaching, and years in the field of teaching) was solicited. The focus group interviews and guiding questions prompted the group to remain focused.

The OREI framework core domains and influences

The OREI framework provides a roadmap for planning, implementation, monitoring and evaluation of ICT in education projects in Tanzania as a developing country. Understanding of key participants in the success of the OREI framework focused mainly on examining the contribution of dimensional requirements into interactions and dependencies that define a

framework dimensions. The OREI framework was designed with seven components of government support, stakeholder's involvements, training, and recruitment of key users, infrastructures, technology and the monitoring and evaluation that work interactively to deliver the guiding principles.

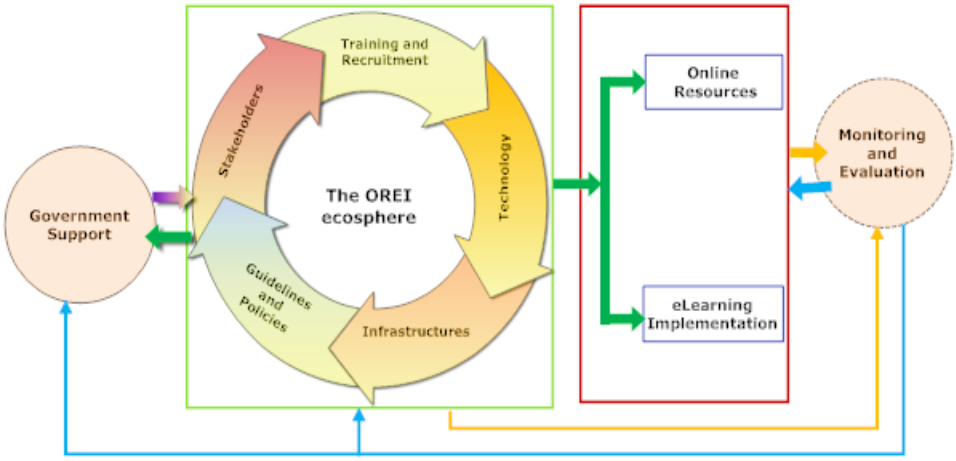

Figure 1. The OREI Core Domains Conceptual Presentation

The OREI framework focused on inventing a shared vision and technology integration plan based on the knowledge, attitudes, beliefs, and positive ICT use practices of all responsible parties. As part of an on-going study, this paper evaluated principle beneficiaries (teachers and students) and government agencies (MoEVT and TIE) required to support enhancement of the ICT in secondary education.

For the project to succeed, consideration of users' characteristics in the early stages is necessary to determine training and recruitment needs and avoid wastage of limited resources such as time and money. Government support should ensure availability and continuity of funding, and a detailed plan for the technology level, training and recruitment. The best use of technology would allow teachers and students, in a user friendly manner, to interact online using well-designed and localised technology with 24/7 access to curriculum relevant digital content. The contribution of research and training institutions should be valued. Teachers should become creators of learning artifacts and interact effectively with the technology. Training institutions should support teacher training programmes that emphasize pedagogies that use ICT resources. Research institutions should support and improve the technology through research, development of new tools and positive suggestions for change. Schools infrastructures (Hardware and software) should support teachers and students sustainable access to the relevant ICT resources. The contribution of contents and teaching should balance to make use of all possible resources and contents available. SWOT analysis measures on the framework should meet what the framework intents to achieve.

Data analysis

The survey data were analyzed using SPSS ver.21 and the focus group interview results reported qualitatively. The data collected through the survey were presented in stacked bar charts, radar with markers and pie charts showing percentages of respondents on each question. The reliability analysis of scales was conducted and was confirmed with Cronbach's alpha higher than 0.70. The participants' responses to the open questions in the questionnaires were qualitatively analyzed.

Results and discussion

Curriculum development experts perceived factors leading to ict use in education

It was vital for this study to solicit information from curriculum developers and experts on the optimal use of ICT use in education to influence on the government's decision to invest in ICTs. The question asked was "Why would you recommend ICTs to be used for teaching/learning in Tanzania secondary education?"). Results are in Figure 2 below.

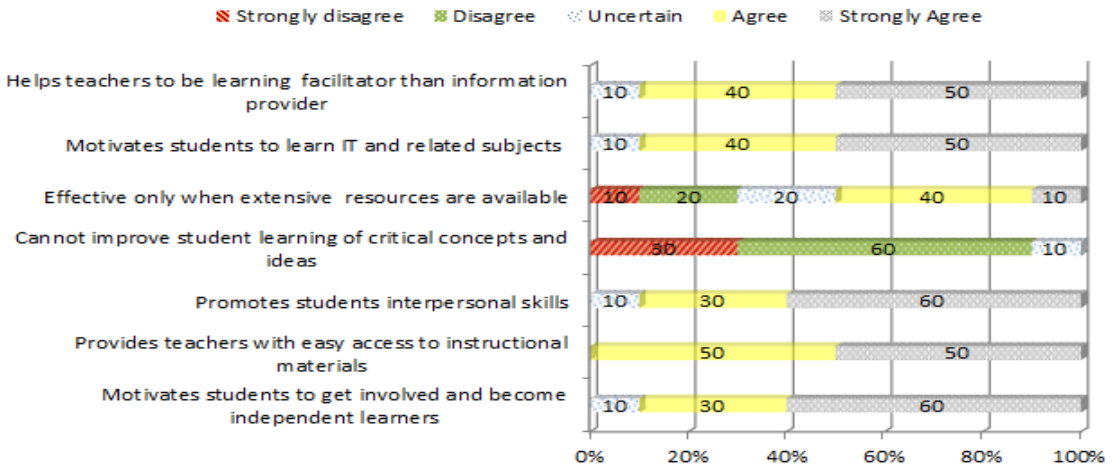

Figure 2. Perception of curriculum developer experts on the use ICTs in education

Results in Figure 2 above show that, majority (60%) agree on the ability of ICT use to motivate students become independent learners, (50%) agree that ICT provides teachers with easy access to instructional materials, (60%) agree that ICT promotes learners interpersonal skills, (50%) agree that the use of ICT motivates students to learn IT and other related subjects and (50%) agree that ICT helps teachers to become learning facilitator than being information providers only. However, it was recently reported that investing heavily in computers and classroom technology in schools does not improve performance; the use of technology increases teachers efficiency and learners collaboration and access to more diverse learning materials in a timely and flexible schedule (OECD, 2015).

Teacher trainees knowledge, skills and classroom ICTs practices

The study examined the abilities, belief, and skills of teacher trainees by focusing on their pedagogical ICT knowledge and skills. Their responses were assessed using Very Strong (VS), Strong (S), Adequate (AD), Weak (W), and Very Weak (VW). Results are present in Figure 3 below using radar.

Results in Figure 3 above show that, most of respondents reported Very Strong (VS), Strong (S), and Adequate (AD). Between 25% and 30% reported Very Strong (VS) on using productivity software (Word, Power point and Spreadsheet), Using Internet for general searching, learning new piece of software, and locating learning opportunities that advances technology skills. Between 25 % and 35 % of respondents reported, Strong (S) on using technology to support curriculum standards, teaching, or sharing technology use in a classroom, designing activities that use technology and searching for online content related to a particular subject. Majority who reported Adequate (AD) at 35% nominated searching for content specific of particular subject and at 25% integrating technology into lessons. This means that teacher trainees perceived themselves as having good pedagogical ICTs knowledge.

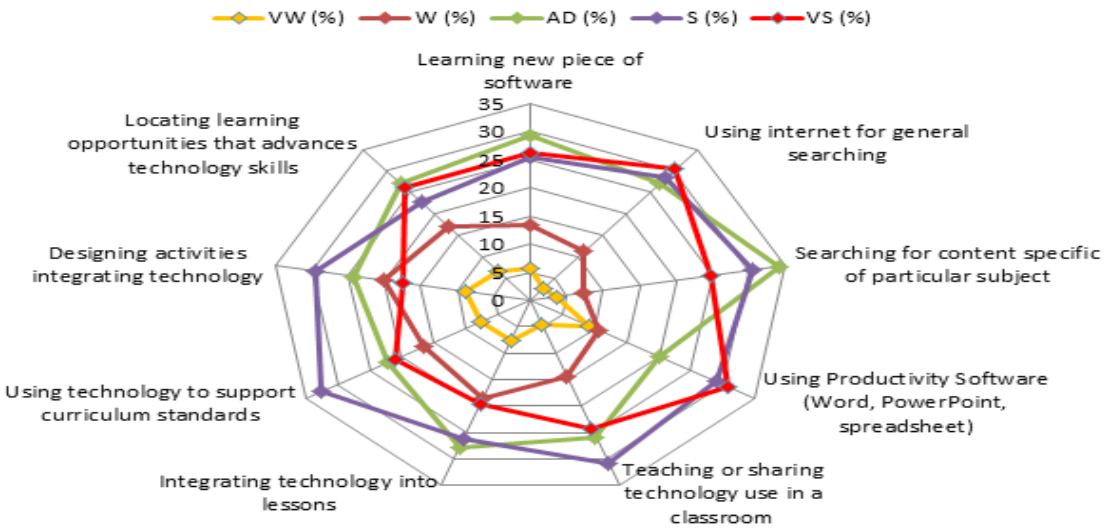

Figure 3. Teacher Trainees Knowledge, Skills and Pedagogical ICTs practices

Teachers' ICT knowledge and skills are important attributes that could have positive influence on technology use in education (Ertmer & Ottenbreit-Leftwich, 2010). Majority of teacher trainees (20%) reported as Weak (W) on the ability to design classroom activities that involve technology. Teachers general ICT use knowledge do not always mean effective skills and ability to design classroom activities that use technology (So et al., 2012). Enhancing teacher trainees on basic ICT skills and knowledge helps them to become innovative for the improvement of the educational environment, development of technological literacy, and creation of deeper knowledge (Midoro, 2013).

School teachers' classroom ICTs practices

School Teachers were assessed to find out how often have they practically considered the use of pedagogical ICT tools as teaching and learning resources. The results are in Figure 4.

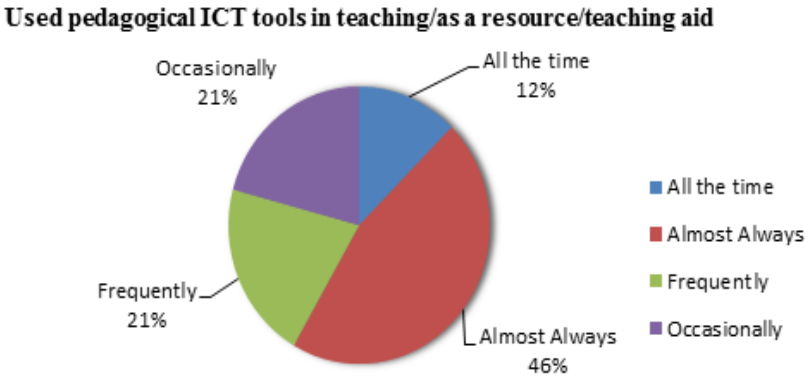

Figure 4. Teachers frequencies of pedagogical ICT tools they have used

As in Figure 4 above, the number of teachers who have considered using pedagogical ICT tools all the time, frequently and almost always combined is high (79.0%), with only 21.0% admitted to have used occasionally. No one reported "Not at all". This means teacher's readiness to use pedagogical ICT is high, even when they still face a lot of challenges. The success of ICT integration into real educational classes will depend on the ability of teachers to restructure the

educational environment with the purpose of combining of new technologies and new pedagogics (Midoro, 2013).

Perception of students on experiences with the use of ICTs

In this study, we examined students' experiences with pedagogical ICT that could have resulted from teachers' abilities to use and present ICT tools in classrooms. All tools assessed were not based on the experience to use but knowledge of the tools. Student knowledge is a potential attribute in the SWOT analysis as an internal personal factors. Statistical results are in Figure 5.

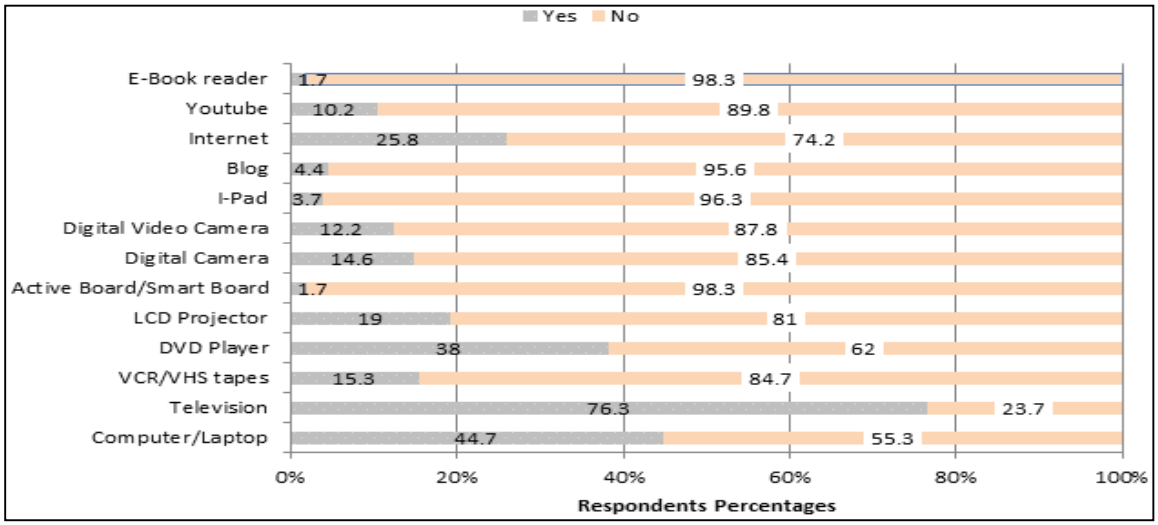

Figure 5. Pedagogical ICT tools students have practiced

Results in Figure 5 above show that, majority of students have not been exposed to the relevant pedagogical ICTs, they lack knowledge, skills and competence in the use of digital contents. The most tools that are knowledgeable to students are television (76.3 %) , computer/laptops (44.7%) and DvD player (38.0%) and the internet (25.8%).The rest reported 'yes' less than 20%. This means most school students perceived themselves to have low knowledge on basic ICT tools that support e-learning models. A successful use of pedagogical ICTs in secondary education must affect both teachers and students through purposive use and access to relevant technologies. A stud by Norris, Sullivan, Poirot, & Soloway (2003) reported that, technology cannot have impact on learners when they have no opportunity to access and use the technology. Having minimum number of ICT tools in schools can lead to significant students' knowledge, skills and awareness that are import for OREI efficient practices. The development of competencies among students follows into three stages of technology literacy (promoting opportunities to use ICTs for more effective knowledge acquisition within the learning process), knowledge deepening (application of technology for concepts deepening using real-world tasks) and knowledge creation (create new knowledge based on the available technology) (Midoro, 2013).

Tutors' (TTC) knowledge and ICT tools practices

In this study, we assessed tutors readiness to use pedagogical ICTs to measure the level of teacher trainees' exposure to relevant ICTs. The tools assessed are important for determining the level of technology, user knowledge and the need for training when OREI framework is enhanced. The knowledge of tutors' on ICT tools, positively or negatively affects teacher trainees knowledge and abilities to adopt ICT use in education. Results are shown in Figure 6 below.

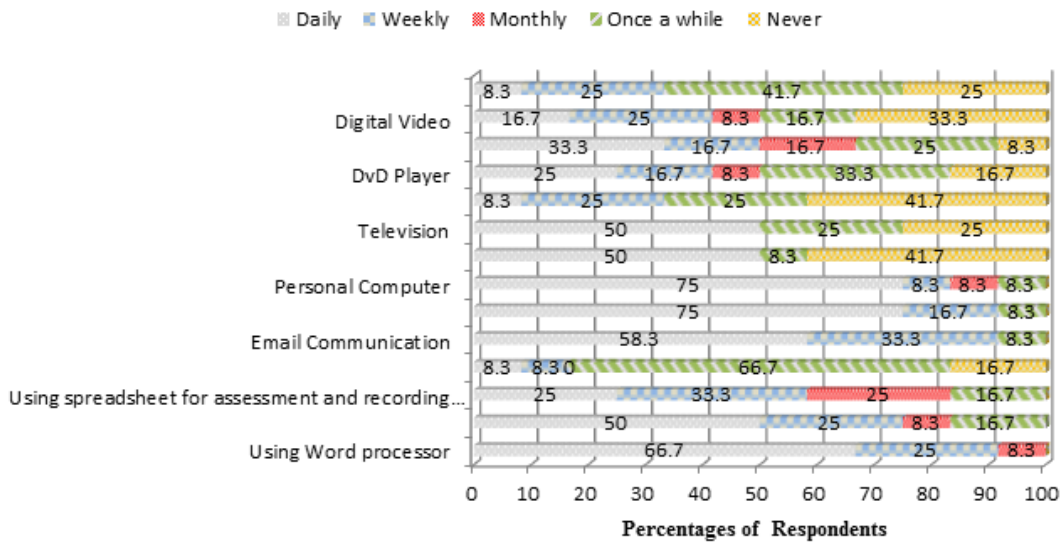

Figure 6. Respondents frequencies of pedagogical ICT tools practices.

Results in Figure 6 above, revealed that the majority of tutors make daily use of word processor (66.7%), PowerPoint presentation (50%), email communication (58.3%), internet search engine (75%), Ipad/iPhone/android Phone/ tablet (50%), television (50%), personal computer (75%) and projector (33.3%). In addition, tutors reported to have, on a weekly basis, used Spreadsheet application (33.3%), digital video (25%) and digital camera (25%). Once-in-a-while users reported using the DVD Player (33.3%), College Website (66.7%). VCR/VHS tapes was reported never-used by 41.7%.

Tutors are able to search and access online educational resources that are more relevant to what e-learning needs. The more knowledge, belief and skills tutors have on ICT use in classrooms; the more motivation and experiences teacher trainees gain. In particular, study by Barton & Haydn (2006) found that teacher trainees ICT use is portrayed by the experience, knowledge and skills of their tutors. Application of new technologies in education assumes a new role of the teacher, new pedagogical techniques, and new approaches to teacher education (Midoro, 2013).

Government readiness to support ICT use in secondary education

Based on the conducted interviews, officials from the Ministry of Education and Vocational Training (MoEVT) had varied positive responses. The interview focused on existence of policies and guidelines, present and past ICT use in secondary education enhancement projects and personal knowledge and readiness to advise the government on investing in ICT use in secondary education. It was found that the ICT policy for basic education exists without implementation guidelines such as astrategic plan and investment framework. One officer stated: "*We have an ICT policy for basic education, however it lacks harmonized implementation plan".* An officer from the Tanzania Institute of education when asked about the curriculum and direct support for ICT tools application, stated: "M*ajority of schools have no ICT infrastructures like computers, internet access, and electricity, therefore it is not realistic to implement ICT in secondary education*". The MoEVT officers when asked on present and previous ICT related projects, they listed three major recently carried out projects. Results are summarized in Table 2 below.

Table 2
Government readiness for educational ICT usage

Project name	Project sponsor/coordinator	Project objectives
(a) National Programme for ICT for Secondary school Teachers, 2005 to 2008	MoEVT-Secondary Education Unit, World bank	-Targeted to eradicate ICT illiteracy among teachers and enhance its use in teaching. -To its completion, the project supported 50 secondary schools and all 34 government teachers' colleges with ICT infrastructures and e-contents
(b) SME (Science, Mathematics, and English) ICT project-2011-2013.	MoEVT-Teacher education Department and Global E-Schools and Communities Initiative (GESCI).	-Baseline study on e- resources gaps in secondary education and teacher training colleges. -Install computer systems, internet, and equipments in 35 schools. -Train Science, Mathematics, and English teachers in in ICT basic skills.
(c) Strengthening Innovation and Practice in Secondary Education (SIPSE) Project - June 2013 - May 2015	MoEVT-Teacher education Department and funded by Master Card Foundation.	-Equipping teachers to provide a student-centered, participative and ICT- based approach to curriculum delivery in Science Technology, English, and Mathematics (STEM).

Government readiness should be known as the most important factor for the public education system and that it influences many other factors. Among factors that depend on government influence and have not sufficiently supported technology use in schools are ICT focused teacher preparation, insufficient number of computers, and unreliable internet connections. These are obstacles for the preparation of student-teachers to teach ICT and use ICT in their teaching (Andersson et al., 2014, p. 88). Investment in e-learning is not an alternative to investment in education generally; the two complementary entities for promoting and transforming education for a better (Olson et al., 2011).

School inspectors pedagogical ICT tools knowledge and support

The knowledge and support school inspectors have on the benefits of pedagogical ICT tools influence adoption of technology by teachers. It should be noted that all school inspectors are teachers by profession and they are part of the MoEVT advising body on issues related to improvement of education. When asked to mention any pedagogical ICT tools that could be recommended as teaching/learning resources, they list numerous tools. The results are in Table 3 below.

Table 3
Interview results on the school inspectors pedagogical ICT tools knowledge and support

Question: List some few examples of the pedagogical ICT tools that you could suggest to be included in the curriculum as teaching/learning resources/aid.

School Inspector (SPn)	School Inspector (Spn) response	Significance
Sp1	Multimedia (scanners, digital cameras and video cameras), Electronic mail and the internet, Presentation software, Expansive software	Yes to all
Sp2	Communicative application, interactive whiteboard software, simulation/animations applications, spreadsheets.	Yes to all
Sp3	DvD player, Video, TV, Radio, Radio tapes, Content specific applications, presentation software e.g. power point, internet resources	Yes to all
Sp4	Analytical/programing tools, content specific applications, presentation software.	Yes to all

Results in Table 3 show that, inspection officers are knowledgeable about pedagogical ICT tools, but do not indicate whether or not inspectors are good users of technology. Their knowledge and skills about pedagogical ICTs have influence on what teachers practice in classroom. Schools' inspectors have influence in the current and future use of ICTs in education (Robertson, 2003). Inspectors are part of policy makers, their knowledge and beliefs about technology have great influences on government's decision to invest in ICT in secondary education.

Tanzania ICT use in education SWOT analysis

E-learning is built on the availability of ICT resources ranging from hardware, software and relevant educational materials that are well planned and accessible to learners and teachers. The SWOT analysis is viewed from two perspectives of external factors and internal factors as in Figure 7 below.

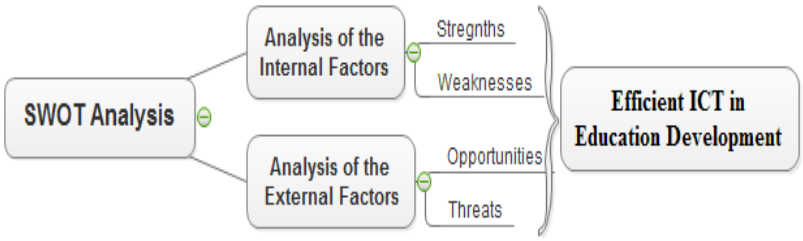

Figure 7. SWOT analysis process for ICT use in education.

The SWOT analysis helps to focus on strengths, minimize threats, and take the greatest possible advantage of opportunities available when taking any strategic action.

Table 4

ICT use in Tanzania secondary education SWOT analysis

Internal factors	
Strengths	***Weaknesses***
Government readiness as indicated by the past and ongoing ICT in education projects. Availability of ICT policy for basic education used as base for ICT use and planning. Presence of key decision makers who see ICT use in education as important. Recognition and readiness of principle users on the importance and needs of ICT education Training institution are increasing ICT teacher supply Existence of private organizations ready to support and fund the ICT use in education projects. Existence of the fiber backbone as an ongoing effort to link all education institutions and public secondary schools to the fiber optic for enhancing connectivity Internet connectivity and Access growth and awareness among many citizens. Growing and penetration of mobile devices country wide. Low connectivity charges per bandwidth and flexibility Possibilities of having local in-house content developers with ability to localise contents relevant to curriculum and guidelines Availability of experienced staffs in delivering e-learning in the field of secondary education.	Lack of ICT policy for basic education strategic implementation plan and the framework. Lack of technical infrastructure issues i.e. IT equipment not fit for education purpose Physiological barrier of teachers and schools management Principle users have weak English language that do support most of technology use terminologies No universal standard of computer software and hardware specifications for secondary education Lack of sustainable funding Earlier, emphasis was given to information technology as a subject rather than pedagogical ICTs applications. Due to lack of computers and professional teachers the skills and knowledge transferred to learners do not meet the minimum standards of ICT use in education Lack of supportive infrastructures (inadequate computers, internet access, like internet , hardware and software, e-contents, unreliable internet connection and insufficient bandwidth) Too many disadvantaged families (many families cannot afford to invest in technologies for their children) Limited number of supporting experts (ICT users lack support). Resistance to change (teachers unwillingness to adopt new technology use) Lack of motivations and incentives to use e-contents in education (Teacher who use ICT are not recognized). Tutors and Teachers have limited technology usage capabilities (pedagogical technology use, inability to search, design, edit and construct e-contents) Lack of standardized and quality e-learning training materials. Learners' lack knowledge, skills and readiness to use ICT tools for learning.

External factors	
Opportunities	***Threats***
Possibility of enhancing availability of online collaboration tools. Existence of unexplored external funding sources. Opportunities for blending of existing traditional teaching methods with technology New advancement in technology for our generation (Surrounded by graphical web browsers, laptops, cell phones, instant messenger services, broadband, wireless, video games, video conferencing, and crowd/cloud computing) Could enhance development of ICT curriculum on international level. Foster active cooperation of government, public and private sectors and international and donor organizations in ICT use in education. Can motivate creativity and contribution in advancement of educational technology	Financial constraints (limited external funding sources) Lack of sustainable power supply for running technological devices Technology changes (new technologies can discourage users who are not eager to learning) Lack of secondary school curriculum related e-books and e-contents. Bandwidth and connectivity issues E-learning being seen as not cost effective. Lacking allocation of specific amount of fund in the government budget for the ICT in secondary education initiatives There is misunderstanding that ICT education is just a computer literacy or knowledge of widely used applications Consequences of inadequate computer hardware and software supply If the government does not resolve issues related to preparation and education of teacher trainees in ICT use, few years later the nation will face lack of ICT qualified teaching staff.

Conclusion

Frameworks that help us to organize learning with, though, or about ICT are useful, as are frameworks that guide us to a new level of technology use. The OREI framework and SWOT analysis prompted identification of favorable factors (strengths and opportunities) and unfavorable factors (weakness and threats) intended to yield strategic insights for the OERI framework practices. Without this information, framework implementation misses feasible inputs (Valentin, 2001). However, there is also possible that a framework that is reasonable and coherent in its own right may not be reasonable and coherent in certain situations (Robertson et al., 2007, p. 23). Hence, the Tanzania education system needs a stable localized framework to be used a roadmap for ICT use in education planning and implementation. The successful use of online educational resources and e-learning implementation (OREI) framework as a roadmap for the ICT in education planning in Tanzania secondary education depends on several critical factors. The planning and deciding on the levels of ICT integration in secondary education settings should be interpreted in ways that are realistic and sustainable for improving educational outcomes. The favorable factors (strengths and opportunities) and the unfavorable factors (weakness and threats) presented in this study are grounded in practical solutions to problems and issues identified in the planning process, school environments, principle user characteristics and the level of stakeholder involvement in the process of designing a working solution.

This study promotes a roadmap for sustainable ICT planning and use steps to enable education policy makers, research institutions, instructional designers, and teachers training institutions to construct and reconstruct their own understandings of their experiences in relation to the use of ICT, its possibilities for continuation, the opportunities for improvement and change, and overcome constraints that limit current initiatives. The OREI framework will improve access, equity, and quality in the delivery of e-contents through integration and harmonization of curriculum relevant e-contents used in teaching and learning. It will identify relevant and core technology for secondary education ICT use enhancement (Hooker et al., 2011, p. 20). Specifically, the OREI creates a cohesive ICT framework that enhances planning and implementation of suitable ICTs in secondary education, and it provides and improves investment in ICT infrastructure that directly support teaching and learning. In addition, it provides guidance for future growth, transforms basic education curriculum for e-delivery modes, develops guidelines for online resources design and access, integrates ICT in educational management functions, and enhances the contribution of stakeholders in ICT research and development. Redefining the Tanzania education in terms of e-learning models and implementation is an important step to be made in the 21st century (Baker et al., 2013, p. 8).

Recommendations and further studies

This study recommends the government to invest in a centralized learning content management system to lead, motivate and allow creation, storage, sharing, and collaboration between users. To overcome barriers of ICT use in education, we recommend a shared vision and a technology integration plan to change attitudes and beliefs for all users. The basic question that needs to be addressed by future studies is how integrated the e-learning models and approaches to cope with the future societal and technological changes, The system should be designed to integrate the available complex of learning resources, enhance multilevel flexibility for students, and empower teachers to work effectively in the school environments with the rapidly growing number of students. The proposed e-learning approach should first, take pedagogical, technical, and organizational aspects into account; second, take a systems design approach to integrate online educational resources with face-to-face instruction and other media in order to maximize the effectiveness and efficiency of the e-learning model of choice; and third, it should be student centered to join education policy and implementation plans that address collaboration of diverse,

widely distributed set of learners who need to learn and transfer skills to an increasingly varied set of real-world contexts and settings.

References

Andersson, B., Nfuka, E. N., Sumra, S., Uimonen, P., & Pain, A. (2014). *Evaluation of Implementation of ICT in Teachers' Colleges Project in Tanzania* (Final Evaluation Report No. Sida61745en Urn: nbn: se: sida-61745en). Stockholm, Sweden: Swedish International Development Cooperation Agency (Sida). Retrieved from http://sidapublications.citat.se/interface/stream/stream.asp

Baker, D., Bliss, A., Chung, R., & Reynolds, C. (2013). *E-Learning for Teacher training in Tanzania : Policy, Players, Models, and Recommendations for the Asante Africa Foundation* (Introduction to Policy Analysis No. PP200). Berkeley, California: University of California. Retrieved from http://www.asanteafrica.org/wp-content/uploads/2015/06/E-Learning.-TZ-Teachers.2013.pdf

Baker, R. (2011). Pedagogies and Digital Content in the Australian School Sector. The Learning Federation, Education Services Australia. Retrieved from http://www.ndlrn.edu.au/verve/_resources/ESA_Pedagogies_and_Digital_Content_in_the_Australian_School_Sector.pdf

Barton, R., & Haydn, T. (2006). Trainee teachers' views on what helps them to use information and communication technology effectively in their subject teaching. *Journal of Computer Assisted Learning*, *22*(4), 257–272. http://doi.org/10.1111/j.1365-2729.2006.00175.x

Beyth-Marom, R., Saporta, K., & Caspi, A. (2005). Synchronous vs. Asynchronous Tutorials. *Journal of Research on Technology in Education*, *37*(3), 245–262. http://doi.org/10.1080/15391523.200 5.10782436

Cavus, N. (2013). Selecting a learning management system (LMS) in developing countries: instructors' evaluation. *Interactive Learning Environments*, *21*(5), 419–437. http://doi.org/10.1080/10494 820.2011.584321

Chingos, M. M., & Whitehurst, G. J. (2012). *Choosing Blindly: Instructional Materials, Teacher Effectiveness, and the Common Core* (Policy Document). Washington DC: Brown Center on Education Policy. Retrieved from http://www.brookings.edu/~/media/research/files/reports/2012/4/10%20curriculum%20chingos%20whitehurst/0410_curriculum_chingos_whitehurst.pdf

Clark, R. C., & Mayer, R. E. (2011). *E-Learning and the Science of Instruction: Proven Guidelines for Consumers and Designers of Multimedia Learning*. (R. Taff, Ed.) (3rd ed). San Francisco, CA,USA: John Wiley & Sons, Inc.

Conde, M. Á., García-Peñalvo, F. J., Rodríguez-Conde, M. J., Alier, M., Casany, M. J., & Piguillem, J. (2014). An evolving Learning Management System for new educational environments using 2.0 tools. *Interactive Learning Environments*, *22*(2), 188–204. http://doi.org/10.1080/10494820. 2012.745433

Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2010). Teacher Technology Change: How Knowledge, Confidence, Beliefs, and Culture Intersect. *Journal of Research on Technology in Education*, *42*(3), 255–284. http://doi.org/10.1080/15391523.2010.10782551

Farrell, G., & Isaacs, S. (2007). *Survey of ICT and Education in Africa: A Summary Report, Based on 53 Country Surveys.* (Country Reports No. Volume 2 : 53) (p. 74). Washington, DC,USA: infoDev / World Bank. Retrieved from http://www.infodev.org/en/Publication.353.html

Grant, M. M. (2010, February). *CMS, LMS and LCMS*. Presentation slides presented at the Education and Technology, University of South Carolina. Retrieved from http://www.slideshare.net/msquareg/cms-lms-lcms

Greenberg, L. (2002). LMS and LCMS: What's the Difference? *Teaching Circuits*, *31*(2). Retrieved from http://scripts.cac.psu.edu/staff/g/m/gms/fa07/IST-440W/LMS%20and%20LCMS_%20What's%20the%20Difference_.pdf

Helms, M. M., & Nixon, J. (2010). Exploring SWOT analysis – where are we now?: A review of academic research from the last decade. *Journal of Strategy and Management*, *3*(3), 215–251. http://doi. org/10.1108/17554251011064837

Hooker, M., Mwiyeria, E., & Verma, A. (2011). *ICT Competency Framework for Teachers (ICT-CFT) :Contextualization and Piloting in Nigeria and Tanzania* (World Bank and GESCI Initiative Synthesis report No. Draft). Dar-es-Salaam, Tanzania: Ministry of Education and Vocational Training (MoEVT), Tanzania.
Retrieved from
http://www.gesci.org/assets/files/Tanzania_Needs_Assessment_Report_Draft_Final_230911%20_3_.pdf

Hrastinski, S. (2008, November 17). Asynchronous and Synchronous E-Learning. *EDUCAUSE*, *31*(4). Retrieved from http://www.educause.edu/ero/article/asynchronous-and-synchronous-e-learning

Hyder, K., Kwinn, A., Miazga, R., & Murray, M. (2007). Synchronous e-Learning : How to design, produce, lead, and promote successful learning events, live and online. (Bill Brandon, Ed.). The eLearning Guild. Retrieved from
http://theelearningcoach.com/wp-content/uploads/downloads/2010/06/ synchbook.pdf

Ismail, J. (2001). The design of an e-learning system: Beyond the hype. *The Internet and Higher Education*, *4*(3), 329–336.

Johnson, L., Malcolm, C., Samantha, A. B., Victoria, E., Alex, F., & Holly, L. (2013). *NMC Horizon Report 2013 K-12* (K-12 series). Austin, Texas USA: The New Media Consortium. Retrieved from http://www.nmc.org/pdf/2013-horizon-report-k12.pdf

Kaplan, M., & Zhu, E. (2011). Teaching with Technology. In M. Svinivki, W. J. McKeachie, & L. Schreiber-Ganster (Eds.), *Teaching with Technology* (Thirteenth Edition, pp. 235–266). Calfornia, USA: Wadsworth, Cengage Learning.

Kidd, T. T. (2010). *A Brief History of eLearning*. (M. Khosrow-Pour, S. Clarke, M. E. Jennex, A. Becker, & A.-V. Anttiroiko, Eds.) (Vol. Vol.1). Hershey, New York, USA: Information Science Reference (an imprint of IGI Global).

Midoro, V. (2013). *Guidelines on adaptation of the UNESCO ICT Competency Framework for Teachers* (Methodological approach on localization of the UNESCOICT-CFT No. UDK 37). Moscow, Russia: UNESCO Institute for Information Technologies in Education. Retrieved from http://iite.unesco. org/pics/publications/en/files/3214726.pdf

Mijatovic, I., Cudanov, M., Jednak, S., & Kadijevich, D. M. (2013). How the usage of learning management systems influences student achievement. *Teaching in Higher Education*, *18*(5), 506–517. http://doi.org/10.1080/13562517.2012.753049

Miles, I., Keenan, M., & Kaivo-Oja, J. (2003). *Handbook of Knowledge Society Foresight* (No. EF/03/50/EN). Dublin, Ireland: European Foundation for the Improvement of Living and Working Conditions. Retrieved from http://edz.bib.uni-mannheim.de/www-edz/pdf/ef/03/ef0350en.pdf

Moore, K. (2007). The E-Learning Strategy. (B. Brandon, Ed.). The eLearning Guild. Retrieved from http://theelearningcoach.com/wp-content/uploads/downloads/2010/06/strategy_ebook.pdf

Nagel, D. (2013, April 6). Six Technology Challenges Facing Education [Ed Tech Trends and News]. Retrieved May 9, 2015, from http://thejournal.com/Articles/2013/06/04/6-Technology-Challenges-Facing-Education.aspx?Page=1&p=1

Naik, U., & Shivalingaiah, D. (2009). Open Source Software for Content Management System. In *7th International CALIBER-2009* (pp. 225–239). Ahmedabad: INFLIBNET Centre. Retrieved from http://ir.inflibnet.ac.in/bitstream/1944/1028/1/29.pdf

Niemi, H., Kynäslahti, H., & Vahtivuori-Hänninen, S. (2013). Towards ICT in everyday life in Finnish schools: seeking conditions for good practices. *Learning, Media and Technology*, *38*(1), 57–71. http://doi.org/10.1080/17439884.2011.651473

Ninoriya, S., Chawan, P., & Meshram, B. B. (2011). CMS, LMS and LCMS for elearning. *IJCSI International Journal of Computer Science*, *8*(2), 644–647.

Nisheva, M., Gourova, E., Ruskov, P., Todorova, Y., & Antonova, A. (2008). Strategic framework for IT education and research at Sofia University. *International Journal of Education and Information Technologies*, *4*(2), 213–225.

Norris, C., Sullivan, T., Poirot, J., & Soloway, E. (2003). No Access, No Use, No Impact. *Journal of Research on Technology in Education*, *36*(1), 15–27. http://doi.org/10.1080/15391523.2003.10782400

O'Carroll , A, Collins, S, Gallagher, D, Tang, J, & Webb, S. (2013). *Caring for Digital Content: Mapping International Approaches* (Research Report No. 2). Dublin, Ireland: Maynooth: NUI Maynooth; Dublin: Trinity College Dublin; Dublin: Royal Irish Academy. DOI: 10.3318/DRI.2013.1. Retrieved from http://dri.ie/caring-for-digital-content-2013.pdf

OECD. (2015). *Students, Computers and Learning*. Paris.: OECD Publishing. Retrieved from http://www.oecd-ilibrary.org/education/students-computers-and-learning_9789264239555-en

Olson, J., Codde, J., deMaagd, K., Tarkelson, E., Sinclair, J., Yook, S., & Egidio, R. (2011). *An Analysis of e-Learning Impacts & Best Practices in Developing Countries: With Reference to Secondary School Education in Tanzania* (Information & Communication Technology for Development). Michigan, USA: Michigan State University. Retrieved from http://cas.msu.edu/wp-content/uploads/2013/ 09/E-Learning-White-Paper_oct-2011.pdf

Project Tomorrow. (2013). New Digital Learning Playbook:The Digital Content Story. Speak Up 2013 National Research Project. Retrieved from www.tomorrow.org/speakup/

Robertson, J. W. (2003). Stepping Out of the Box: Rethinking the Failure of ICT to Transform Schools. *Journal of Educational Change*, *4*(4), 323–344. http://doi.org/10.1023/B:JEDU.0000006047.67433.c5

Robertson, M., Webb, I., & Fluck, A. (2007). *Seven steps to ICT integration*. Camberwell, Victoria, Australia: ACER Press.

Ryan, T. G., Toye, M., Charron, K., & Park, G. (2012). Learning management system migration: An analysis of stakeholder perspectives. *The International Review of Research in Open and Distributed Learning*, *13*(1), 220–237.

Sambuu, U. (2005). The usage of ICT for secondary education in Mongolia. *International Journal of Education and Development Using ICT*, *1*(4), 101–118.

Smart, K. A., & Meyer, K. A. (2005). Changing Course Management Systems: Lessons Learned. *EDUCAUSE Quarterly*, (2), 68–70.

So, H.-J., Choi, H., Lim, W. Y., & Xiong, Y. (2012). Little experience with ICT: Are they really the Net Generation student-teachers? *Computers & Education*, *59*(4), 1234–1245. http://doi.org/10.1016/j.compedu.2012.05.008

Tanzania Institute of Education (TIE). (2009). *Curriculum for Advanced Secondary Education in Tanzania* (2013th ed.). Dar-es-Salaam, Tanzania: Tanzania Instituite of Education. Retrieved from http://www.moe.go.tz/index.php?option=com_docman&task=doc_download&gid=226&Itemid=619

United Republic of Tanzania (URT). (2008, August). Education Sector Development Programme-ESDP (2008-2017). The United Republic of Tanzania. Retrieved from http://planipolis.iiep.unesco.org/upload/Tanzania%20UR/Tanzania-ESDP-2008-2017.pdf

United Republic of Tanzania (URT). (2013). *Basic Education Statistics in Tanzania (BEST).* (National Data 2008-2012). Dar-es-Salaam: Ministry of Education and Vocational Training (MoEVT). Retrieved from http://www.moe.go.tz/index.php?option=com_docman&task=doc_download&gid=226&Itemid=619

Valentin, E. K. (2001). Swot Analysis from a Resource-Based View. *Journal of Marketing Theory and Practice*, *9*(2), 54–69.

Varlamis, I., & Apostolakis, I. (2006). The Present and Future of Standards for E-Learning Technologies. *Interdisciplinary Journal of E-Learning and Learning Objects*, *2*(1), 59–76.

Warger, T., Dobbin, G., Initiative, E. L., & others. (2009, October). Learning environments: where space, technology, and culture converge. EDUCAUSE Learning Initiative (ELI). Retrieved from https://net.educause.edu/ir/library/pdf/ELI3021.pdf

Watson, J., Murin, A., Vashaw, L., Gemin, B., & Rapp, C. (2013). *Keeping Pace with K-12 Online and Blended learning: An annual Review of Policy and Practice* (10th annual Keeping Pace report). Evergreen Education Group. Retrieved from http://www.kpk12.com/wp-content/uploads/EEG_KP2013-lr.pdf

Zhang, P., & Goel, L. (2011). Is e-learning for everyone? An internal-external framework of e-learning initiatives. *MERLOT Journal of Online Learning and Teaching*, *7*(2), 193–205.

About the authors

Patrick D.Kihoza is a PhD student at the Nelson Mandela African Institution of sciences and Technology, Arusha, Tanzania. He is majoring in Information and Communications Sciences Engineering (ICSE) in the School of Computational and Communication Sciences and Engineering. He graduated in 2012 with a MSc. Computer Science (International CBU Master's Programme in ICT) - University of Eastern Finland, Joensuu. He has a BSc.in Information and Communication Technology with Management (BSc.ICTM) from Mzumbe University, Tanzania.

Email: kihozap@nm-aist.ac.tz

Irina Zlotnikova is a full professor and Interim HOD Computer Science and Software in College of ICT, Botswana International University of Science and Technology. She has a PhD in Theory and Methodology of Computer Science Education (Doctor of Pedagogical Sciences, Moscow, Russia).In addition she has a PhD in Solid-State Electronics, Nano- and Microelectronics (Candidate of Technical Sciences, Voronezh, Russia) and an Engineer Degree in Radiophysics and Electronics (Voronezh, Russia).

E-mail: zlotnikovai@biust.ac.bw

Khamisi Kalegele is a lecturer at the Nelson Mandela African Institution of Science and Technology, Arusha, Tanzania; School of Computational and Communication Sciences and Engineering. He received a PhD in information sciences-Tohoku University, Japan. Currently, he is undertaking R&D activities related to ICT for development in health, education, and agriculture sectors.

E-mail: khamisi.kalegele@nm-aist.ac.tz

Return to Table of Contents