THE ONLINE JOURNAL OF DISTANCE EDUCATION AND E-LEARNING

ISSN 2147-6454

The Online Journal of Distance Education and e-Learning

Volume 3 Issue 2
April 2015

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www.tojdel.net
01.04.2015

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April 01, 2015
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COMPARING E-TIVITIES, E-MODERATION AND THE FIVE STAGE MODEL TO THE COMMUNITY OF INQUIRY MODEL FOR ONLINE LEARNING DESIGN

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Abstract: This paper explores the question as to whether learning design strategies of E-tivities, e-Moderation and the 5-Stage Model by Professor Gilly Salmon, might be practically aligned with the Community of Inquiry Model (CoI). This is relevant to explore as there is very little literature that firstly presents on the current research in to these 'Salmon Methodologies'. Nor is there any literature at all that marries these methods as a possible guide for catering to the complexities of Social Presence, Cognitive Presence and Teaching presence within the CoI model. This report will explore, analyse and compare these methods and their alignment to the three CoI presences. Also providing an argument for consideration of their use in CoI online learning design. Limitations in the research and application of both models are explored and recommendations for future research that would enable the appropriate testing of this idea are then finally presented.
Keywords: E-tivities, e-Moderation, 5-Sage Model, Communities of Inquiry, Social Presence, Teaching Presence, Cognitive Presence, Online Learning Design.

INTRODUCTION

Online learning continues to increase in momentum as an accessible method for participating in higher education, with many higher education institutions have been investing their resources into accommodating these new learners needs (Sun, Tsai, Finger, Chen, & Yeh, 2008). Currently in the United States "thirty-one percent of all higher education students now take at least one course online" (Allen, Seaman, & Sloan, 2011, p. 4); and in Australia, 19% of student in higher education students participated online and multi-modal courses in 2010 (Australian Bureau of Statistics, 2013). The issue however is that the student experience of online learning has continued to be one of high dissatisfaction with many facets of their learning journey (Bolliger & Martindale, 2004). Institutions are now in competition to attract and sustain learners to their organisations (Abdous & Yen, 2010; Roach & Lemasters, 2006; Ernst & Young, 2012), and there has been a rise in learners expectations of a positive online learning experience (Goodyear, Jones, Asensio, Hodgson, & Steeples, 2005; Paechter, Maier, & Macher, 2010). In conjunction with higher learning satisfaction being linked to continual enrolment/lower dropout rates (Allen, Burrell, Bourhis, & Timmerman, 2007; Park & Choi, 2009) and perceived course satisfaction found to predict e-learner self-regulation and sufficiency (Liaw & Haung, 2012), ensuring that learners are satisfied with their online learning experience has become more relevant to institutional success than ever. Student satisfaction research has been wide and varied and the key areas identified in the literature, have been most effectively summated by Bouhnik and Marcus (2006) as the four dimensions of: "(a) Interaction with the teacher; (b) Interaction with Content [includes course design]; (c) Interaction with Classmates; and (d) Interaction with the system" (p.301-303). As technical systems are often outside the online teachers influence, it is the first three categories that form the basis of reviewing successful learning online learning design.

One particular methodology that has grown exponentially over the past decade of research into solving these learner satisfaction issues of online learning, is the principles of constructivist learning design (Chitanana, 2012). Specifically on review of the literature, it is the constructivist approach of a Community of Inquiry (COI) framework (Garrison & Anderson, 2003), that theoretically appears addresses theses first three issues of student satisfaction in online learning design. The COI framework emphasis the role of three key elements to creating a sustainable and effective online learning experience. These areas are Social Presence, Teaching Presence and Cognitive Presence. Social presence is suggest to occur when participants are "identifying with the community, communicating purposefully in a trusting environment, and developing interpersonal relationships" (Garrison, Anderson, & Archer, 2010, p. 7). Teaching presence emphasis the role of the online teacher in creating a sustainable online community and the facilitation of social and cognitive presence initiatives (Garrison, 2007). Indeed Teaching Presence is seen "as a significant determinant of student satisfaction, perceived learning, and sense of community" (Garrison & Arbaugh, 2007, p. 163). Lastly,
Cognitive Presence is described as "the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse"(Garrison & Arbaugh, 2007, p.161). The issue for diligent and conscientious

online educators, is how to navigate the complex and diverse world of designing and structuring their content in a way that suitable addresses these three categories of the COI framework. Indeed Garrison and Arbaugh (2007) reflected that future research needing to be done into CoI framework should include exploring practical learning design strategies for it. Such as "practical strategies and guidelines on how best to create social presence in an online environment" (p.168).

One particular 'practical' learning design approach that has a foundational of constructivist approaches, is the teaching and designing strategies first developed and coined by Professor Gilly Salmon of E-tivities (2002, 2013), e-Moderation (2003, 2011), The Five-Sage Model (2003, 2011, 2013), and more recently Carpe Diem professional development workshops for designing for online learning (2013). These particular learning and teaching design approaches attempt to converge many constructivist theories of online learning design in to one overarching framework for creating online pedagogy appropriate design of collaborative interactive learning and teaching in online environments. Although there is some research into the outcomes of applying these particular designing strategies, there is no research reviewing the connection between e-Tivities (Salmon, 2013) as a practical application of designing for CoI frameworks (Garrison & Anderson, 2003). Further there is no research that links designing e-Tivities to match the integral CoI indicators of Social, Teaching and Cognitive Presence. This paper seeks to argue that e-Tivities, e-Moderation and the 5-Stage Model, do indeed overlap and align with CoI, and could be utilised more fully by educators seeking to align their teaching and design practices with CoI frameworks.

This report will firstly provide definitions of E-tivities, e-Moderation, 5-Stage Model, and The Community of Inquiry. It will then compare the original literature on the Community of Inquiry and the subsequent key framework components of Social, Teaching and Cognitive presence, to E-tivities, e-Moderation and the 5-Stage Model as appropriate learning design strategies for catering to the three CoI presences. It will then explore the current, though minimal, literature on these Salmon specific strategies that are independent of the original authors work, and reflect on possible connections or alignments to the CoI framework in the results of the research. It will then explore limitations in the research for these Salmon Specific methodologies, then provide conclusions and recommendations for future research in the field.

Method of selecting literature

The literature for this review was chosen principally in the following manner.

- **E-tivities, e-Moderation and 5-Stage Model**: As there is limited research into these topics (thus the reason for this current research) most literature that could be found was included. This included literature from the original author, and from other researchers who claimed to have specifically used Salmon methods only. This was deducted on the basis of their citations and their descriptions of their processes. However some literature was omitted if there were methodological concerns, ambiguities in the purity of their use of the Salmon Methods. Research that was older than 2000 was also omitted, and where possible the most recent research available was utilised.
- **CoI research (inclusive of Social, Cognitive and Teaching Presence):** As there is quite a substantial amount of literature that has investigated CoI in one manner or another, it was decided that this review would stick to the original authors and regular contributors research as much as possible. This was to ensure purer and more accurate comparison between the original intentions of both methods descriptions and outcomes. As the original authors and contributors to CoI research have been diligent in producing regular and scientifically valid research, selection of literature was able to be chosen on the basis of relevant content to this research topic. However care was still taken to select research that did not have generalisability or ambiguity concerns. Also again, research that was older than 2000 was also omitted, and where possible the most recent research available was utilised

Methods of literature searching was predominantly electronic, with some exceptions for hardcopy books etc. The data base system EBSCOhost was used with the 'select all' option to include the total 38 subtopics, each which had access to thousands of journals. Including the popular Academic Search Complete which includes 8,500 full-text periodicals and more than 7,300 peer-reviewed journals. From there specific date range, full text and peer-reviewed journals only were set as refined searching settings. Google Scholar was also utilised for seeking relevant research. A number of search terms were used for finding results, obvious key terms included Online Learning, Distance Learning, Online Learning Design, e-Learning Design, e-Tivities, e-Moderation, 5-Stage Model, CoI, Community of Inquiry, and Social/Cognitive/Teaching Presence. Further terms were searched on the basis of their reoccurrence as synonymous to the above key terms in the literature. Author refined selection was also used to find relevant research from the main authors of the methods (eg. Gilly Salmon, Andy Garrison and so on). Citation searches in Google Scholar and EBSCOhost were also done on specific seminal papers or books from the original authors. This was to help hone in

finding research on the topics that appeared to have utilised the methods in their research and remaining close to their original forms.

E-TIVITITES, E-MODERATION AND THE 5-STAGE MODEL: DEFINED

E-tivities are defined as "frameworks for enabling active and participative online learning by individuals and groups" (Salmon, 2013, p. 5), and are utilised in online learning in order to create a clear structured opportunity for learners to participate and interact collaboratively with the content, peers and the e-moderator. Utilised as a means of seeking and acquiring a deeper understanding and connection to the content of the learning. The foundations of e-tivities include constructivism, situated learning and social learning theories (Salmon, 2002, 2013), which are integral components in "well rehearsed, principles and pedagogies for learning" (Salmon, 2013, p. 1). E-tivities are utilised weekly and constantly through course modules, are recommended to be deployed in groups of a maximum of 25 people (Salmon, 2002), and have a very distinct structure in their design. Please see Salmon (2013) page 3 for an overview of the structure of an e-tivity.

E-Moderation (2003, 2011) is term used to describe a particular strategy of interaction between the online instructor and their students. According to Salmon (2003) the role of the e-moderator is described as "promoting human interaction and communication through the modelling, conveying and building of knowledge and skills" (p.4). E-moderating skills (Salmon, 2003, 2011) include the use of weaving (integrating online student responses and probing or questioning areas of further discussion- particularly in through the use of e-tivities), and summarising (a succinct summary of learners responses to the module topic discussions, that explores the deeper context of learners responses and knowledge acquisition). An e-moderator is expected to be sensitive to the online learner's experience and have high levels of emotional intelligence. Important in applying e-moderating is "self-awareness, interpersonal sensitivity and the ability to influence" (Salmon, 2011, p. 104). Therefore e-moderating is directly linked to creating quality, personal, and effective interactivity between the learner and the teacher as important components of constructivism principles. See Salmon, 2013, (p.184-185) for an overview of weaving and summarising strategies in e-Moderation.

The 5-Stage Model (Salmon, 2011) is a strategic approach to structuring course content and interaction, around the basis of a natural stage-by-stage progression the e-learner is likely to go through in online learning. The model provides the course designer a scaffold in which to organise course content and structure, with the integration of specific stage appropriate e-tivities, to meet the individual online pedagogy needs of the learner (Salmon, 2003, 2011). This links directly to providing a valid strategy for meeting learner satisfaction in Course Structure and Organisation factors (CSO). Figure 1 displays a direct image replication of the model and the information of the stages involved from Professor Salmons (2014) website.

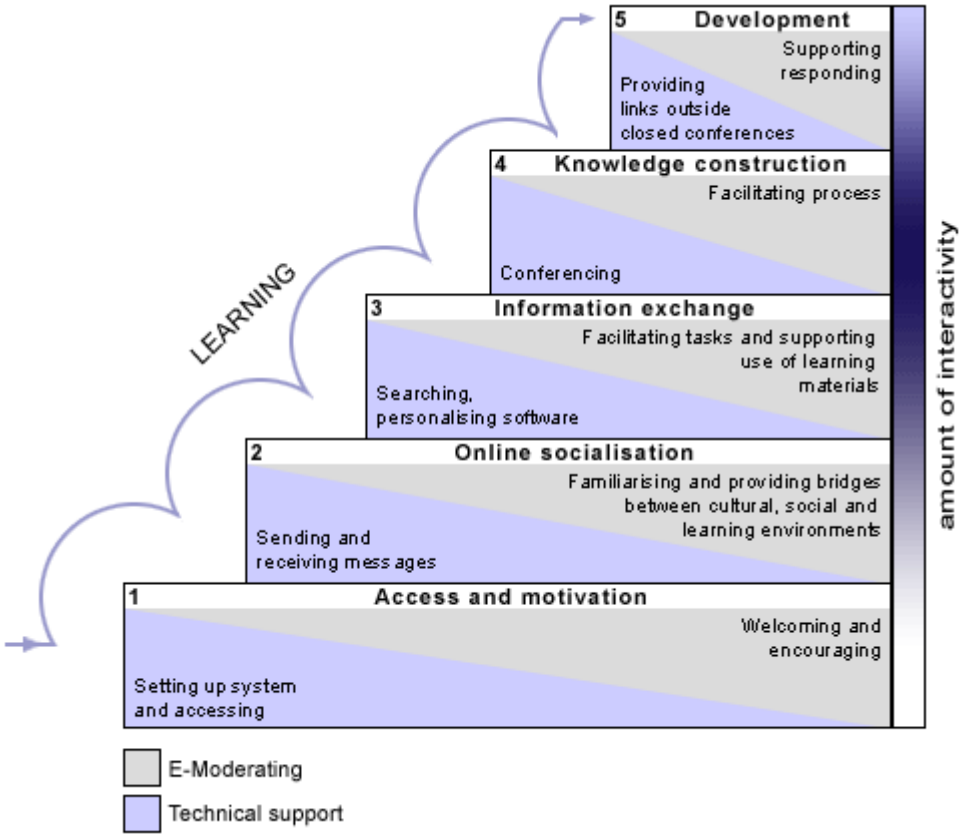

Figure 1: Salmon (2011) Five Stage Model (Gilly Salmon, 2014, para 1)

COMMUNITY OF INQUIRY DEFINED

According to the Communities of Inquiry (CoI; 2014) website, an educational CoI may be demonstrated as:

> A group of individuals who collaboratively engage in purposeful critical discourse and reflection to construct personal meaning and confirm mutual understanding. The Community of Inquiry theoretical framework represents a process of creating a deep and meaningful (collaborative-constructivist) learning experience through the development of three interdependent elements - social, cognitive and teaching presence (Communities of Inquiry, 2014, para. 1-2)

Also defined as a process model of online learning, it emphasise the importance of developing a community of learners, who through collaboration and connectivity, are able to create sustain higher order processes of learning (Swan, Garrison, & Richard, 2009). It seeks not only to establish this integral online learning community of students, but to embed the pursuit of inquiry into online learning (Swan, Garrison, & Richard, 2009). In order to create this, the CoI frame work identifies three key overlapping areas that are integral components of learning design for applying the model. These key elements are known as Social Presence, Cognitive Presence and Teaching Presence (Garrison & Anderson, 2003). The visual depiction of the framework and these entwined key elements a depicted in the model, Figure 2 below.

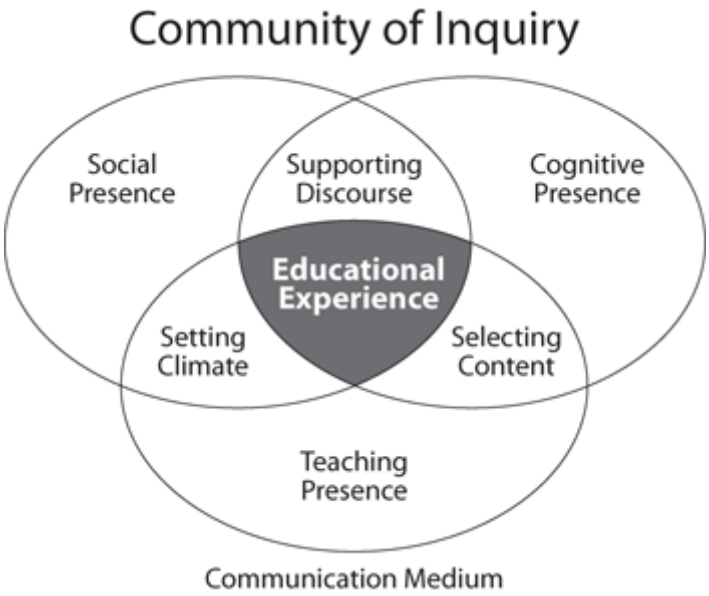

Figure 2. CoI Model. (Garrison, Anderson, & Archer, 2000; Model image retrieved from the Communities of Inquiry, 2014 website)

COMPARING SOCIAL, COGNITIVE AND TEACHING PRESENCE TO SALMON METHODOLOGIES.

SOCIAL PRESENCE

As it is understood that social presence encompasses the interactivity and meaningful correspondence between group member and course instructor in a trusting, collaborative and open online community (Garrison, 2007: Garrison, Cleveland-Innes, & Fung, 2004). Social presence in an online community can be divided in to three further aspects of "effective communication, open communication, and group cohesion" (Garrison, 2007, p.63). Research suggests that this type of social interaction is integral for successful online learning outcomes and that it is imperative they are imbedded within learning design (Irwin, & Berge, 2006; Watson, Gemin, & North American Council for Online, 2008). Some research has supported the necessity of social interaction with a sense of group belongingness reflecting better academic performance on coursework (Graff, 2006). Others provided results of barriers to student online learning, with a lack of social interaction indicated by students as the most important barrier (Muilenburg & Berge, 2005). Other student reflected data reported students beliefs that online socialisation was integral to their learning depth, sense of cohesion and emotional support (Holley, & Taylor, 2009). However, methods embedding social presences into online learning course design have not only been varied, but somewhat elusively described in the literature. There are still large gaps in providing clear and unambiguous clarity on how to design for this particular presence exactly (Garrison, 2007). Further limitations in Social Presence research seem to revolve around the issue that explorations tend to not measure the presences as a main variable as an achievement outcome, or its effect on other important learning variables (Biocca, Harms, & Burgoon, 2003). As well as a dominance in the literature to focus on social presence, without considering the overlap or importance of the simultaneous inclusion and effect of the other two presences (Garrison & Arbaugh, 2007).

Salmon (2013) stresses the importance of socialisation opportunities to be built in to e-tivities for successful online communication and group cohesiveness. Emphasizing that e-tivities need to support cultural, individual, and educational and personality sensitivity in order to enable participant's interpersonal engagement (Salmon, 2011). Indeed e-Tivities are expected to be designed catering specifically to the Five- Stage Model of student progression through an online environment, with stage two being the Socialisation stage. After students have progressed through the first stage, gaining access to the technology and being prompted by e-Tivities to explore their motivations towards the online course, the learning design is then set to move students through to the Socialisation stage of learning. E-tivities for this stage are meant to be designed so as to establish the online community and develop student networks and friendships similar principles of Wegner's (2006) communities of practice; joint enterprise, mutuality and shared repertoire. With these components reflected by designing e-tivities that teach the value of collaboration online and methods for doing so (Salmon, 2013). As well as opportunities to develop trust through safe self-disclosure and shared interested and ideas. Salmon (2013) again highlights the importance of the e-moderators role in enhancing the groups sense of cohesion and collaboration, thus supporting Garrison and Arbaugh's (2007) assertion to the importance in the overlap of the Presences.

Socialisation opportunities are built in to e-Tivities for successful online communication through the design component of the 'interact/respond' section (Please see Salmon , 2013, page 3). Whereby participants are required (through the e-Tivity instruction) to engage with other participants post responses to activities in order to allow for more meaningful connectivity between participants. Research supports that e-Tivities have the potential to develop this social element of online instruction as seen in the previously mentioned Pavey and Garland's, (2004) research that utilised e- tivities specifically to enhance student interaction and learning. It was noted that "successful bonding required encouragement and well-planned activities to foster student communication" (p. 313). This study reported that students did indeed engage with e-tivities to create social discourse and overall positive feedback for their implementation to socialisation and their learning outcomes was received (Pavey, & Garland, 2004). In other research (Morley, 2012) study that utilised e-tivities for enhancing practical socialisation, results revealed that students evaluated e-tivities as having assisted them with 'in-group' socialisation which contributed to their learning engagement.

Garrison and Arbaugh (2007) however have emphasised that the purpose of developing social presence should not reside solely for creating social support networks, interaction and effective communication. But rather its purpose in education "is to create the conditions for inquiry and quality interaction (reflective and threaded discussions) in order to collaboratively achieve worthwhile educational goals" (p.64). Which reflects the Cognitive Presence element of the model, and emphasises again on the overlap and fluidity of the presences. While Salmons 5-Stage Model does emphasise a full stage for the development of Socialisation, it does not believe that the social processes end there. Rather that they form the foundations for more in-depth cognitive processes to occur, through collaborative inquiry to be designed in e-Tivity structure, at the next two stages of the model. Which will be explored further in the next analysis of Cognitive Presence.

COGNITIVE PRESENCE

Cognitive presence is defined as "the exploration, construction, resolution and confirmation of understanding through collaboration and reflection in a community of inquiry" (Garrison, 2007, p. 65). Cognitive presence has been described as rooted with in Dewey's (1993, as cited in Garrison & Arbaugh, 2007) assertion regarding practical inquiry and the importance of critical thinking. Cognitive presence can be operationalised through a process of four phases of learning, as identified in Figure 3 below.

Figure 3. The Practical Inquiry Model (Garrison, Anderson, & Archer, 2001; Model image retrieved from the Communities of Inquiry, 2013 website).

The first phase of the Practical Inquiry model within CoI (Garrison & Anderson, 2003) is that of a 'triggering event' to create cognitive dissonance, whereby the students are faced usually with some form of learning challenge or issues to review. This can be likened to the 'Spark' element of the design of every e-Tivity, where by the learning designer/teacher using various online media, creates the ignition for the activity and discussion of the learning event. This could be a controversial/inspiring video, photo, or article that relates directly to the learning outcome of the task. The purpose of this spark is an "opportunity to expose 'content' but with the purpose of a spark to start a dialogue with others" (Salmon, 2013, p.3).

The second phase of 'exploration' "participant's shift between the private, reflective world of the individual and the social exploration of ideas. Early in this phase, students are required to perceive or grasp the nature of the problem, and then move to a fuller exploration of relevant information" (Garrison, et al., 2001, p. 10). This same phase reflects Salmon's (2013) third stage of Information Exchange whereby e-Tivities are to be designed concentrating on "discovering or exploring aspects of information that are known or reasonably easily retrieved by them. E-Tivites that encourage the presenting and linking of data, analysis and ideas in interesting ways online will stimulate productive information sharing" (p. 29). Both the Cognitive Presence phase of Exploration, and the Information Exchange stage of the 5-Stage Model emphasise the importance of an appropriately timed development process in critical thinking and the construction of knowledge. With an understanding that students must first be allowed to explore their own understand of a problem, and then seek knowledge and information both through the collective experience and personal reflection.

At the third phase of 'integration' in Cognitive Presence learning is more constructed and "decisions are made about integration of ideas and how order can be created parsimoniously" (Akyol & Garrison, 2011a, p.236). In other words there is a synthesis and focusing of their knowledge construction, application and understanding. However it has been reflected that this particular stage has been difficult to not only design for, but also to measure in terms of students achieving it (Akyol & Garrison, 2011a; Garrison, 2007; Garrison & Arbaugh, 2007). Garrison (2007) reflected on the research into this particular difficulty and acknowledge that it was integral that timing, appropriate content designing, and the role of the instructor to facilitate the group towards developmental discussion opportunities, were likely to be key to moving students through this phase. Salmon's forth stage of Knowledge Construction correlates directly with the requirements of integration, however does operationalise an approach to designing for students to demonstrate their achievement of the integration phase, through the use of appropriate e-Tivites and the role of the e-Moderator. Salmon (2013) advices that e-Tivites at this stage are to be designed to build knowledge without clear answers, create sequenced e-tivites that are strategic or problem based. Recommending that discussion based activities work well here as long as objectives are clearly focused but still allow for multiple perspectives. Salmon provides an e-Tivity exemplar to demonstrate a way to design for this particular stage (See Salmon, 2013, p.142-143). The role of the e-moderator also here is integral through 'weaving' and 'summarising' (See Salmon, 2013, p.184-185, for key explanations of what the process of weaving and summarising entails) in order to provide participants opportunities critically reflect and provide evidence of their learning. Research (Darabi, Arrastia, Nelson, Cornille, & Liang, 2011) also supports this particular style of scaffolded online facilitation (or moderation), whereby moderators were to "raise questions focusing on advancing the discussion towards a consensus among the group members on recommending an intervention asked" (p. 220). With results revealing that this scaffolded moderating approach was "strongly associated with all of the phases of cognitive presence" (Darbi et al., 2011, p.223).

Finally the last stage of Cognitive presence is the Resolution phase whereby students now are able to apply their learning from the previous phases within a meaningful context, through processes of testing and reflection (Akyol & Garrison, 2011a). The process of which could be demonstrated by finding solutions, evaluation, or providing examples of cognitive processes to reach their decisions or understanding (Garrison, et al., 2001). Salmon's (2013) final stage in the 5-Stage Model, 'Development' reflects the same outcomes as the resolution phase. With emphasis on this stage producing evidence of metacognative processes as students demonstrate cumulative knowledge to new situations, self-reflection and critical evaluation. With explicated instructions for designing e-tivities at this stage that ask students to demonstrate this though encouraging them "to explorer their metcognative awareness of positions they adopt-for example, 'How did you arrive at that position?' or 'Which is better and why?' (Salmon, 2013, p. 34). With research supporting that if the design or facilitator did specifically focus their questions on encouraging students to produce practical applications of their knowledge, then students/discussions would proceed into this resolution phase of Cognitive presence (Darbi et al., 2011). Limitations of the research into Cognitive Presence has focused on analysis of discussion forums and other web communicative content, in which the clarity of student progression through the four cognitive presence phases is reliant on the activity design and the role of the facilitator (Akyol & Garrison, 2011b). Overall Cognitive presence represents higher order thinking and is seen as one of the hardest areas to design for and measure (Garrison, 2007; Garrison et al., 2010; Akyol & Garrison, 2011a).

TEACHER PRESENCE

Teaching presence is defined as the "design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educational worthwhile learning outcomes" (Community of Inquiry, 2013, para 1.). Teaching presence reflects the online facilitators ability to help establish a trusting online environment, where by the facilitation of learning is goes beyond a transactional experience, but encompasses the 'coaching' of knowledge acquisition and group cohesiveness through shared meaning (Garrison et al., 2001). Much of the research into Teaching Presence and the CoI over the last 10 years or so has emphasised the growing awareness of just how important this presence is (Garrison, et al., 2010), and it "might be thought of as the glue which holds together the

CoI"(Redmond, 2011, p. 43). However the complexities of facilitating a collaborative and cohesive student cohort in the online environment, as well as training traditional teachers in this method is something that research has debated widely since the introduction of online learning (Macdonald & Poniatowska, 2011; Salmon, 2011). As reiterated by Anderson, Rourke, Garrison, & Archer (2001) "for learning to occur in this lean medium of communication, dependent on written language only, a strong element of what we refer to as teaching presence is required" (p.3). But with many online teachers having very little experience to teaching in this medium, let alone what it means to be a student in one (McQuiggan, 2012), a substantial framework or method for achieving this presence is integral to online learning success. Limitations into Teaching Presence research includes issues with debate with regards to the validation of the three subsections included in Teaching Presence (Design, Facilitation and Direction) and how to adequately define or measures the constructs (Garrison, 2007; Garrison et al, 2010). Other general limitations include the issue that much of the research to date tends to explore the three presences as a standalone investigation to another variable (Garrison & Arbaugh, 2007). As opposed to ensuring that all presences are adequately designed for and measured in research and learning design, given that the original CoI framework states that success in a CoI framework is the result of the interwoven experiences and co-aligned development of the strategies working together, not as separate entities (Garrison et al., 2000; Garrison et al., 2010).

Garrison et al., (2001) highlighted that elements of successful teaching presence include the "regulation of the amount of content covered, use of an effective moderation style in discussions, determining group size, understanding and capitalizing on the medium of communication" (p. 96-97). Anderson et al., (2001) explain Teacher presence through the three components of design (before and during the course), facilitation (encouraging discourse and knowledge construction) and direction (providing direct instruction for key course milestones). It is of note that these overlap and aligned with six categories in competencies for online teaching and e-moderators as identified by Goodyear, Salmon, Spector, Steeples & Tickner (2001). The following table gives a representation of these six Goodyear et al., (2001) areas with the researchers summations in relation to Anderson et al., (2001) Teaching Presence indicators.

Table 2:Online Teaching Competencies Compared with Teaching Presence Indicators.

Online Teacher/e-Moderation competencies	**Alignment to three Teacher Presence key indicators**
Process facilitator: facilitating the range of online activities that are supportive of student learning.	Facilitation and Design
Adviser/counsellor: working on an individual/private basis, offering advice or counselling learners to help them get the most out of their engagement in a course.	Facilitation
Assessor: concerned with providing grades, feedback, validation of learners' work, etc.	Direction
Researcher : concerned with engagement in production of new knowledge of relevance to the content areas being taught	Design
Content facilitator: concerned directly with facilitating the learners' growing understanding of course content.	Facilitation and Direction
Technologist: concerned with making or helping make technological choices that improve the environment available to learners.	Design and Direction

Salmon (2011) went on to further define these strategies and competencies for e-moderators which related to their "a) understanding of online processes, b) technical skills, c) Online communication skills, d) Content expertise (and) e) personal characteristics "(p.106-107). This comprehensive description can be reviewed in more detail in Salmon (2011), p. 106-107. Research supports that effective Teacher Presence (in conjunction with social and cognitive) has an effect on students perceived learning and course satisfaction (Akyol, & Garrison, 2008). With further research into Salmon's e-Moderation technique specifically also revealing that e-moderators giving quality feedback, support and module

management to ensured an effective online learning environment from the students perspective (Packham, Jones, Thomas, & Miller, 2006). As well e-moderation, in conjunction to the 5-Stage Model, created a cohesive and confident group environment for exploring learning through innovative technologies (Salmon, Nie, & Edirisingha, 2010).

REVIEWING THE PREVIOUS RESEARCH ON E-TIVITITES, E-MODERATION AND THE 5-STAGE MODEL

In a study by Pavey and Garland (2004), e- Tivities were utilised in a blended delivery, sports and exercise physiology module at the University of Durham in order to "stimulate depth of learning by encouraging students to engage more fully with the topics and issues" (p.305). As well as promote more interaction between students, instructors and the course content than have previously been experienced before the implementation of these strategies. The study attempted to utilise e-Tivities and the 5-Stage Model using a variety of platforms. While it did not follow the traditional structures of e-Tivities, which limits it its reliability as support for the learning design, it did utilise formative quizzes, discussion boards, interactive pages and virtual lectures to support learning through the 5-Stage Model. The course tutor and 95 of the 146 participants completed a multiple choice and short answer feedback survey and overall Pavey and Garland (2004) stated that "positive feedback emerged from the student's overall experience of participating in e-tivities to support their learning" (313). As well as positive online collaboration and interactivity observed between participants of e-tivities which could be linked to the development of possible Social Presence. However generalisability is limited to blended delivery mode only and to the use of e-Tivities and the 5-Stage Model, without the effects of e-Moderation as a facilitation strategy.

A further study by Headlam-Wells, Gosland and Craig (2005) involved e-mentoring for career development for women in management (Empathy-Edge), utilised e-Tivities and e-Moderation in order to structure their online e-mentoring web environment. While evaluations did not directly assess the success of the implementation of e-Tivities, nor was this a traditional academic environment, but rather a professional development one, positive student feedback and engagement was reported to help foster socialisation and authentic relationships between mentors and mentees (Hedlam-Wells et al., 2005). It could be considered that the role of a mentor is similar to that of a teacher, and that these outcomes could relate to Social Presence and Teacher Presence.

Morley (2012) investigated the use of wikis through an e-Tivity and e-Moderation structure, as a method for creating self directed and collaborative learning environments in a blended 1st year nursing course at Bournemouth University in the UK. Student evaluation of the experience revealed implementation of e-tivities helped them with their "learning demonstrations" (p.265). Content of the wikis also were evaluated and provided positive progression through the 5-Stage stage model helped create a cohesive and active group which lead to more positive evaluations. Evaluations did not extend to the whole course, nor to the use of these strategies, however there's an indication here of possibly Cognitive Presence and Social Presence effects of the analysis.

E-tivities and the 5-Stage model was used in a study was conducted by Bermejo (2005) over two years, on an engineering course for the School of Telecommunication Engineering of Barcelona, in order to meet integral learning outcomes set by the Accreditation Board for Engineering and Technology relating to higher order processing skill outcome expectations. Results of the study were the product of analysing student participation contributions and Student Evaluations regarding these knowledge skills (Bermejo, 2005). Results revealed that through these learning strategies, higher order skills processing and meaningful knowledge construction were prevalent both in the online environment, and the students assessment pieces. There is further possibility here that these outcomes, had they been measured, might have demonstrated the creation of Cognitive Presence. Other research that might also support Cognitive Presence comes from a private university in Malaysia of part time education students, reflected that the use of collaborative e-tivities was reported by students to aid in creating meaning and perusing deeper information construction (Sidhu, & Embi, 2010)

Kovacic, Bubas, and Zlatovic, (2008) investigated e-Tivities in the form of a wiki for English as a second language courses. They found that e-Tivities supported creative and deeper engagement with the content, an ability to reflect on personal interpretations and apply authentic learning strategies. Also it was noted that "most of the 23 analysed e-tivities with a wiki were positively evaluated by students of the ESP/EFL course" (Kovacic et al., 2008, p.1). As well as that e-tivities have "worked miracles and in many others changed the students learning experience" (p. 9). Again, although not a measurement variable, there is insight here into the potential of Social Presence initiatives emerging from this learning design.

In one of the few research available that utilised all three methods, Armellini, Jones and Salmon (2007) at the University of Leicester completed a 12 month study investigated the Carpe Diem process (a team based process in higher education for developing e-learning course design that utilises all three strategies of e-Moderating, e-Tivities and the 5-Stage Model) for learner centred e-learning course design and assessment in online learning through. However while their results reflected these strategise as being a valid method for creating learner centred course design and assessment strategies, the results of the teachers development of these strategies, and implementation in their online classes (successful or otherwise) was not a part of the measurement of results of the research design. Armellini and Aiyegbayo (2010) investigated the use of Carpe Diem process four British universities and three course disciplines, as a methodology to create "change and innovation in e-Learning design and assessment through e-tivities" (p. 933). This 12 month cognitive mapped study revealed that not only were Carpe Diem processes effective team based environments for creating innovation and change to online pedagogy, but also that the e-tivities created within this environment were successful in creating learner centred course design (Armellini & Aiyegbayo, 2010). However again, there was no follow on research into the implementation of these strategies by teachers, or the outcomes of the students they may have been applied to.

E-TIVITIES, E-MODERATION AND 5-STAGE MODEL RESEARCH LIMITATIONS

Firstly, there is very little research that clearly and identifiably utilising correctly designed or trained in Salmon specific e-Tivities, e-Moderation and the 5-Stage Model. Particularly all three methods within the one study. Also much of the research has limitations in providing effectual empirical data with its over reliance on qualitative methods, and follows the same issues in research design that much of the literature into online teaching strategies share (Oncu, & Cakir, 2011). It is also integral to note that not only is there little research into these strategies in general, but so far there is no research into the use of e-Tivities, e-Moderation and the 5-Stage Model (Salmon, 2003, 2011, 2013) that measure the success of these strategies specifically linked directly to the CoI. The links to the CoI presences provided in the e-Tivities, e-Moderation and 5-Stage literature above, is at best, deductive reasoning, rather than empirical evidence. Nor is there more importantly much research that directly explores how to effectively design for these strategies outside of the original authors work. More often these methods were used as part of a research design measure, other than student learning outcomes and factors, which in itself denotes a generalisability limitations.

Conclusions and Recommendations

Whether the industry likes it or not, teaching and learning as we have known it, is rapidly changing due to the trailblazing and transparent nature of online learning. E-learning is pushing teaching and learning design to evolve and reflect a more authentic and accurate representation of how we as humans, actually learn. What appears to be a 'new' era of knowledge delivery, actually reflects how humans have traded in knowledge for millions of years. Our individualistic educational culture is beginning to recognise the wisdom of collective principles in learning and knowledge. The days of the so called 'sage on the stage' are numbered as we make way for an organic and collective voice on what constitutes knowledge and skill acquisition. Constructivism (Dougiamas, 1998; Siemens, 2004) and its learner-centred principles of collective knowledge and personal meaning in learning, provided the seeds which gave rise to the roots of the future of learning design. Excellent gardeners Garrison et al., (2000) fertilized and tended to this 'new' learning tree and provided the guiding principles of Social, Cognitive and Teaching Presence that nurtured the sapling. No longer a sapling it widens its reach and strengthens the rings on its bark more and more every day. But what of the branches and shadow casting leaves that might be applicable to complete this potent life force? E-Tivities, e-Moderation and the 5-Stage Model appear very much to being in the same genus, with potential to blossom and cast their own seeds into the e-learning wind.

However in order for this knowledge delivery forest to blossom and give life and resources to a knowledge hungry world, many more ground keepers are needed. It stands to reason, based on previous research limitations that future research into CoI, needs to include more quantitative analysis methods. Future studies need to survey students directly, using a stable survey instrument such as Arbaugh et al., (2008), as seen in Shea and Bidjerano (2009). However this research assumes that the CoI methods have been adequately designed for in the online courses to begin with. Although it is clear, not just in this literature review, but in much of the dominating e-learning literature, that there is surmountable debate and confusion in to the 'how' of actually achieving this. As this literature review has pointed out, a viable 'how' is the use of Salmon specific methodologies (E-tivities, e-Moderation and the 5-Stage Model). Therefore future research should explore whether educators who use these strategies, are designing for the elements of CoI. Providing firstly evidence of CoI frameworks in design components of these methods, and secondly important insight and practical design advice for strategising to meet theses CoI frameworks. Lastly this would contribute to the limited body of research into these Salmon methodologies, providing much needed support and evidence for their increasing popularity in online learning design.

Furthermore, if online learning is more and more being accepted as the future of learning delivery for 21st century students, then it is imperative that ongoing investigating into many learning design methods continues in order to support student success. The key to the future of online learning, student, and institutional success, is for educators to simply never stop trying to provide quality and innovative delivery of knowledge. Continue to support the growth of new methods and approaches to learning design, rather than allowing online course delivery to stagnate due to lack of experience or interest. For in the end, not only does this rob students of the sustenance they require to succeed, but it also robs us all of a prosperous and resource plentiful harvest for the world we live in.

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DESIGN AND DEVELOPMENT OF MOBILE LEARNING APPLICATION

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Abstract: Access to the Internet and mobile devices provides a great opportunity for public to open and continuous education. Although mobile learning is not new subject in education but regarding to mobile technology features such as fast and easy accessibility, assimilates researcher, practitioner and educator's attention as channel to deliver their Instruction as well as many educational institutes, humane organizations and companies.
On the other hand design and development of mobile learning applications need careful cognitive processes and technical skills which might make it more difficult for educators to consider leveraging and developing mobile learning application by themselves in their curriculum.
This paper provided an overview report of previous studies conducted on mobile learning application and investigated challenges and difficulties of design and development of mobile learning application. Moreover in order to have better understanding of implementing a mobile learning application, a prototype of one mobile learning application is developed to educate and enhance motivation among adult to donate specific necessities for underprivileged students.
Keyword*: Mobile learning, m-learning, design and development, instructional design*

1. INTRODUCTION

The rapid development of technology has touched almost all aspects of life such as education. “It is almost impossible to think of education without also thinking about the many different kinds of technology used to support education” (Spector, 2012, P.8). New development of the Internet and mobile devices has impact on education and led mobile learning arises as potential part of educational system. “Recently the rapid growth of mobile technologies has leaded e-learning to a new era.”(Huang, Hwang, & Chang, 2010, P.1). On the other hand, mobile learning system can be applied to several ranges of users. “Mobile learning in past years has proven to be successful in many different contexts and with various target groups” (Kalloo & Mohan, 2012, P.2). Regarding this capability and extensive use of mobile devices such as smart phones and tablets, many schools, educational institutes and humanitarian organizations trying to advertise and educate people through mobile learning applications. “With the advanced technologies like GPS, RFID or sensors, mobile devices also provide context-related opportunities for users to enjoy their personal moment or explore their surrounding context from wherever they may be”(Huang, Hwang, & Chang, 2010, P.1).

Although mobile devices utilization is rising considerably (Danado & Paternò, 2014) and researchers predict that mobile learning has outstandingly influence on education (Alden, 2013) but design and development of mobile learning application consider as complicated progress for many institutions. “One main challenge is to identify how to design application development environments able to support integration of such technologies through intuitive mobile interactive environments. The challenge is further complicated by the limitations presented in mobile platforms with limited screen sizes, usage of touch-based interaction and heterogeneous contexts of usage. ” (Danado & Paternò, 2014,P.1).

Moreover, regarding to limitations of learning tools such as mobile application, fast and endlessly changes, there are priorities in design and development phase between content and context, instruction, interface, learning approach and... . “How do I create an environment to teach what I am trying to teach? The conundrum lies in the struggle between the ideal learning environment and the pragmatic solution based on available resources. Should an educator first consider technological decisions and the accompanying constraints that follow those decisions? Or should a traditional approach to create education based in instructional design and learning objectives be followed?” (Hanson & Shelton, 2008, P.4). Thus, there is a need to investigate characteristics of design and development a mobile learning application.

Moreover, this study looks into related literature review on current mobile learning and purposed design and development of mobile learning application which can be used as schema for educational institutions. Furthermore, charities and humanitarian organizations may look for simple, fast and easy access informing tool. Using mobile learning application for humanitarian activities might provide better facility as medium between donor and donee in the shortest time and quickest way.

2. RELATED LITERATURE REVIEW

2.1 MOBILE LEARNING HISTORY

Perhaps mobile learning study traced back to 1990 with project named Wireless Coyote which is conducted by Apple Classrooms of Tomorrow (ACOT). The study aim was to evaluate usability of wireless mobile computer for staff and student of Orange Grove Middle school (Manga & Lu, 2013).
By technology growth, usage of mobile technology in learning and teaching process got popular. Levine, 2002;

McGhee & Kozma, 2001; McKenzie, 2001 argued that "The movement of mobile wireless technologies in education is a recent trend, and it is now becoming the hottest technology in higher education". (Kim, Mims & Holmes, 2006, P.2). It seems one of the important mobile learning feature which enhances efficiency of education is benefit of mobility (Maginnis, White, & Mckenna, 2000). In 2003 a study conducted by Chen, Kao, and Sheu design and developed a bird watching system that helps students to use their mobile devices for data collection and watch bird. (Chu, 2014)

In another study which was conducted during 2005 to 2009 by JISC e-Learning program researchers tried to discover and clarify student's experiences of using e-learning technology and using mobile devices. They argued that "the mix of new technologies used by students and traditional ones supplied by course tutors and institutions was shifting patterns of study and causing a mismatch between the expectations of academic staff and the study habits of learners." (Kukulska-Hulme, 2010 ,P.4).

Wu et al. (2012) argued about mobile learning over 164 researches which is done during 10 years. They found that "the most topics of the mobile learning studies were currently based on the learning effectiveness and the evaluation of system".(Hou et al, 2014).

Kukulska-Hulme et al. (2009) conducted international survey in five countries to find connection between "mobile technology use in relation to life and learning". Based on their reports, referring to figure 1, participants use their mobile devices widely to " o create, collect and access useful resources, to communicate inventively in a variety of ways with other individuals and communities, and to make best use of time wherever they happen to be." (Kukulska-Hulme, 2010, P.6).

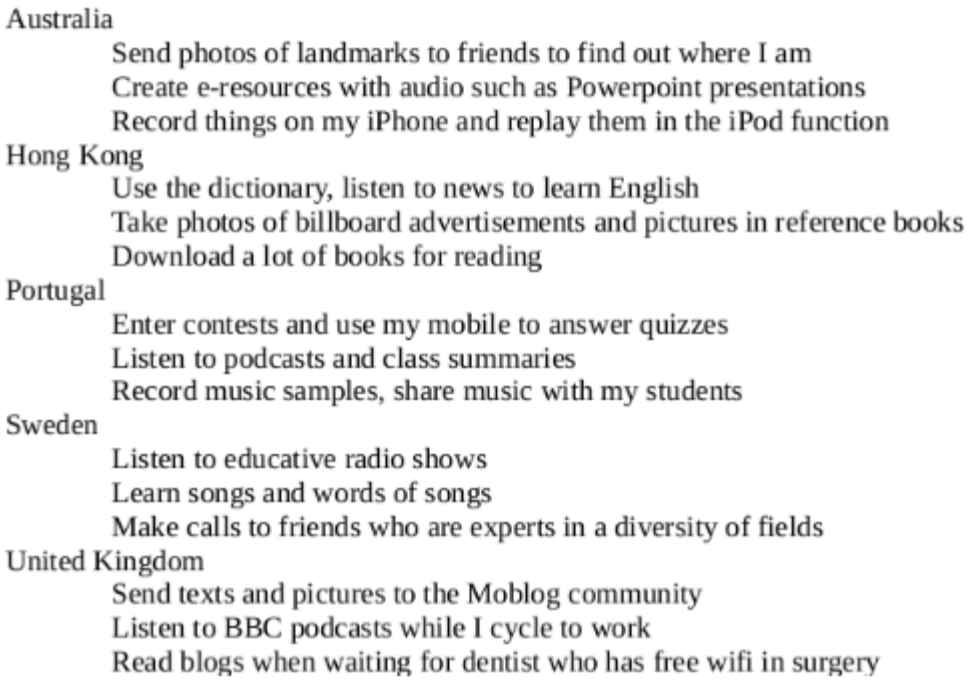


Figure 1: International survey in five countries to find connection between mobile technology use in relation to life and learning

2.2 MOBILE LEARNING DEFINITION

Many studies investigated the impact on mobile learning on learning process. Hoppe, Joiner, Milrad, & Sharples, 2003;Liu, Wang, Liang, Chan, Ko, & Yang, 2003; Hsu, Hwang, & Chang,2010; Sharples, Taylor, & Vavoula, 2007; Wong & Looi, 2011; Wong, Chin,Tan, & Liu, 2010; Zhang et al., 2010 discuss the advantage of using mobile technology and devices in teaching and learning processes in different courses such as "science, social science, and language course" (Chu, 2014)

However there are many different definitions for mobile learning based on its characteristic, but having access to educational context and environment without limitation of time and place are common definition between them (Serin, 2012).

2.3 MOBILE LEARNING EFFICIENCY

Mobile learning efficiency is extremely affected by quality of mobile applications. Hence mobile applications characteristics should be emphasized too in design and development part. Marty et al, 2013 discussed about user friendly element of mobile applications such as "intuitive and functionality" and highlighted developer should consist on user-centered solution design. Other researchers gave credit to real-time and connectivity features which enhance

learners actual time analysis and data gathering skills (Spain, Phipps, Rogers, & Chaparro, 2001). Baek, Cagiltay, Boling, & Frick, 2008; Norman, 1988 argued that mobile application should be "usable, applicable, and functional for a wide range of individuals" (Marty et al, 2013). Also it should be fun, engaging and pleasurable learning process (Ching, Shuler, Lewis, & Levine, 2009).
Despite mobile learning is widespread concept, apparently regarding to lack of relevant guidelines (Park, 2011) the most critical part of it, can be creating instructional environment and delivering educational materials through mobile applications.

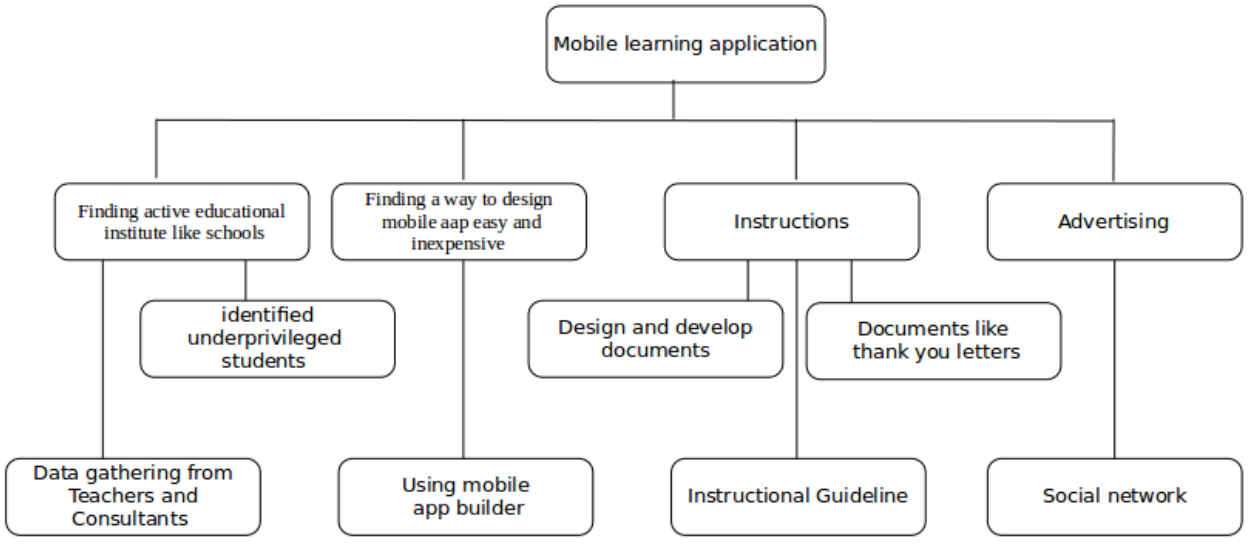
3. DESIGN AND DEVELOPMENT OF MOBILE LEARNING APPLICATION

The design and development of mobile learning application with no doubt is hard process which needs software programming knowledge, graphic design knowledge, instructional design knowledge, content localizing. Winn & Windschitl, 2001; Salzman, Dede, Loftin & Chen, 1999 argued about characteristic virtual learning environment. "they permit students to experience high levels of presence, they are interactive and they are autonomous" (Hanson & Shelton, 2008). Based on mobile application flexibility some educational institutes, universities or schools started to develop specific mobile applications for their students according to their curriculum and particular need. In 2010, Princeton University implemented their mobile learning services. Through this service and students can have "Access documents in multiple formats, post announcements, create threaded discussion posts, upload media as attachments to discussion boards and blogs, create content items within the course map, ...take tests, and receive push notifications for important course updates or changes" (Alden, 2013).

On the other hand, some researchers suggested that there must be learning strategy in design and development phase such as active learning, collaborative learning, authentic learning and multiple perspectives (Karagiorgi & Symeou, 2005). Although there many research in mobile learning but recent research shows that there are priorities in research which can have effect on better design and development phase. "1) teaching and learning strategies; 2) affordances; 3) theory; 4) settings of learning; 5) evaluation/assessment; 6) learners; 7) mobile technologies and interface design; 8) context awareness and augmented reality; 9) infrastructure and management; and 10) country and digital divide." (Hsu, Ching, & Snelson, 2014)

3.1 ANALYSIS PHASE

Analysis phase started by task analysis, referring figure 2. There were four major components in this phase and each step broke down to manageable component.



3.2. DESIGN AND DEVELOPMENT

The design and development of mobile application determined as hard procedure regarding to technical phase such as software programming, interface designing and familiarity with smart phone hardware. To avoid these types of intricacies, there are many mobile application builders which have been developed and help users to create their ideal custom mobile application.

Furthermore, unavailability of some infrastructure might be reason for unsuccessful integration of ICT based tools in education. "The major barriers were lack of confidence,

lack of competence, and lack of access to resources" (Bingimlas, 2009, p.1). According to literature review for design and development, identification of these steps (referring figure 3) seemed vital for successful application.

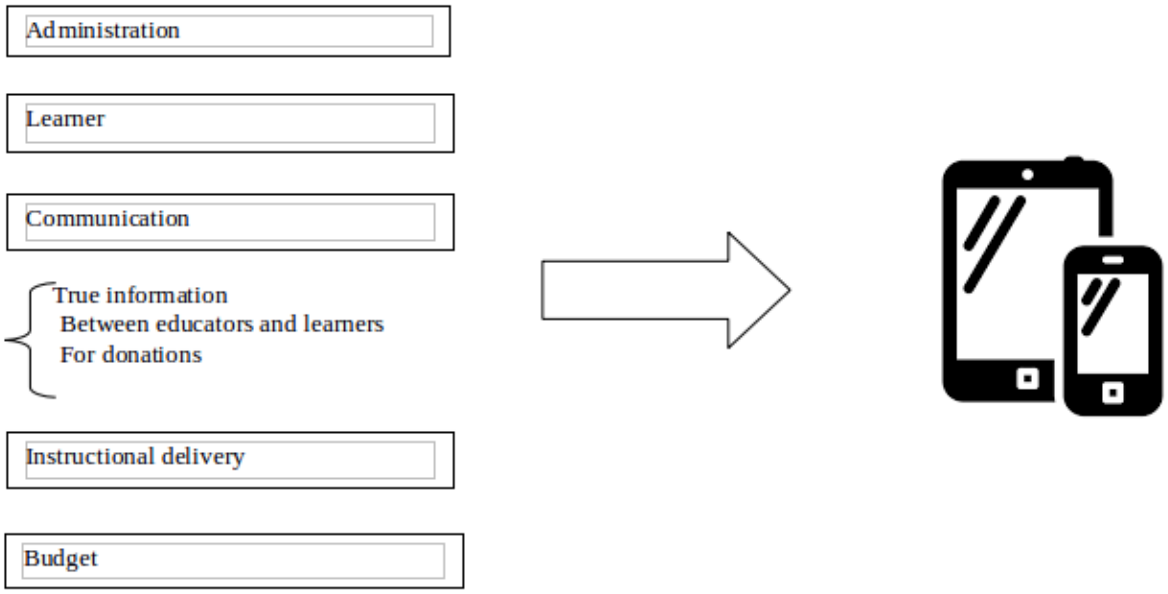


Figure 3: Identification vital steps for design and development

Since administrators and users of this system might not be influent in ICT skills, the system should be simple and operative to manage and use. Hence, figure 4 shows, this mobile learning application have 8 tabs: About us, Events, Services, Donation, Wishes, Guide and Facebook, Find us.

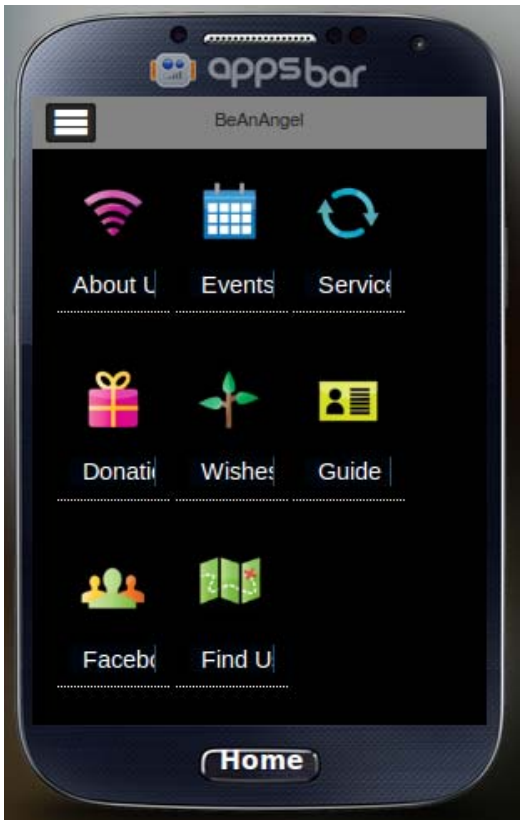


Figure 4: Eight major tab in design and develop mobile learning application

3.2.1 ABOUT US

Based on the first questionnaire donors prefer to have true and correct information about their target charity, therefore there should be space in application that alleviate the need, (referring figure 5).In this section the following information is provided: The application target, fast and simple direction to donation tab, introduction of the Institution.

Figure 5: About Us

3.2.2 EVENTS

Any occasion can provide opportunity for donation. It might be global events, local event or events that coordinated by target organization (referring figure 6). Thus there is a need to inform donors fast and informative. Based on the mobile application builder powerful platform, there are features for participants to add the event on their calendar or share it with others.

Figure 6: Events

3.2.3 SERVICES

To motivate donors and show the value of their action, Charities might prepare some services include sponsorship information such as social network free learning opportunity, highlighting community responsibility, participating in new and deeper community networks, targeting a new market (referring figure 7), Or sending happy birthday card or thank you letter from donee.

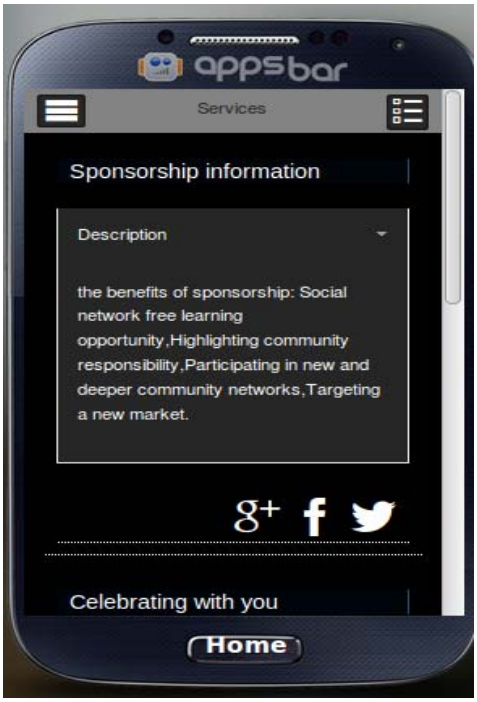


Figure 7: Services

3.2.4 DONATION

One of the main mobile application goals is providing fast, easy and reachable access to target market. In this case, regarding to information that provided for donors or based on their interest, they can give their personal information and mention what they want to donate through the mobile application for administrator (s) and due to organization principal, administrator (s) can coordinate better for collecting donation (referring figure 8). Also the organization have data base of donors contact for any updates.

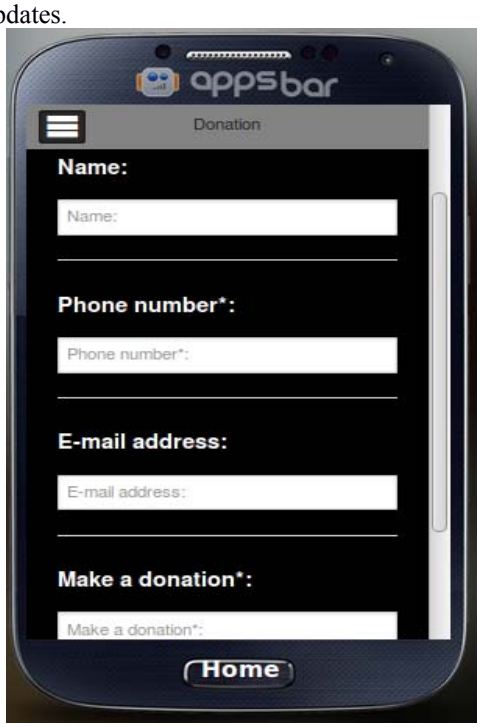


Figure 8: Donation

3.2.5 WISHES

Regarding to the growth of technology and better access to cheap mobile devices and telephone, nowadays using smart devices gradually increasing. However access to smart phone for underprivileged students or their family seems unlike but there is possibility that people how have contact with them like their teachers, their principals, have access to this mobile application and acting for specific need on behalf of them. Thus, administrator(s) can coordinate the new requests as well. (referring figure 9).

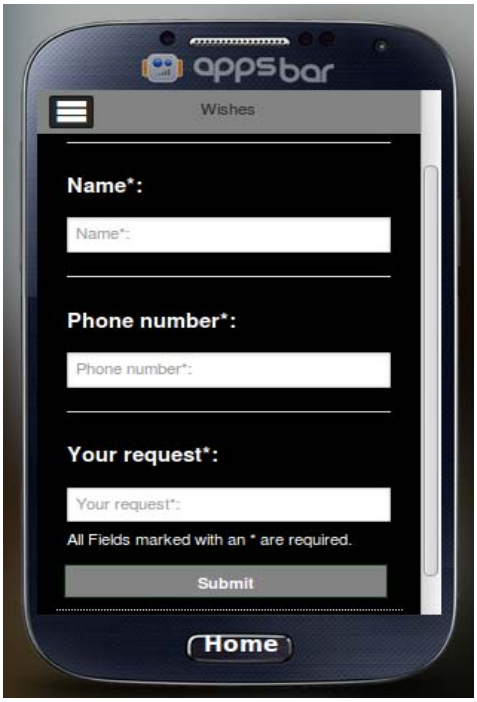


Figure 9: Wishes

3.2.6 GUIDES

The main target of this study which is design and develop mobile learning application, for sure there must be a part to cover learning and training (referring figure 10). This might be the most important part due to most of instruction from the organization can be delivered here. In this case there are virtual guidelines for working with selected social network (FaceBook), how to approach with underprivileged children, how we can promote helping others and how we can avoid of psychological traumas.

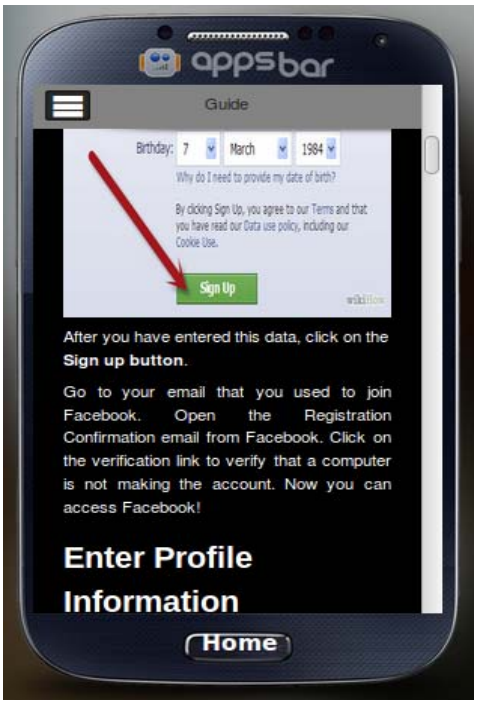


Figure 10: Guides

3.2.7 SOCIAL NETWORK

Barab and Duffy (2000) argued that learning happened in interaction and practice within the community. In this case social network can help to build a community to educate, motivate and update the participant (referring figure 11). In addition some features such as questionnaire be conducted through this tool.

Figure 11: Social Network

3.2.8 FIND US

To ensure people that organization is real and also they can find the nearest charity or organization it is important to give true and valid address such as e-mail, website, telphone number and people who are charge. (Referring figure 12)

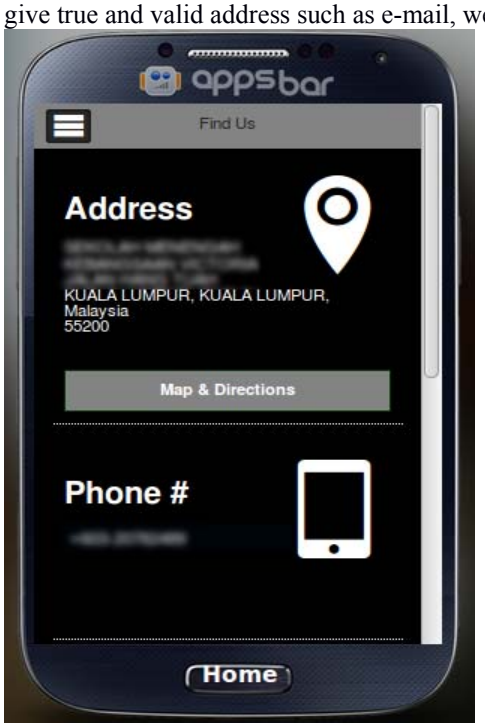


Figure 12: Find Us

4. IMPLEMENTATION

The real mobile application which can be installed on Android and OS operational system was ultimate production of this study. The summery of design and development process of mobile learning application prototype is mentioned below:

1) Creating research framework
2) Carry out task analysis in every step and navigate based on the map
3) Consulting from instructional designer and IT experts
4) Reviewing and modifying of instructions.
5) Implementing and improvement prototype and validation with instructional designer expert

5. CONCLUSION AND FUTURE RESEARCH

Many scholars have predicted that mobile technology and mobile learning applications will have huge impact on education. Technology growth and investment of considerable budget on developing mobile applications show that its might be the time for educator to touch this technology, have hands on experiences and face opportunities and challenges of mobile learning application in their teaching process.

Many companies offering their platforms free or inexpensive which enable teachers to have a better perspective of mobile applications even with less technical knowledge. Educators need to choose their teaching strategy based on strong framework, design accurate task analysis, obtain basic knowledge about major factors in design mobile application due to mobile device screen size, phone size and so on. Implement their prototype and evaluate assessment their product. In all these phases consulting with instructional designer may have positive influence on their procedure and increase their speed.

According to bloom taxonomy there are six steps (Knowledge, Comprehension, Application. Analysis, Synthesis and Evaluation) that lead students to higher level of thinking and learning (Bloom, 1984 ;Krathwohl, 2002). Mobile learning application as a popular medium should be evaluated if they bring creativity on to learners.

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EFFECTIVE TEACHING OF HIGHER-ORDER THINKING (HOT) IN EDUCATION

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Abstract: The teaching of Higher-order Thinking (HOT) has its own challenges and these challenges deserve due attention. In the 21st century, one critical aspect in discussing effective teaching and learning is examining the effectiveness of teachers in developing students' capability to think while ensuring content mastery at the same time. The aim to develop and enhance students' HOT has been a major educational goal. As a matter of fulfilling a national aspiration in education, the role of teachers in inculcating HOT is another important aspect of teaching HOT effectively.
Keywords: Higher-order thinking, Bloom's taxonomy, teachers, teaching, students

INTRODUCTION

Most teachers are familiar with Higher-order Thinking (HOT) due to Bloom's taxonomy (Figure 1). It was found that it is common understanding that to develop students' HOT teachers should promote student engagement with learning tasks which exceed the second level 'comprehension' in order to encourage *application*, *analysis*, *synthesis* and *evaluation* activities in processing information (Zohar, 1999). This resonates with the notion that HOT encompasses any thinking skills which require more than mere recall or memorization of information (Ivie, 1998; Underbakke, Borg & Peterson, 1993).

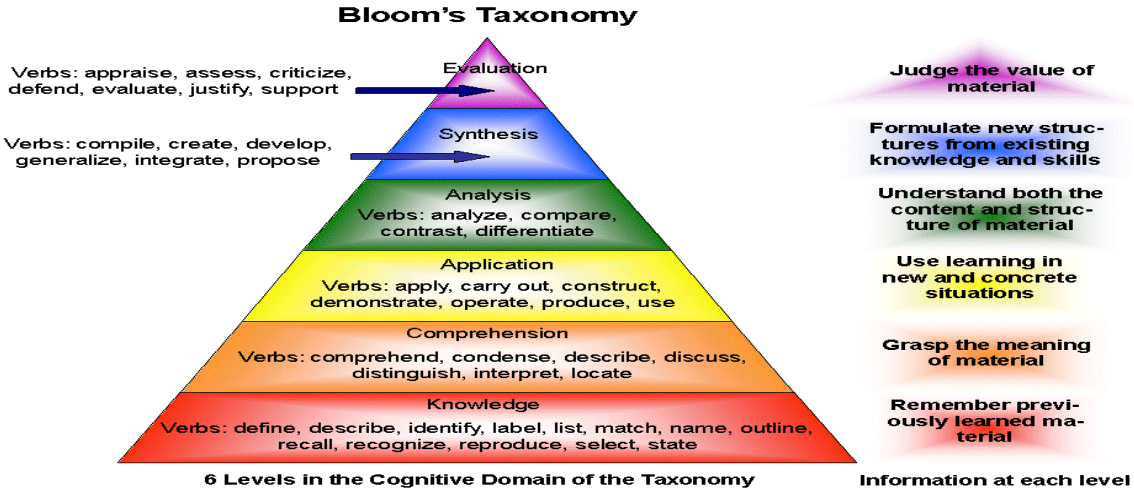

Figure 1. Bloom's Taxonomy.

The literature on HOT has been informative and broad. Yes, broad in the sense that HOT builds on and extends beyond Bloom's Taxonomy, resulting in discrete dimensions attributed to it: Critical thinking, creative thinking, problem solving, decision making and metacognition, just to name some prominent ones. Zohar's (2013) attempt to clarify the dimensions of HOT seems helpful for future reference of teachers and researchers alike. He summarizes the knowledge to teach thinking into "knowledge of elements of thinking" together with the four sub-categories, namely:

(i) Knowledge of individual thinking strategies
   – making comparisons, formulating justified arguments, drawing valid conclusions, etc.
(ii) Knowledge of genre of thinking
   – argumentation, inquiry learning, problem solving, critical thinking, scientific thinking, creative thinking, etc.
(iii) Knowledge of metacognition
   – thinking about own thinking
(iv) Knowledge of additional issues
   – thinking dispositions (habits of mind), culture of thinking, etc.

(p. 235)

To further help refine the understanding of HOT, Resnick in 1987 explained that although HOT is complex and may not be easily defined, its characteristics are actually quite easily observed in practice (as cited in Fisher, 1999). Table 1 shows Fisher's (1999, p. 54) adaptation of Resnick's (1987) characterization of HOT versus "routine teaching"; this may assist teachers in determining whether HOT is taking place in their classroom.

Table 1. Higher-order Thinking (HOT) versus Routine Teaching

HOT	Routine Teaching
Not routine/not fully known in advance	Routine/outcome planned in advance
Complex	Clear purpose and goal
Yields multiple solutions/viewpoints	Yields converging outcomes
Involves uncertainty	Seeks certainty
Involves process of making meaning	Involves process of doing
Is effortful, requires mental work	Is judged by outcome rather than effort

THE TEACHING OF HIGHER-ORDER THINKING (HOT)

Over the decades, the aim of developing and enhancing students' HOT has been a major educational goal (Fisher, 1999; Marzano, 1993; Supon, n.d.; Zohar & Schwarter, 2005). As Resnick in 2010 said, "scaling up the 'thinking curriculum' in a way that will foster proficiency for all students is currently a major educational challenge" (as cited in Zohar, 2013, p. 234); and a primary glance at teachers' perspective tells us that most teachers agree that it is crucial to teach students HOT, primarily to guide their idea generation (Yee et al., 2012). This commitment toward HOT is relevant to global economic growth, the development of information and communications technology (ICT), a knowledge-based economy and a fast-paced world. In reality, HOT is an extremely needed skill for every individual in any educational setting. Also, Fisher (1999) believes that the development of students' HOT is complementary with the inculcation of lifelong learning among them. In other words, we need "thinking" students who can incessantly respond to real-world demands (Vijayaratnam, 2012).

Obviously, we know what is important and what we expect of our education system, of our teachers and of our students; but how well are they responding to the challenge of teaching and/or learning HOT? For one, "in most classrooms higher order thinking receives little or no attention" (Ivie, 1998, p. 35). Ivie (1998) continues to substantiate using previous findings that even when HOT does occur in the classroom, teachers rarely make effort to sustain students' flow of higher-level thoughts, perhaps due to teachers' incompetency or disinterest in pursuing learning outcomes other than learning content-specific goals. Sadly, a classroom scenario of such dismalness is believed to be epidemic across nations. On the other hand, despite unfavorable reports, considerable development has occurred in improving the teaching and/or learning of HOT; it is just that in terms of realizing the educational ideal of having 'thinking' students in a 'thinking' classroom within the 'thinking' curriculum where active cognition is a routine, we still need to work real hard (Zohar, 2013). Attention is needed at the planning and implementation levels because recurring inconsistencies in curriculum development and enforcement will continue to keep the effective teaching of HOT in the classroom as pure rhetoric (Ivie, 1998).

Within Malaysia, the steady increasing influence of thinking skills in our education system is eminent. To enhance effective teaching of HOT, the Ministry of Education (MOE) implemented a stretch of structural reforms through the Integrated Curriculum for Secondary Schools (KBSM) which introduced critical thinking skills, in 1988, the Vision 2020 in 1991, the Critical and Creative Thinking Skills (KBKK) in 1996, and the concept of "smart school" in 1997, with the aim of producing human capital with high thinking ability. Then in 2012, the Malaysian MOE released the Preliminary Report of the Malaysia Education Blueprint 2013-2025 that so evidently emphasized HOT in three core aspects of education: The written curriculum, the taught curriculum, and the examined curriculum (assessment).

With such prominence given to HOT through our national agenda for the past three decades, it is necessary if not compulsory for teachers to hone effectiveness in teaching thinking especially with regard to HOT. One may wonder, with the existing strong emphasis on HOT in our curricula through various educational policies, is there even an issue of ineffectiveness in teaching HOT in schools specifically in Malaysia? "Yes, of course", says the literature review.

For a quick check, how have we been performing in accordance with our national curricular effort? A study in the Preliminary Report of the Malaysia Education Blueprint 2013-2025 has shown that most lessons in schools did not sufficiently engage students in constructive thinking where teachers relied on lecture format and most importantly, the learning focus was still directed at recalling facts or achieving surface-level content understanding rather than cultivating HOT (Malaysia MOE, 2012). In short, just like the conditions portrayed earlier by Ivie (1998) and Zohar (2013), in Malaysia too, lower-order thinking, instead of HOT, still dominates teaching methods and learning outcomes.

CAN HOT ACTUALLY BE TAUGHT?

The lack of encouraging performance in the teaching of HOT makes one wonder if HOT can actually be taught. Could it be that we have not succeeded simply because teaching HOT is undoable? The articles reviewed suggest two opposing views as follows:

(i) Teachers treat thinking skills as not teachable, that they are an intrinsic ability like "common sense" which is naturally molded by one's social and cultural values (Atkinson, 1997). It is common that many are still reserved about the idea of teaching thinking as the notion of "thinking-as-a-skill" (Hart, 1993, as cited in Fisher, 1999, p. 53) remains under scrutiny. Piaget would most probably insist that children's development of thinking is a biological process and needs no explicit instruction (Hannum, n.d.).

(ii) Puchta (2012) who quotes Robert Fisher, stresses, "… thinking is not a natural function…needs to be developed". Indeed, thinking skills need practice (Marzano, 1993) and could be developed, but not automatically (Rajendran, 2000); this shows that thinking skills are indeed teachable. Despite the belief that to an extent the ability to think is something we are born with and hence the limited intelligence capacity of each individual, we do not and could not exactly know the limit of that thinking capacity; that is why thinking can and should be developed so that each student can achieve their highest thinking potential (Fisher, 1999). Fisher (1999) further illustrates that "children who come to believe that with effort you can always do better at thinking and learning will tend to do better at school than those who think their intelligence is fixed" (p. 53).

Two main ways to teach HOT have been proposed by researchers (Rajendran, 2001, 2002; Zohar, 2013; Zohar & Schwartzer, 2005): (1) Infusion approach (Fisher, 1999) and (2) Separate-subject approach. The former refers to teaching of HOT in a content-specific setting; teachers integrate HOT explicitly with the teaching of specific content. The latter regards HOT as general strategies used across subject domains (not content-specific; teachers teach HOT as a set of skills or strategies to be acquired).

WHY IS THE TEACHING OF HOT PRESENTLY INEFFECTIVE (THE CHALLENGES)?

From the articles reviewed, we personally agree that HOT can indeed be taught and there are existing paradigms (infusion and separate-subject) to guide the proper approach to teach HOT effectively. Then again, why the ineffectiveness in teaching HOT till now? For deeper investigation, some of the most significant findings discovered by various studies are summarized in Table 2.

Table 2. The Challenges in Teaching HOT

No.	Challenges	Descriptions
i.	**Time**	The cultivation of HOT is an internal process which develops over time. It is a time-consuming effort where students need to reflect, to articulate, to justify, to interact with, to discuss, to question, etc., all in one time frame. Hence, due to the tight schedule for each subject, teachers may have difficulties planning HOT-filled lessons to be completed in 1 or 2 class periods (Limbach & Waugh, n.d.; Sparapani, 1998).
ii.	**Student factor**	Attitude/Motivation ▪ Some students (even the good ones) have the mentality of taking the easy way out; they do not see the necessity to go through the hassle if there are easier ways to complete their tasks in/out of the classroom (Sparapani, 1998). In other words, they do not like and have no motivation to think. For them, it will be easier and faster to be given a direct answer instead of being asked to think out of the box and to provide rationales afterwards.
iii.	**Teacher factor**	a) Competence ▪ Teachers themselves are confused over the definitions of thinking skills (Beyer, 1984) and they sometimes find it difficult to differentiate levels in thinking (Marzano, 1993; Rajendran, 2000). This lack of knowledge of HOT may eventually lead to teachers' inability to assess students' HOT. ▪ Teachers are not always sure of how to teach HOT (Rajendran, 2001; Sparapani, 1998). Yildirim (1994) discovered that the majority of teachers had only adequate skills to promote HOT (Supon, n.d.). Also, it was found that "in-service and pre-service teachers' initial knowledge of thinking

		strategies was often not sound enough for purposes of instruction" (Zohar, 2013, p. 235). To conclude, teachers lack the appropriate pedagogical knowledge to teach HOT (Fisher, 1999; Zohar, 1999; Zohar & Schwartzer, 2005). ▪ As teachers are confused themselves, they sometimes thought that they are teaching HOT when in reality they could be just inducing lower-order thinking among their students (Rajendran, 2002; Sparapani, 1998). On the contrary, some teachers may be unaware that they have been unconsciously integrating HOT in their instruction all this while (Zohar, 1999). ▪ Teachers see it easier to "prepare simplistic lessons that let the textbook do the teaching" (Sparapani, 1998, p. 274); the integration of HOT into the curriculum is being compromised (Zohar & Schwartzer, 2005). ▪ Some teachers rely solely on Bloom's taxonomy without realizing that the taxonomy is not prescribed specifically for the teaching of HOT (Ivie, 1998). b) <u>Perception</u> ▪ Teachers have expressed that Mathematics and Science teachers are most probably better oriented to teach HOT (Hashim, 2003). ▪ Teachers are still clinging on to the thought that HOT is only meant for high-performing students (Hashim, 2003; Lundquist & Hill, 2009; Zohar et al., 2001; Zohar & Dori, 2003; Zohar & Schwartzer, 2005). To them, weak students have very little thinking capacity, and their thinking ability is mostly hindered by their low language proficiency (Lundquist & Hill, 2009). ▪ Language teachers generally have more confidence in teaching language arts than teaching HOT (Rajendran, 2001).
iv.	**Assessment**	a) Standardized tests (teach-to-test syndrome) ▪ Teachers are bound with the issues of accountability in providing quantifiable achievement scores; as a result they have to stick to "normal" classroom practices to fulfil examination requirements (Sparapani, 1998). ▪ "Standardized tests (national and international) inhibit and contradict the development of HOT" (Zohar, 2013, p. 239). Any changes made to the curriculum (e.g., Integration of HOT) but not to the assessment practices will result in naught. ▪ Assessments should be geared toward appreciating and meriting HOT ability instead of recognizing only content mastery. It has become a norm that content goals are prioritized over thinking goals (Zohar, 2013). ▪ To this effect, in Malaysia especially, the dominance of standardized examinations in the education system is clearly exhibited (Ali, 2003; Che Musa, Koo, & Azman, 2012; Michael, 2012). b) Teachers' use of alternative assessments to evaluate HOT is usually hindered by the rigid guidelines provided by the authorities. The inflexibility of mainstream assessments has been and will always be a constraint to teaching HOT effectively.
v.	**Learning environment**	a) An example is the traditional way of desk arrangement has been maintained up to this day, especially in Malaysian classrooms. Students usually sit in pairs in rows facing the teacher and the whiteboard at the front. Such seating is neat and formal-like for the teaching and learning process, however it bars HOT. If classrooms are to be platforms for lively exchanges of intellect, teachers have to provide a stimulating atmosphere which encourages deep thinking (Sparapani, 1998).

		b) The culture of learning has greatly been inherited from drill-and-practice and rote learning (Sparapani, 1998). Teachers need to provide scaffolding for transition from this type of passive learning to active learning (HOT). c) It has been claimed that critical thinking is a form of western culture and that Asian students are unable to think critically because such practice is alien especially in Asian educational contexts and culture (Abdul Rashid & Awang Hashim, 2008).
vi.	**Resources**	a) Support in resources to ensure an engaging learning process among the teacher and the students is lacking. Practising HOT with students in class is intense and could always throw the teacher's pre-planned lesson out the window (still a well-thought out lesson plan is indispensible), thus having a variety of resources (e.g., computers, reference books, newspapers, etc.) is a must to cater to the on-going intellectual interaction in the classroom (Sparapani, 1998). b) Resources to develop teachers' professional knowledge of HOT and pedagogical knowledge to teach HOT effectively need vast improvement (Zohar, 2013).

CONCLUSION

Once again, all articles reviewed point to the importance of teaching HOT effectively as a matter of fulfilling a national aspiration in education. And this noble responsibility descends upon the shoulders of none other than our fellow teachers. Teachers have to realize that the effectiveness of teaching HOT will materialize only when the traditional view of transmitting information becomes secondary to a more constructivist view which affords students active learning that harnesses meaning-making in the learning process.

To wrap up, effective teaching gives rise to effective learning and students' learning can come in all forms, one of them being learning to think at the higher levels. This naturally makes effective teaching of HOT imperative in ensuring students' effective learning as a whole. The emphasis attributed to students' development of HOT is titanic, so much so that Dewey posits (1916), "all which the school can or need do for pupils, so far as their minds are concerned is to develop their ability to think" (as cited in Fisher, 1999, p. 59).

Bearing such ambition in mind, the challenges are immense. Many have been trapped in the "why-try-because-nothing-positive-will-happen-anyway" (p. 275) dark hole and some may go to the extent of belittling other teachers' budding efforts in trying out new approaches to teach HOT (Sparapani, 1998). As this review essay has deliberated, with the challenges identified and understood, with well-planned strategization and self-development, and with unwavering belief and perseverance toward the marked targets, we will sooner or later hit the bull's eye.

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FROM GIRL SCOUT TO GROWN UP: EMERGING APPLICATIONS OF DIGITAL BAGES IN HIGHER EDUCATION

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Abstract: Despite the fact that digital badges have been an emerging trend in education in recent years, some professionals in the field of higher education are uncertain as to how to incorporate the technology, specifically digital badges, into their practice. In this article, the authors address this uncertainty by discussing four applications of digital badges at a large Midwestern university. A brief summary of the origins of and educational theory behind digital badges precedes this discussion.

INTRODUCTION

It is evident that our students are technically savvy and are interested in new and innovative ways to enhance their learning experience. One of those innovative ideals falls under digital badges, a phrase that some faculty and higher education administration may not heard of as yet. However, due to the increasing interest in the concept of these virtual badges, colleges and universities are exploring the new world of innovation.

For many, the term badges conjure up images of colorful patches on Boy Scouts and Girl Scout uniforms. In some respects, those images are applicable to a new breed of badges known as digital badges. Just like the cloth badges that countless Girls Scouts and Boy Scouts have earned over the years, digital badges are used to recognize the skills and tasks an individual has developed. The advantage of this new form of badge is that it can be used toward professional development and academic learning.

The origins of digital badges come from online discussion forums and social media platforms, such as FourSquare, as a way to distinguish "super users" from average users. To earn this type of digital badge, users must accomplish more tasks to earn certain badges based on what that badge represents. Although many social media sites and online discussion forums still use digital badges in this way, digital badges have also evolved in complexity to the extent that many in the media identify them as an ideal way for individuals to showcase skills. These badges capture specific and sometimes marketable skills that traditional documentation such as transcripts and diplomas do not provide (Gligoski, 2012; Matkin, 2012; Young, 2012;). Abilities include those gained through the military, professional development programs, and non-credit courses offered at two and four year colleges. Digital badges can even serve as evidence of participation in civic organizations, clubs, and other non-traditional learning experiences.

Although no single entity deserves credit for developing the more evolved form of digital badges, the open source software company, Mozilla, is definitely pioneering the technology's use and availability for a broad range of users. Through its Open Badges Infrastructure (OBI), Mozilla has provided coding and identification verification systems available to organizations that want to issue badges to their members. However, some barriers arise for those who are interested in using Mozilla's OBI but lack computer programming skills.

Fortunately, EverFi's Sash and Purdue University's Passport are two examples of applications aimed at reducing some of the technological barriers associated with creating and offering digital badges. In addition to Sash and Passport, Mozilla is currently developing a similar project called Open Badges. For now, Passport is the only completely free program that allows users with no programming skills to create, track, and award digital badges.

Other options are available for individuals who are interested in earning digital badges but are not affiliated with any particular program. These individuals can earn badges through open online universities such as Peer to Peer University, Codecademy, or Kahn University. Regardless of where individuals earn badges, participants can display their badges using Mozilla's Open Badge Backpack platform as a way to promote their new skills. Additionally, badge earners can use social media sites, such as Facebook or Twitter, and job search sites, such as Monster, to showcase their digital badges.

While there is certainly a lot of buzz around digital badges, there is a lack of qualitative research regarding the use of digital badges in varied curricular and co-curricular settings. In an effort to contribute to the literature regarding the practical use of digital badges, this article will provide an overview on how to incorporate digital badges in higher education. A brief review of the theory supporting the use of digital badges to assess learning is also discussed.

LITERATURE REVIEW

When Secretary of Education, Arne Duncan (2011) identified digital badges as a potential "game-changing strategy," he was referring specifically to the potential of digital badges to serve as micro-credentials. The president of Charter Oak State College, Ed Klonoski (2010), provided a succinct definition of micro-credentials when he described them as "a cluster of courses around a core of expertise." The advent of digital badges might just assist in helping to shrink that cluster. Badges help in providing credentials related to expertise gained through smaller learning experiences or a sequence of smaller learning experiences belonging to a larger experience, such as a course, an after school program, or even military service. Thus, badges provide documentable evidence of skills that were once difficult to quantify and document on resumes or transcripts. As the New York Times states, digital badges "may be a convenient supplement [to traditional resumes or transcripts], putting the spotlight on skills that do not necessarily show up in traditional documents" (Eisenberg 2011). Digital badges offer potential employers useful information on skills that "tell you who issued it, when it was earned, and the criteria for earning it—*and* it can link to all of the evidence" (Watters, 2010, p.10). However, some doubt whether employers will value digital badges as much as they value more traditional credentials like a college transcript. Jeffrey Seligno, editor at *The Chronicle of Higher Education* addresses those doubts by stressing the fact that digital badges offer demonstrable evidence of skills a traditional transcript cannot offer.

> "The big question, of course, is whether employers would view badges as credible, especially when compared against a traditional college diploma. Probably not, at least not at first. But employers express plenty of dissatisfaction with the current crop of college graduates, especially those from lower-tier schools. For some technical jobs, employers might prefer a system that can show them what students studied, as well as samples of their work". (Selingo, 2013, p. 69)

The evidence-based feature of digital badges can be especially valuable and motivating for higher-education students who can only provide individual grades and general e-portfolios that highlight the work they have done in college (Batson, 2012). This feature of digital badges is also attractive for students who are in the process of completing their degrees and need documentation of their skills while pursuing scholarships, applying for internships, seeking employment, or applying for graduate school. Digital badges can also offer evidence of skills earned through coursework for students unable to complete their degrees.

Game-based learning adds to the theoretical framework of digital badges. Game-based learning is part of a trend in instructional design commonly referred to as "gameification" or gameified" learning. The term "gameification" refers to the application of video game design principles to non-game experiences. Gameified learning engages and motivates individuals by offering incentives for completed tasks. The amount of time spent completing specific challenges and tasks associated with badges supports the findings in Chickering and Ehrmann's work on the seven principles of a quality undergraduate education. In a research bulletin exploring the gameification of the post-secondary classroom, Epper et al. (2009), identify digital badges as one of six trends that will "drive the adoption of game-based learning" (p. 1). They also propose a theoretical ecosystem for game-based learning in which digital badges function as the assessment component of the ecosystem.

One of the advantages of game-based learning is that it offers students "the instructional scaffolding strategies that offer individualized support for learners by means of a series of incremental improvement opportunities where a learner builds on past successes" (Epper et al., 2009, p.7). Digital badges simultaneously provide learners with evidence of those past accomplishments and the motivation to tackle challenges that could result in future successes.

Similarly, James Paul Gee (2004) notes that good games are those in which the problem solving required by its players is very progressive. As Gee (2004) states it, "earlier parts of a good game are always looking forward to later parts [and] prepare the player to get better and better at the game and to face more difficult challenges later in the game" (p. 19). Gee's ideas apply to digital badges in the sense that the tasks learners must complete to earn a digital badge, if structured in a leveled or tiered fashion, can prepare students to complete more complicated tasks in a learning experience. Although game-based learning is described in the classroom context here, the learning theory can translate to co-curricular learning as well, which relates to one of the applications of digital badges we discuss later in this article.

It must be noted that digital badges offer a way to engage students in the learning process, a key concept to increase student learning outcomes. As Epper et al. assert, "the majority of today's postsecondary students are digital natives and have grown up with computer games" (p. 1). These students respond well to game based learning, such as digital badges, because it is what they have been familiar with throughout their lives. Additionally, digital badges offer students a way to develop and demonstrate skills in an interconnected manner. It also offers them a sense of accomplishment that helps them to persist and progress with their learning rather than practicing skills in isolation and out of context. Gee notes the following:

> In good games, players learn and practice skill packages as part of accomplishing things they need and want to accomplish. They see skills first and foremost as a strategy for accomplishing a goal and only secondarily as a set of discrete skills. (p. 21)

A digital literacy partnership between the Department of Education and the Office of Postsecondary Readiness in New York City can attest to the motivational potential of digital badges. This program involves students in second-chance high schools and provides an opportunity for these students to empower themselves in the development of real-world skills and knowledge. Many of these students are at risk of dropping out of high school or are transitioning back to school after having dropped out (Nolan et al., 2012). Many of the badges that are used in this type of program are tiered or leveled so that one badge must be earned to progress to the next level within the program. Additionally, these badges have point values that vary depending on the skill level or effort involved required to earn them. Students use the in-house created badge system to share their badges with fellow students and teachers in the program. The program designers have even created a class of badges that students can nominate each other for based on their positive actions within the program or their contributions to the group. All of these features have vast implications when it comes to engagement and motivation because they help to bolster "students' sense of process and accomplishment – and, far more precisely than a letter grade, pinpoints, the skills and understanding students have to show for their efforts" (Nolan et al., 2012 p. 45). If digital badges can have such an impact on motivation for "at-risk" students in a traditional classroom setting, imagine the motivational potential they could have for students who are voluntarily participating in curricular and co-curricular activities at a traditional four-year university.

DISCUSSION

Finding early adopters for a new technology can be a challenge. Digital badges represent an unfamiliar concept for faculty and staff members, thus new technology such as digital badges can be underutilized. If in effort to determine if digital badges could be something that could be more widely used on their campus, an assessment staff at a large Midwestern University felt the need to understand the use of digital badges by faculty and staff. In order to do so effectively, the team monitored how digital badges were being used by the few faculty and staff that had adopted the technology. As a result of these actions, a snapshot of how digital badges were used by faculty and staff emerged. This article discusses how four diverse areas on the authors' campus use digital badges.

DIGITAL BADGES WITHIN THE CLASSROOM

In the Spring of 2013, the President of this Midwestern university commissioned a task force to measure student outcomes while attending the university. One of the task force's recommendations for increasing student growth was for faculty to offer more digital badges as part of their instruction. During the time of this recommendation, few faculty members were using digital badges in their classrooms. However, one faculty member in the College of Education was using this tool. This professor stated two factors that caused him to incorporate digital badges within his courses. First, a close colleague within the College of Education was one of the driving forces behind the development of digital badges at the university. The relationship exposed this faculty member to digital badges. Second, the professor's graduate student, was a developer of a digital badge platform used at the university. Bolstered by these two professional relationships, this professor began to use digital badges in the fall of 2014 with his Introduction to Educational Technology Course, a 200 level undergraduate course that is required for all students seeking a teaching certification.

The class introduced a series of eight badges comprised of a portion of the course's required assignments. Students who completed all of the badges would demonstrate skills in the areas of social media, word processing, desktop publishing, spreadsheets, media editing software, and classroom technology. The eight badges were designed with scaffolding levels of difficulty and original though demanded by the tasks associated with the badge levels. For example, to earn the first badge in the series, students must complete basic tasks such as identifying resources related to educational technology and creating an RSS feed to connect to organizations, websites, and individuals related to educational technology related, while the later badges in the series require students to complete more complex tasks, such as using media software to create a digital story. All supporting materials for students were within the challenges that comprise the digital badge. Through creating this series of thoughtful and challenging digital badges, not only did the professor diversity the instructional eco-system of his classroom, but he has also offered students a way to showcase potential employers of their skills and knowledge. Students can choose to share the badges with others as well. Thus, the videos and other artifacts they created served as evidence, in addition to their academic transcript, the skills they have developed through completing the course.

DIGITAL BADGES IN THE CO-CURRICULAR CONTEXT

Perhaps one of the most promising applications of digital badges is the digital documentation of co-curricular learning, a concept that many universities are adopting highlighting. In this context, the term "co-curricular" refers to activities

that contribute to the academic learning experience, especially activities that provide students with opportunities to learn and develop skills through active participation. These activities may be led by faculty, staff, or students, but they must have stated goals and measured outcomes. Although co-curricular activities can create substantial and significant learning for students, often their new abilities and skills are not documented. Offering digital badges for co-curricular learning could create a platform of collecting and illustrate this higher level of learning.

One of the co-curricular departments at the university decided to try digital badges in the context of their LinkedIn Boot Camp. The boot camp's purpose was to help students create a LinkedIn profile that would lead to successful networking and a positive online image. Once they completed the book camp, participants would earn a digital badge which they could choose to share their badge via the Passport digital badge platform, Mozilla's Open Badges Backpack, or selected social media sites. Employers, as well as others, viewing the boot camp badge would be able to see the ten challenges that students completed to earn the badge. Prior to their decision to use digital badges, interns associated with the department developed a four-category rubric with values ranging from zero to three to evaluate each of the ten challenges with three being the highest level of achievement. Those three rubric values translated to three levels of digital badges based on the quality of the tasks submitted for each of the ten challenges. Students with mediocre profiles would be awarded a LinkedIn Learner badge; students with good profiles would be awarded a LinkedIn Leader badge; and students with outstanding LinkedIn profiles would be awarded a LinkedIn Legend badge.

Initially the department planned to offer digital badges to all 163 boot camp participants, however, the program coordinator and the student interns quickly recognized that offering the badges to such a large group might become unmanageable. Therefore, they decided that a more manageable approach would create a test group consisting of department ambassadors (learning leaders) and interns. This approach would allow the student interns enough time to verify the work the ambassadors did to earn the badges and to consider any modifications that would be necessary for a wider group of participants in the future.

DIGITAL BADGES AS A MEANS TO FULFILL GRADUATION REQUIREMENTS

An example of digital badges is through fulfilling core curriculum. For example an assistant director of the faculty development organization at the university, created a series of badges to assess and document intercultural learning beyond the classroom. The series consists of six badges related to intercultural learning in the areas of intercultural openness, intercultural curiosity, cultural self-awareness cultural worldview, intercultural empathy, and intercultural communication. Once students have earned those six badges, they can earn a seventh capstone badge by reflecting in writing on what they learned by completing the six previous badges and by completing a brief quiz. The Association of American College and Universities's (AACU) Intercultural Knowledge and Competence VALUE rubric served as a guide for structuring the challenges that comprise each of the seven badges. The staff member chose to use the AACU rubric for this domain because it is the same rubric that university where the badges uses to assess intercultural learning as part of its core curriculum. It was the designer's intention that undergraduates could complete the series of badges to complete the intercultural learning requirement of the university's core curriculum. After a rigorous review process, the badges were approved as fulfilling the intercultural learning portion of the core curriculum. As a result of this staff member's innovative use of digital badges, students now have a means, beyond traditional coursework, to fulfill one of their graduation requirements.

DIGITAL BADGES AS OUTREACH

Outreach programs, whether they are targeted to the community at large or to the K-12 population, are a very common component of many academic programs at many major universities. As an example of how digital badges can become part of community outreach, the Office of Engagement within one of the university's colleges is developing a four tiered system of badges of increasing difficulty. For example, at the lowest level are the discovery badges which can students can earn by visiting the college's kiosk at different events. The next level of badges, the Explorer Badges, require students to read or watch materials related to various aspects of a certain disciple and complete a quiz related to those materials. All of the badges in this series are designed to teach K-12 students something about an aspect of the discipline. The next two levels are titled Leader Badges and the Champion badge. Although those badges are currently under development, they are designed to recognize students who have demonstrated significant learning and dedication to the learning about multiple aspects of a particular profession.

CONCLUSION

In providing readers with this snapshot of four very different applications of digital badges, it is the authors' hope that educators, in higher education and K-12 education, will become inspired by these early uses of digital badges and begin to use digital badges at their own schools. The digital badges concept is a versatile and unique educational technology that can only reach its full potential if the early adopters of the technology share their experiences with each other.

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FUTURE OF ONLINE EDUCATION IN CRISIS: A CALL TO ACTION

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Abstract: Online education is growing rapidly and there is little doubt that it will continue to expand until it one day encompasses the majority of higher education course offerings. Higher education leaders agree that online education will continue to grow even in the face of a slight recent decline (Allen & Seaman, 2013). As the rise of online education began, concern also rose as to whether the quality of higher education would suffer as a result of this new fast tracked course of academia. The quality of education in general is in question. The average degree standards are lower in America (Cote & Allahar, 2011). Today in higher education it is almost unacceptable to expect students to be solely just that, students (2011). Working full time, while carrying a full load is becoming the acceptable norm (2011). This type of student is more often the student that elects an online education. Despite the current drawbacks, online education is still the best prospect for the future provided the barriers of faculty assessment and course design are addressed. Fear of student evaluations and administrative disapproval are causing grade inflation while simultaneously influencing course design. Instructors are designing courses that allow the student to easily pass the course, which in reality is a disservice to everyone involved. This literature review provides evidence to justify a warning to acknowledge the paradox of current faculty assessment practices and the codependent relationship with course structure, to ensure the future value of higher education.
Keywords: Online learning, online education, higher education, grade inflation, faculty assessment, student evaluations, cheating, online exams, exam proctoring

Introduction

The rapid growth of online learning (OL) demands careful attention to the academic vehicle of higher education. Higher education (HE) in general is a slow moving machine. Therefore when anything begins to accelerate out of contextual manner, caution should be taken to carefully attend to the details and direction of the force. OL has been growing at a rate well beyond that of overall HE (Allen & Seaman, 2014). The Babson Survey Research Group has been tracking online education (OE) for more than a decade. There have been eleven reports to date. These reports serve as useful barometers to keep a pulse on the trend of OL in the United States (US). The survey group collects data from more than 2,800 colleges and universities (2014). The latest report however reported a leveling out of the growth curve. Over the past few years online growth has been decreasing (2014).

Despite the seemingly temporary deceleration of OL growth in the US, OL is still considered to be the way of the future. Institutions are including OL in their long term strategies significantly more today than they did in 2002 when the survey's first began (2014). Online classes will continue to grow faster than traditional classes as they have been doing for so long (Thiede, 2012). The number of online students that are taking online courses remains at a steady normative of students taking at least one online course per year (Allen & Seaman, 2014). Interestingly it is found that the greatest increase of OL is occurring in the institutions that are classified by Carnegie as Doctoral Research Universities (Allen & Seaman, 2013).

It is questionable as to whether the push by institutions to increase OE is simply a way to increase their enrollment (Turyel & Griffen, 2014). Unfortunately the consideration of that possibility brings into question the resulting quality of HE and whether it may suffer in a race to increase enrollment.

Administrators hold a very positive outlook on the future of OE (Allen, Seaman, Lederman & Jaschik, 2012). The increase in administrators that are in favor of increasing OE has jumped significantly in the past decade. The Babcock Survey Group found that the percentage of administrators that considered OE important to the future of the institution went from less than half in 2002 to almost 70% in the 2012 survey (Allen & Seaman, 2013). The survey reflects that administrators believe that an OE is just as good as a face to face education; nearly 77% (2013).

Caution must be taken in the fact that OE means financial gain for institutions, which quite often is in the interests of the administration. Shorter courses are offered online to benefit the institution financially (Shaw,

Chanetzky, Burrus & Walters, 2013). For the institution, OE provides growth opportunity and is cost efficient (Bristow, Shepherd, Humpreys & Ziebell, 2011). The danger is that administration may begin to see OL courses as more prosperous than face to face courses (Kay, 2013). That perspective can lead to downsizing of tenured faculty and departments.

Even considering the pitfalls of OE becoming a money machine for HE institutions, it still remains one of the best prospects for the future provided certain precautions are taken and prospective pitfalls are admitted and addressed. Online education provides the best prospect for the future value of HE as long as the following barriers are conceded and addressed; methods of faculty assessment and course design. This study will focus on the best ways to proceed into the future of OE by constructing a literature review of current trends in OL in HE, methods of faculty assessment, current course designs of OL in HE and best practices and recommendations for the future of OE.

Literature Review

Current trends in OE.

A current trend in OE is that the perception of students, faculty and administrators do not acquiesce. In fact research shows that students and faculty perceive their roles in almost an opposite way (Community College Research Center (CCRC) pt.2, 2013; Wachenheim, 2009). Students perceive online classes as the "easy way out" (2013). One student was quoted as describing face to face classes as "real learning" (2013). Students report that they feel instructors should be active in their learning experience, while instructors see their role as more of a facilitator or guide (2013).

The CCRC study found, as well as other researchers, that students expect instructors to be "on call" all the time including weekends (CCRC pt. 2, 2013; Mulig & Rhame, 2012). Faculty however, views their availability in quite the opposite way. They believe they should not be on call especially on weekends (2013). Students feel that faculty are responsible to motivate them, while faculty feel that students should be independent learners and self motivated (2013).

The administrators perspective is also quite different from the faculty perspective (CCRC pt.2, 2013). Allen & Seaman (2014) report that according to the findings of the Babcock Research Survey, academic leaders believe that OL is the positive way of the future for HE. Faculty have been reported to be more pessimistic about OE (Allen et al, 2012). Allen et al (2012) reported that almost 2/3's of faculty believe that learning through online courses is inferior to that of face to face classes. Wilkes, Simon & Brooks (2006), also report that faculty believe that face to face classes promote better learning than online classes.

Another current trend in OE is the debate over cheating. Students cheating when taking online courses is vast and increasing (Harmon, Lambrinos & Buffolino, 2010). On the contrary, in one study to investigate student's perspectives, students reported that they cheat less in online courses (Simonson, Hudgins & Orellana, 2009). As reported in the Babson Research Survey, students perceive online courses as easier (CCRC pt. 2, 2013). Kirtman (2009) studied student perceptions of online courses. They compared student's performance in online courses to performance in face to face courses (2009). The same teacher was used for both forms of instruction. Online learners did significantly worse on the midterm than the face to face learners, however the difference disappeared on the final exam (2009). It can be concluded that the students initially expected the course to be easier and once they performed poorly on the midterm they learned that the course was not as easy as they expected and put forth a greater effort for the final exam.

There is a trend to produce massive open online courses (MOOC). These courses allow hundreds of students to enroll and the institution gains considerable funding for these types of courses. Problems arise such as how to grade all the assignments and give the students the personal attention they are used to from online courses. Currently only 5% of HE is offering these MOOC courses (Allen & Seaman, 2014). However over nine percent say that they plan to offer them in the future (2013). The increase in these types of courses may solely be for the financial benefit because though there is an increase in the number of academic leaders that say they plan to offer them, less than ¼ of academic leaders actually believe MOOC is a good method of online instruction (2013). The problem with the small intimate courses is that faculty load will be higher with each faculty member teaching fewer students. Most HE leaders were found to be in expectation of OE reducing the costs to the institution.

Methods of faculty assessment.

One of the common practices of faculty assessment is student evaluations. The problem with student evaluations being used for that purpose is that they do not reflect a teacher's effectiveness (Svanlin & Aliner, 2011; Stark & Freishtat, 2014; Kamenetz, 2014). Svanlin & Aliner (2011) conducted a study of 220 online students and they found that the student's evaluation were more dependent on student's success, personal motivations and the amount of effort on the student's part. In other words, students will evaluate a teacher higher when they do well in the course themselves or when they get a higher grade. The highly motivated student that makes a concerted effort in the course will typically rate the teacher higher.

Stark & Freishtat (2014) found that students typically fill out the evaluations in detail when they fall into either of the extremes. If the student is pleased with their grade and worked hard through the course, the self satisfaction is reflected in the instructor's evaluation (2014). The same is true for the other extreme. If the student earned a lower grade and lacked effort and self motivation, they are eager to blame the instructor and complain (2014). Anger is a very motivating emotion. Stark & Freishtat (2014) also point out that statistically, conclusions cannot be drawn from such small samples. The typical class size is small for current online courses, especially fast tracked courses. Small sample sizes are not justifiable in measuring anything including performance of a professional. Secondly, it is counterintuitive to expect any kind of meaningful evaluation of a professional by a non-professional (2014).

Students are however, in a good position to report a professor's availability or their own boredom or excitement. For example, a student may complain that a professor was not available enough to help them through the course because the instructor did not answer emails on the weekend. Their perspective is that it wasn't enough, but the institution's perspective is that it is fine. Part time instructor's are not expected to work all through the weekends, just like face to face professors are not expected to work all weekend, or hold weekend office hours.

Better evaluation tools would be the materials the instructor uses in the course such as the instructor's syllabi, the lectures, the assignments, materials created to enhance course exams, samples of student's work that professors have graded and grading rubrics. Furthermore, teacher's ongoing behaviors may be observed easily by the institution. For example, is the teacher revising work? Does the teacher take time to record video? Does the teacher give research supervision online, such as teaching proper APA style and giving feedback on it? And probably most important, is there a normal grading curve?

Grade inflation.

More instructors are part time without the security of tenure and may need their positions desperately enough to be more lenient in online courses (Kamenetz, 2014). Kemenetz (2014) found that professors who hand out easy A's get higher student evaluations. Grade inflation is a growing problem in HE (Schutz, Drake & Lessner, 2013). Grade inflation lowers learning standards, lowers the value of education and causes the student to feel entitled thus lowering their efforts (2013). Students gain a false sense of achievement and they then reward the instructor with a favorable student evaluation. Schutz et al, (2013) conducted a study comparing tenured faculty (who feel a greater sense of job security) to adjuncts and found that adjuncts inflated grades significantly more than tenured faculty. More than likely these results reflect the fear that adjuncts have of administrators letting them go.

Barr, Kadiyah & Zussman (2009) conducted what is now known as the famous Cornell study on grade inflation. They studied 500 students and found that grade inflation is steadily increasing, and students were choosing classes with the highest median grade average. These results reflect the desire of students to have an instructor that is willing to give away high grades easily. Since this study Cornell stopped posting the average median grade (2009).

Wellesley College implemented anti-grade inflation policy (Butcher, McEwan & Weerapana, 2014). They found that student evaluations were tied to lenient grading. Once the policy lowered the grade inflation, student evaluations dropped significantly (2014). The problem is that faculty are now trying to satisfy both students and administration, while trying somehow to hang on to some shred of ethical value. Kay, 2013 reports that teachers are enticed into planning easy assignments that are merely feel good or fun for the students. The problem is, we as faculty and HE institutions are supposed to be preparing these students for the real world where hard work and effort will be expected. We are also preparing professionals. If students do not really learn and retain the education that our devalued diplomas say they hold, would you really want that so called "accountant" doing your taxes. Or would you like these graduates to be your "lawyer" representing you in court, or worse, have that graduate as your surgeon? It may be tempting to look at simple psychology courses as something that is not really harmed if they student learns the information or not, until they are operating as a professional social worker counseling a teenager

contemplating suicide. Suddenly what they are supposed to be an expert in becomes very important to society in general.

Higher average grades in a class are reflective of an instructor that is turning out students that are not really learning the material for any permanent amount of time if at all. Higher average grades in a class lead to less effort of students (Babcock, 2010). Lower average grades on the other hand lead to a greater effort on the student's part (2010). Khanlarian & Singh (2014) describe today's online learner as lazy wanting to do the least amount of work to complete the task. For example most discussion board assignments require a student to make comments to at least two of the peer posts each week. Most students log into the discussion board at one small point during the week and make sure to get their two meaningless posts up and counted for. What learning occurred there? The researchers also found that today's online students do less work and ask for lots of help from the teacher (Babcock, 2010). What would happen in the case of an MOOC class? Would the instructor be responsible for motivating and hand holding each student? It would be impossible. The online student must be self-motivated and self-directed.

Grade inflation harms the student, the individual institution and most of all HE in general. It devalues the student's degree, it devalues the education that comes from that institution and may eventually ruin their reputation and most important it destroys the value of a HE in general.

Therefore it must be concluded that student evaluations must be reconsidered as to what they are used for. Certainly they give insight into the student's perspective, however they are nowhere near an assessment tool for a professional's performance especially the instructor that gave them a grade. If anything at all, it is a conflict of interest. Perhaps administration could put in more effort to really look at all the work the professor has put in to building and improving the course.

Current course designs of OL.

The social aspect.

Online instruction has developed some structures that appear to be a given such as discussion boards. Originally academic leaders and faculty were worried that online courses take away the social and interactive element that face to face courses provide and those aspects of face to face courses are indeed important (Aksal, 2011). Aksal (2011) constructed an evaluation tool to assess online learning and they found that social interaction is highly important. Social interaction can be implemented into online courses however, what is really lost in online courses compared to face to face courses is the built in discipline of having to put aside a certain time for the course each week. OE looses that forced structure of having to make an effort for the course and with fast courses there is the loss of time to take the material in.

Discussion boards offer very little value to online courses (Sebastianelli & Tamimi, 2011). In a study by Tucker (2012), they examined the social interactive constructs of OE. They found that discussion boards are worthless (2012). The responses were generally brief and didn't reflect scholarly thought (2012). Most of the time the responses did not add anything to the topic (2012). They also found chat sessions to be worthless (2012). Students that type slow ended up going silent in the sessions, or reported feeling left out of the conversation (2012). When they compared discussion boards with face to face class discussions, they found that class discussions promoted student retention and learners perceived the instructor as prompting an atmosphere of community (2012). They also found that instructors in the face to face classes received higher student evaluations (2012).

Group projects are another effort to socialize online coursework. Capdeferro & Romero (2012) found that group assignments cause students frustration. It violates the very reason many of the online students take their courses over the internet. They don't have time to conform to everyone else's schedule. Also the other students in the group don't always do their part. Online learners appear to prefer riddance of group assignments (2012).

Course length.

Course length recently is a paradigm of change in the structure of online courses. Institutions have found ways to generate more income by faster turnover. Accelerated courses are online courses that are completed in less than the traditional 16 week course. Course lengths vary anywhere from 5 to 8 weeks in duration. The research is in the middle on this issue. Shaw, Chametzky, Burrus & Walters (2013) found that 16 week courses were not found to facilitate learning any better than 8 week courses. The only problem with this example is, there were no exams given in the online course, just 18 homework assignments and a final grade generated from the homework assignments.

Ferguson & DeFelice (2010) compared five week courses to 16 week courses. The five week course received higher satisfaction ratings from the students with regard to student to student communication (2010). The students in the 16 week courses expressed higher satisfaction with student to professor communication (2010). The perceived learning was higher in the 16 week course, however the students in the five week course had significantly higher grades (2010). It was not reported however, whether the students in the five week course had proctored exams or even if they had exams (2010).

Mensch (2013) compared student grades in three week, five week and 14 week courses. They found that students in the three week course had significantly better grades. However when examining the grading distribution, the three week course had a grade compression clustered around A's making the average grade an A (2013). This clearly indicates grade inflation by the course instructor. The research did not report whether exams were proctored or timed, or even if there were exams. The researchers admitted that there was a possibility that the three week course was probably made easier because it was short.

Flexible course lengths may offer the most promise for varying the course length. Zucca (2013) found that adults that were given a flexible time limit to work on the material performed well. They could finish the course faster if they wanted to, as in five weeks, or they could take the full 16 weeks to complete the course. Learning was better in all cases when students were allowed to set their own pace within the bounds of the 16 week traditional course time.

Proctored exams.

In each of the cases of course acceleration, it is expected that students will retain the same information in a very condensed time compared to the traditional 16 week course, whether online or face to face. In each of the studies presented here, the terms of examination or grade assessment were not made clear. Grade assessment is important for to the retention of information and actual learning. Students do cheat when exams are not proctored (Harmon & Lambrinos, 2008). Online students take advantage when exams are not proctored. Two different classes were compared. One class was administered a proctored exam. The other class was not. Three of the previous exams during the semester were unproctored. The class receiving the unproctored exams were not warned they would receive a final proctored exam. They did significantly worse than their previous exams (2008). Furthermore, they did significantly worse on the final exam than the other class who was receiving proctored exams throughout the entire semester (2008). The indication here being that if students do not think they are really going to be tested on their knowledge, without notes or books to help them, they will not make the effort to learn the material. It has to be concluded that no real learning has occurred.

Wachenheim (2009) compared the performance of students in both online and face to face classes on a proctored final exam. They found that the face to face class performed significantly better than the students in the online class (2009). However when comparing students taking a proctored exam to students taking a non-proctored exam the students taking the non-proctored exam performed significantly better, indicating cheating (2009).

Some course designers of online courses believe that letting students retry an answer over and over until they get the correct answer on weekly quizzes will help them better retain the information and promote learning. Wachenheim (2009) found that not to be true. Weekly quizzes were also given to in class students but they weren't allowed to use books or redo the answers until all were correct. The online students were allowed to use books and re-submit answers until the correct answer was found. If the hypothesis is true that retrying until you find the correct answer on weekly quizzes promotes learning, then the online students should have learned more than the students in the face to face class. This however was not what the researchers found. When the proctored final exam was given the in class students performed much better than the online students (2009). The researchers concluded when exams are not proctored online students will cheat and when exams are not proctored online students really do not experience learning (2009).

Further Harmon, Lambrinos & Buffolino (2010) found a correlation between assessment type and cheating. Courses with non-proctored exams affect the credibility of the institution (2010). According to Mayadas, Bourne & Bacsich (2009), it is common practice to take the final exam under a proctor. However that may not be the case today with the recent findings that adjunct professors grade inflate more than professors (Schutz, Drake & Lessner, 2013; Barr, Kadiyah & Zussman, 2009).

Online student profile.

It's possible that students learn from the instructor's leniency that effort is not required. Allen & Seaman (2013) report that today's online students lack discipline. Students in classrooms were found to put more time into a course than students online put into a course (Brown & Liedholm, 2002). It is possible that the academically stronger student gravitates to the face to face method of instruction. Research does show that academically stronger students tend to gravitate towards face to face classes (Driscoll, Jicha, Hunt, Tichavsky & Thompson, 2012). They found that online classes were perceived as easier, therefore they attracted the weaker students (2012). Overall GPA's of online students are found to be lower (Turyel & Griffen, 2014). Withdrawal is also higher with online students (2014).

Recommendations for Quality Online Education

Improvement begins with the institution and the administration. The institution should create readiness activities for students to determine the probability that they will be successful in online courses (CCRC pt.2, 2013). Institutions should make sure that faculty receive professional development (CCRC pt.2, 2013). Entrance requirements may be a course of action to ensure quality of OL and administer a connotation of greater effort and value of the OE, such as minimum grade point average standards to be eligible to enroll in online courses (CCRC pt.2, 2013).

Institutional responsibilities.

Institutions must have a teaching plan and a reliable technical delivery system (Institute of HE policy, 2000). Khanlarian & Singh (2014) found that students are frustrated when there are IT issues. Student frustration is important because frustration is correlated to student's success (2014). There should be a centralized tech system in place that both students and faculty may rely on (2014).

The institution should show an interest in the faculty by actually reviewing instructional materials periodically while minimizing their reliance on student's evaluations. The Institute of HE policy (2000) suggests that minimal standards should be used for development, design and delivery. Technical assistance should be available to the instructors and instructors should receive training and assistance in technology for the courses (2000).

Instructor evaluation should be based on the syllabi, the lectures, the assignments, the materials used to enhance the course, the assessment methods used in the course and samples of the student's work, that have been graded by the professor. Instructor or faculty evaluations should not be rooted on student evaluations (Svanlin & Aliner, 2011; Stark & Freishtat, 2014). In a research university it is even more important to evaluate an instructor's grading rubric to ensure that they are properly preparing students for academic level research and writing skills.

At the conclusion, institutions will eventually be held accountable for students actually learning and retaining information for the college credits they bestowed upon their graduates (Brazina & Ugras, 2014).

Faculty responsibilities.

Faculty should ensure daily communication. They should provide feedback in a reasonable efficient time (Barr & Miller, 2013). They should express high expectations and embrace cultural diversities (2013). Their instructions should be very specific with the use of rubrics given in advance, preferable in the course guide (Thiede, 2012). Therefore students will have a good concept of what the instructor is looking for when grading an assignment. The assignments should cause students to engage in research, discuss the course material with others and force them to take an analytical approach (Thiede, 2012).

Exams should always be proctored or timed allowing no more than 2 minutes maximum per question (Institute of HE policy, 2000; Wachenheim, 2009; Barnes & Paris, 2013; Mayadas, Bourne & Bacsich, 2009; Stanley, 2006; Harmon & Lambrinos, 2008; Kirtman, 2009). The use of proctored test sites is best. However, sometimes that is not possible therefore timed exams are essential. Timed exams that allow 24 or 48 hours for the students to look up the answers are not considered "real" exams. That type of "exam" is really nothing more than a homework assignment.

Exams should be single entry online. Students should not be permitted to save the exam and come back later to finish it. Exams should be changed each semester (Barnes & Paris, 2013). If possible lock the student's

browser during testing (2013). The questions should be changed each semester (2013). Questions on exams should concentrate more on conception rather than general knowledge (Wachenheim, 2009).

Student responsibilities.

Students should make the strongest effort in an online class. Students should be self-motivated and operate as self-directed learners. Students must take OE seriously and apply themselves accordingly. Students must realize that they will not benefit from the least amount of work possible (Khanlarian & Singh, 2014). Research shows that better note taking in class results in better grades (Nakayama, Mutsuura & Yamamoto, 2014). Unfortunately it is found more and more that students prefer courses that require the least amount of effort and time (Marshall, Greenburg & Machun, 2012). Student effort was found to be one of the best indicators of success in OE (Firmin, Schiorring, Whitmer, Willett, Collins & Sujitparapitaya, 2014). The entire online environment is weakened when a professor's time is consumed by students who do not put forth a copious effort to succeed.

Conclusions

OE is the fastest growing segment of HE and it is a positive academic direction. However, there are cautionary situations that must be addressed immediately. There are two paths presenting themselves in front of OE as it approaches its future. One path will degrade HE in general and devalue education in the US considerably. The US is currently the country with the most successful online programs in the world (Mayadas, Bourne & Bacsich, 2009). With the US leading the future of OE, it is important for change to begin in the US.

The other path is to sustain a strong and vital growth in HE that not only maintains integrity but strengthens HE. The possibility presents itself to elevate HE to a level of value higher than it has ever been. But to do that, there are barriers that demand extraction. The use of student evaluations for any sort of faculty performance indicator must be eliminated. Student evaluations may still be collected but the use and value should be placed elsewhere.

True exams must be required of all faculty. Proctored or limited timed exams must be used. Some studies report success with the use of web cameras, however complaints of costs have impeded that form of assessment becoming common (Barnes & Paris, 2013). Administrators must give clear guidelines of exam expectations and monitor grading curves. Faculty should have a normal grading curve in the course. Faculty that have an average grade of "A", should be evaluated closely.

The design of online courses should include a social aspect but not as the most important standard for success. Success should be surmised on the premise that learning has occurred. It is not just assumed learning that is considered acceptable, but learning with some form of verification. OE must include clear communication between the student, faculty and institution which starts with a clear and detailed course guide that is approved by the institution, endorsed by the faculty and understood by the student. Grading rubrics and high expectations married to strong student effort and motivation will result in a strong education in the US and the world. As educators, we are in agreement that the most important objective of what we do is to induce or facilitate learning in the student. Cote and Allahar (2011) stated it very well when they said "Simply handing someone a credential, without the personal and intellectual resources to back it, is to shortchange that person" (p. 119).

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PERKS OF BEING A WALLFLOWER: LEARNING WITHOUT ENGAGING IN DISCUSSION FORUMS

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Abstract: While much has been written about student engagement as measured by *interactions* in online discussion forums and its relationship to student success, little, if any, research has been done to connect student engagement as measured by *non-interactions* in online discussion forums and its relationship to student success. Learning Management Systems (LMSs) have the ability to measure student engagement by tracking the frequency of discussion forum posts and replies (interactions), and the frequency of discussion forum views (non-interactions). This initial exploratory study sought to determine whether relationships existed between students' frequency of discussion forum activities—posts, replies, and views—and student success. Correlation and regression analyses were performed to determine type and strength of relationships. Non-probability purposive sampling was used to recruit 38 participants. Data showed meaningful findings, which yielded statistically significant, modest or moderate positive partial relationships in discussion forums posts, replies, and views, and student success. This study attempted to fill the gap in the literature by identifying additional measures of student engagement in online environments. Results from the study can potentially inform administrators and educators in making data-based decision to improve teaching and learning practices, thus increasing retention and graduation rates.

INTRODUCTION

A wallflower is a term used to describe a person who from shyness or unpopularity remains on the sidelines of a social event, such as a dance (Wallflower, 2014). Although wallflowers do not participate in the activities, wallflowers are engaged and notice everything that is happening around them. Administrators and educators have long understood the importance of student engagement and its relationship to student success. Student engagement is measured by the amount of time and effort a student puts forth in academically purposeful activities (Kuh, 2001), such as studying for an exam, participating in class discussions, and interacting with peers. LMSs are capable of measuring how students engage with peers and educational content by tracking the number of times a student posts, replies, and views discussion forums. In addition, LMSs are capable of calculating student success rates.

Educators have access to vast amounts of data. Knowing which information is related to levels of student engagement will help identify online behaviors related to student success. Recently, research has focused on obvious online interactions such as posting and replying to discussion forums, but little, if any, has been done to study the non-interactions of online engagement. In this study, the researchers sought to determine whether relationships exist between students' frequency of discussion forum activities—such as posting and replying (interactions), and viewing (non-interactions)—and students' success.

The following research question and sub-questions informed the study:
Research Question: What is the relationship between students' level of engagement as measured in discussion forum activities and students' success in an online course?

- Research Sub-question #1: What is the relationship between students' frequency of discussion forum posts and students' success?
- Research Sub-question #2: What is the relationship between students' frequency of discussion forum replies and students' success?
- Research Sub-question #3: What is the relationship between students' frequency of discussion forum views and students' success?

This study will help administrators and educators identify LMS data that measure student engagement. Beer, Clark, and Jones (2010) claim that identifying early indicators of student engagement will give institutions the ability to measure factors that can inform and improve current teaching practices, thus increasing retention and graduation rates. The process of extracting, analyzing, and interpreting data to gain insights into student learning has been termed *learning analytics* (Bienkowski, Feng, & Means, 2012). Administrators who initiate the use of analytics at their institutions can

harvest real-time student data that can potentially help educators track student progress to determine whether teaching practices need to be adapted to promote student engagement, and ultimately identify students who are at risk of failure.

Key Definitions

Student engagement: the amount of time and energy a student invests in educationally purposeful activities and the effort institutions devote to using effective educational practices (Kuh, 2001).

Frequency of discussion forum posts: the total number of original posts a student makes to a discussion forum. Posts may be made under the same topic or under a different topic, so long as it begins a new threaded discussion with a new topic for discussion for that student. Responses to previously posted threads or replies do not count as posts.

Frequency of discussion forum replies: the total number of times a student replies to a discussion forum. Replies may be to another student's original post, a follow-up response to a previously posed question, or a response to another person's reply that continues the same topic of discussion. It does not begin a new threaded discussion or a new topic for discussion.

Frequency of discussion forum views: the total number of times a student visits a discussion forum but does not contribute to the postings. Each visit is counted when a student leaves the page and returns whether during the same log in or subsequent log ins.

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

In order to better understand how data extracted and analyzed from an LMS can be used as early indicators for student engagement, relevant literature will be reviewed. An overview of student engagement is presented, including student engagement in discussion forums, and how learning analytics can be used to track student engagement levels.

Student Engagement

Student engagement has been studied extensively for the past 40 years and has been used to describe a variety of student behaviors. Hu and Kuh (2002) assert that student engagement is "the most important factor in student learning and personal development during college" (p. 555). Many researchers have offered various meanings of engagement, starting with Astin's (1984) definition of student involvement as the degree to which students are involved in school-related matters by "the investments of physical and psychological energy in various objects" (p. 519). Skinner and Belmont (1993) describe engagement as the intensity and quality of behavioral and emotional involvement during learning activities. According to Kuh (2001, 2004, 2009), engagement is the amount of time and effort students invest in academic activities related to student learning outcomes. As evidenced in the literature, many researchers agree that student engagement reflects the amount of time and effort a student puts forth into educational activities and is directly related to a variety of desired student outcomes (Astin, 1984; Kuh, 2004; Kuh, Cruce, Shoup, Kiinzie, and Gonyea, 2008; Skinner & Belmont, 1993). In essence, the more time and energy a student spends participating in meaningful activities, the more engaged he/she is in his/her education.

In traditional face-to-face classrooms, simple measurements of student engagement typically involve observing students' behavior through attendance, eye contact, posture, and asking questions. However, in online environments, it is much more difficult to monitor student engagement given the subtlety of students' behavior (Romero & Ventura, 2007). LMSs record every mouse click from each student within the system. The data may be tracked for analysis and used to gauge a student's level of involvement (Beer et al., 2010). Rapuano and Zoino (2006) inform readers about LMSs' ability to retrieve detailed data on learner scores, choices on questions, and navigation habits, which provide important data on students' engagement behavior. Although this may be true, Beer et al. (2010) argue that while LMS data has the potential to measure student engagement, research into how this can be done is still in its infancy.

Student Engagement and Discussion Forums

Hu and Kuh (2002) assert that student engagement is a function of interaction; more than 80% of interaction that occurs in an LMS occurs in the discussion forums (Dawson, Macfadyen, & Lockyer, 2009). Student engagement is related positively to student interaction with instructors and other students. Many empirical studies have explored interactions in discussion forums. One of the earliest studies using discussion forums to increase student engagement was Persell's (2002) "Using Focused Web-based Discussions to Enhance Student Engagement and Deep Understanding." This study addressed pedagogical problems in her weekly senior sociology seminar where students came to class not having read the course readings; therefore, they were not ready to discuss the issues on a deeper level. In addition, not all students participated in discussions. To acquire greater participation, to get students to read course material, and to think and write about the issues more analytically and sociologically, Persell used discussion forums to get "staters", students who initiated posts, to report about the reading before class, "responders" replied to staters' posts by extending ideas, and

then "integrators" combined previous ideas and posted additional questions. Persell counted the number of times students referred to their peers by name in the discussion boards to assess the degree of student engagement. Results of the study revealed that students became more engaged by the end of the semester by referring to their peers by name 100% of the time compared to 30% during the first week of school.

In 2009, three separate studies assessing student interaction in discussion boards were performed, and each study had similar results. Dawson et al. (2009) correlated learning dispositions with student LMS data to identify patterns of student achievement in first-year medical students at the University of Wollongong in Australia. Results showed a strong correlation between student achievement and participation in discussion forums. Sher (2009) implemented regression analysis to analyze the relationships between student-student and student-instructor interactions in asynchronous discussion forums with student learning and satisfaction. The researcher concluded that interaction variables contributed significantly to student learning and satisfaction. Bliss and Lawrence (2009) provided further evidence by evaluating 11,596 message posts from 14 online undergraduate Mathematics courses at Empire State College in the winter 2008 term. Student participation was calculated by the number of students participating in a thread divided by total number of students enrolled in the course. The researchers confirmed findings of earlier studies that suggest guidelines, feedback, and instructor presence are correlated with greater student participation.

More recent studies have explored ways to increase student interactions in discussion forum posts. Ertmer, Sadaf, and Ertmer (2011) examined relationships between question types and critical thinking levels, as described by Bloom's taxonomy (elucidated previously), to levels of student interactions in online discussion forums represented in number of responses per student, average number of student-student sequences, and average number of threads for each question. The study's results showed that higher-order thinking questions produced a higher frequency of student interaction.

Tracking Student Behavior: Learning Analytics

Learning analytics are starting to emerge in the educational landscape as online techniques to improve student outcomes. The International Conference on Learning Analytics began meeting annually since 2010 and its professional society was founded in 2011 (Bienkowski et al., 2012).

According to the First International Conference on Learning Analytics and Knowledge, "learning analytics is the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs" (gsiemens, 2010, para 5). Johnson, Adams, and Cummins (2012) assert that learning analytics applies mainly to monitoring and predicting student performance and recognizing at-risk behaviors so that interventions may be put into place. Several institutions and researchers have begun applying learning analytics into their research projects. For instance, the Society for Learning Analytics Research (SoLAR) is offering a free online course introducing learning analytics at Athabasca University. Harvard University has developed a software called *Learning Catalytics* that provides real-time feedback while students are in class by grouping students together based on questions posed (Learning Catalytics, n.d.). In 2007, Purdue University initiated their Signals project, which gathers information from a variety of sources, such as the course management systems and gradebook, to generate an at-risk profile and target those students for outreach (Johnson et al., 2012). The University of Maryland has also made use of data extracted from Blackboard, their institution's LMS, and developed a program called *CheckMyActivity*, which allows students to access their data to check and regulate their progress at any time (Lonn, Krumm, Waddington, & Teasley, 2012). These studies will help faculty to better understand their students' needs and tailor instruction to meet those needs.

Limited studies have been performed correlating mined student LMS data and student engagement. Saenz, Hatch, Bekoski, Kim, Lee, and Valdez (2011) used data mining techniques to extract a large array of data from 663 community colleges' LMSs and more than 320,000 students to explore patterns of engagement between similar and dissimilar groups. This study found the most distinguishing factor between similar and dissimilar groups was students who utilized the college's student services, McWilliam, and Tan (2008) used academic analytics to look at a range of institutional data and create a visual model of student engagement/effort based on faculty activity level. Network analysis was performed on course discussion boards to discover patterns of student-student and student-instructor interactions to visualize student engagement and the likelihood of success (Macfadyen & Dawson, 2010). Although only a small number of studies have used data mining and academic analytic techniques to explore the relationship between student LMS data and student success, there have been no studies to date investigating the correlation between students' perceived level of engagement and students' actual levels of engagement as measured by an LMS. Long and Siemens (2011) have expressed their amazement regarding the remarkably ineffective use of data in higher education, an institution that has historically collected vast amounts of data. Macfadyen and Dawson (2010) add that "there are few examples that demonstrate successful and systematic application of academic analytics across an institution in order to inform and enhance teaching and learning practices" (p. 590)

METHODS

This initial exploratory study sought to determine whether relationships exist between students' frequency of discussion forum posts, frequency of discussion forum replies, and frequency of discussion forum views and students' success. The target population for this study was undergraduate students who enrolled in one of six online courses offered during the spring 2013 quarter of a large, public university. Non-probability, purposive sampling technique was used to select 38 participants. A correlation design was used to determine the types and strengths of relationships (Popham, 1999), if any, between students' levels of engagement as measured by the LMS and student success.

Existing LMS data for the study were retrieved retroactively and obtained by the researchers 2 weeks after final grades were submitted to the Registrar's Office. By logging on to the online course and visiting the LMS's Report Logs, the researchers were able to retrieve required LMS data, such as frequency of discussion forum posts, frequency of discussion forum replies, frequency of discussion forum views, and student success rates.

Success rates were determined by examining students' achievement of course objectives based on total points earned compared to total points possible. Students earned points from a variety of activities, such as posting and replying to discussion forums, completing online assignments, taking online quizzes, and finishing an in-class final exam. Scores were either automatically updated via computer-graded online assessments or manually entered by the course instructor into the LMS's gradebook. Students' percentages were calculated by the system and determined by dividing accumulated points earned by the total points possible and then multiplied by 100 for all course activities.

FINDINGS

Discussion forum posts were measured as original threads that initiated a topic for discussion. Discussion forum replies were measured as responses to either an original post or a secondary reply and did not initiate a topic for discussion. Discussion forum views were measured by the number of times a student visited a discussion forum page but did not necessarily contribute to the forum. Frequency data were numeric variables on a ratio level of measurement.

Table 1 summarizes students' actual level of engagement with the number of responses (*N*), minimum value (Min.), maximum value (Max.), mean, median, mode, standard deviation (*SD*), and skewness for frequency of discussion forum posts, replies, and views.

Table 1:*Descriptive Statistics on Students' Actual Level of Engagement as Measured by LMS Data*

Variable	*N*	Range	Mean	Median	Mode	SD	Skewness
Freq. of Forum Posts	38	0-31	13.16	10.00	10.00	7.621	.872
Freq. of Forum Replies	38	1-50	20.37	17.50	16.00	11.129	.596
Freq. of Forum Views	38	29-483	200.74	187.50	29.00	118.474	.762

Frequency of discussion forum posts, or the number of times a student posted on a discussion forum, for the 38 respondents ranged from 0 to 31. The mean frequency of discussion forum posts was 13.16 with a standard deviation of 7.62. This meant that if all the respondents had the same frequency of discussion forum posts, they would have posted 13.16 times with a + or - variation of 7.62. The mode was 10.00; therefore, the most common frequency of discussion forum posts was 10.00. The median frequency of discussion forum posts was 10.00, which meant that half of the respondents posted on a discussion forum 10.00 times or less and the other half of the respondents posted on a discussion forum 10.00 times or more. The range of frequency of discussion forum posts was 31. This meant that 31 points separated the highest frequency of discussion forum views of 31 and the lowest frequency of discussion forum views of 0. The coefficient of skewness was .872, which indicated an asymmetric distribution with the tail extending towards the right or positively skewed.

Frequency of discussion forum replies, or the number of times a student replied to an original post of discussion forum or a reply to an original post, for the 38 respondents ranged from 1 to 50. The mean frequency of discussion forum replies was 20.37 with a standard deviation of 11.13. This meant that if all the respondents had the same frequency of discussion forum replies, they would have replied 20.37 times with a + or - variation of 11.13. The mode was 16.00; therefore, the most common frequency of discussion forum replies was 16.00. The median frequency of discussion forum posts was 17.50, which meant that half of the respondents replied to a discussion forum post or reply 17.50 times or less and the other half of the respondents replied to a discussion forum post or reply 17.50 times or more. The range

of frequency of discussion forum posts was 49. This meant that 49 points separated the highest frequency of discussion forum replies of 50 and the lowest frequency of discussion forum views of 1. The coefficient of skewness was .596, which indicated an asymmetric distribution with the tail extending towards the right or positively skewed.

Frequency of discussion forum views, or the number of times a student viewed a discussion forum post, for the 38 respondents ranged from 29 to 483. The mean frequency of discussion forum views was 200.74 with a standard deviation of 118.47. This meant that if all the respondents had the same frequency of discussion forum views, they would have viewed the forums 200.74 times with a + or - variation of 118.47. The mode was 29.00; therefore, the most common frequency of discussion forum views was 29.00. The median frequency of discussion forum views was 187.50, which meant that half of the respondents viewed a discussion forum page 187.50 times or less and the other half of the respondents viewed a discussion forum page 187.50 times or more. The range of frequency of discussion forum home page views was 454. This meant that 454 points separate the highest frequency of discussion forum views of 483 and the lowest frequency of discussion forum views of 29. The coefficient of skewness was .762, which indicated an asymmetric distribution with the tail extending towards the right or positively skewed.

Students' success rates were determined by examining their achievement of course objectives based on total points earned compared to total points possible. Points were earned from a variety of activities, such as completing assignments, posting and replying on discussion forums, and taking online quizzes and exams. Students' percentages were calculated by dividing accumulated points earned by total points possible

Table 2 summarizes students' success scores with the number of responses (*N*), minimum value (Min.), maximum value (Max.), mean, median, mode, standard deviation (Std. Dev.), and coefficient of skewness. Student success scores, or the total points earned divided by the total points possible, for the 38 respondents ranged from 44 to 92. The mean student success score was 76.97 with a standard deviation of 11.33. This meant that if all the respondents had the same student success score, they would have scored 76.97 with a + or - variation of 11.33. The mode was 75.00; therefore, the most common student success score was 75.00. The median student success score was 76.97, which meant that half of the respondents had a student success score of 76.97 or less and the other half of the respondents had a student success score of 76.97 or more. The range of student success scores was 48. This meant that 48 points separated the highest student success score of 92 and the lowest student success score of 44. The coefficient of skewness was -1.276, which indicated an asymmetric distribution with the tail extending towards the left or negatively skewed.

Table 2:*Descriptive Statistics for Students Success*

Variable	*N*	Range	Mean	Median	Mode	SD	Skewness
Student Success Scores	38	44-92	76.97	78.00	75.00	11.33	-1.276

Correlation and Regression Analyses

Table 3 summarizes the findings when performing correlation and regression analysis for student success (DV) and frequency of discussion forum posts. Plotting the regression equation for frequency of discussion forum posts the Y value was student success (DV), and the X value was frequency of discussion forum posts (IV). The y-intercept was $\alpha = 67.176$. The regression coefficient (or slope of the line) was $\beta = 0.745$. Therefore, the regression equation was expressed as $Y = 67.176 + 0.745X$. The correlation coefficient *r* for the relation between frequency of discussion forum posts and student success was $r(36) = 0.501$ ($p = 0.001$). The relationship between frequency of discussion forum posts and student success was a modest or moderate positive relationship. An increase in frequency of discussion forum posts (IV) had a modest or moderate association with an increase in student success (DV). The coefficient of determination R^2 for the proportion of variance of one variable predicted from the other variable was $R^2 = 0.251$; therefore, 25.1% of the variation in student success (DV) can be accounted for by the variation in frequency of discussion forum posts (IV). The ratio of the variance that determines whether two variances—student success and frequency of discussion forum posts—are equal was F-ratio = 12.050 ($p = 0.001$). Since the F-ratio was greater than the F distribution critical value at $p = 0.01$, then the F-ratio was significant and indicated an overall goodness of fit of the regression equation.

Table 3 :*Regression Analyses to Determine Whether Relationships Exist Between Frequency of Discussion Forum Posts, Replies, and Views (IVs) and Student Success (DV)*

Criterion (DV)	Predictor (IV)	*p*-value	α	β	*r*	R^2	F
Student Success	Forum Posts	0.001***	67.176	0.745	0.501	0.251	12.050***
Student Success	Forum Replies	0.000***	65.079	0.584	0.574	0.329	17.650***
Student Success	Forum Views	0.015**	69.427	0.038	0.393	0.154	6.578***

Note. * significant at $\alpha \leq 0.10$, $p < 0.10$; ** significant at $\alpha \leq 0.05$, $p < 0.05$, *** significant at $\alpha \leq 0.01$, $p < 0.01$.

Correlation and regression analysis was performed for student success (DV) and frequency of discussion forum replies. Plotting the regression equation for frequency of discussion forum replies the Y value was student success (DV), and the X value was frequency of discussion forum replies (IV). The y-intercept was $\alpha = 65.079$. The regression coefficient (or slope of the line) was $\beta = 0.584$. Therefore, the regression equation was expressed as $Y = 65.079 + 0.584X$. The correlation coefficient *r* for the relation between frequency of discussion forum replies and student success was $r(36) = 0.574$ ($p = 0.000$). The relationship between frequency of discussion forum replies and student success was a modest or moderate positive relationship. An increase in frequency of discussion forum replies (IV) had a modest or moderate association with an increase in student success (DV). The coefficient of determination R^2 for the proportion of variance of one variable predicted from the other variable was $R^2 = 0.329$; therefore, 32.9% of the variation in student success (DV) can be accounted for by the variation in frequency of discussion forum replies (IV). The ratio of the variance that determines whether two variances—student success and frequency of discussion forum replies—are equal was F-ratio = 17.650 ($p = 0.000$). Since the F-ratio was greater than the F distribution critical value at $p = 0.01$, then the F-ratio was significant and indicated an overall goodness of fit of the regression equation.

Correlation and regression analysis was performed to determine type and strength of relationship between student success (DV) and frequency of discussion forum views (discussion forum views is defined as the original posting for that discussion thread). Plotting the regression equation for frequency of discussion forum views the Y value was student success (DV), and the X value was frequency of discussion forum views (IV). The y-intercept was $\alpha = 69.427$. The regression coefficient (or slope of the line) was $\beta = 0.038$. Therefore, the regression equation was expressed as $Y = 69.427 + 0.038X$. The correlation coefficient *r* for the relation between frequency of discussion forum views and student success was $r(36) = 0.393$ ($p = 0.015$). The relationship between frequency of discussion forum views and student success was a modest or moderate positive relationship. An increase in frequency of discussion forum views (IV) had a modest or moderate association with an increase in student success (DV). The coefficient of determination R^2 for the proportion of variance of one variable predicted from the other variable was $R^2 = 0.154$; therefore, 15.4% of the variation in student success (DV) can be accounted for by the variation in frequency of discussion forum views (IV). The ratio of the variance that determines whether two variances—student success and frequency of discussion forum views—are equal was F-ratio = 6.578 ($p = 0.015$). Since the F-ratio was greater than the F distribution critical value at $p = 0.05$, then the F-ratio was significant and indicated an overall goodness of fit of the regression equation.

CONCLUSIONS

After collection and analyses of data, the guiding research questions explored whether relationships existed between students' frequency of discussion forum activity—posts and replies (interactions) and views (non-interactions)—and students' success. Students who had higher frequencies of discussion forum posts, discussion forum replies, and discussion forum views had higher rates of student success. The first two findings are not surprising since research has found positive relationships between student interactions in discussion forums, such as discussion forum posts and replies, and student success. For example, Hu and Kuh (2002) assert that student engagement is a function of student interactions. Dawson et al. (2009) argue that more than 80% of student interactions occur in the discussion forums of an LMS. Dixson (2010) claims that highly engaged students are more likely to use discussion forums to interact with other students and the instructor than less engaged students. Furthermore, Beer et al. (2010) add that discussion forums have the ability to promote student interaction and engagement, thus increasing the likelihood of student success.

Surprisingly, students who had higher frequency of discussion forum views—meaning they visited the discussion forum pages without adding to the conversation—also had high rates of success. There are no previous studies that support students who do not actually contribute to the discussion, yet benefit by reading other students' posts and replies.

This initial exploratory study attempts to fill the gap in the literature by focusing on students who find success in online environments but may not necessarily contribute to discussion forums—like wallflowers at a dance who have fun at a

social event but may not necessarily participate in the activities. The above findings suggest that educators need to do more than just require students to post and reply to discussion forums. Instructors should incorporate teaching techniques to ensure students view previous posts and replies found within discussion forums. For example, instructors could create exam questions that directly tie into discussion forum topics, or create prompts that require students to read previous posts and or replies in order to participate. Practices that promote student interaction and non-interactions in online environments could be initiated at the administration level as well. Administrators could also help increase online student success by offering professional development opportunities for faculty. Professional development can help educators realize unconventional ways to increase student engagement within LMSs, thus increasing student success.

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TECHNOLOGY USE IN HEALTH EDUCATION: A REVIEW AND FUTURE IMPLICATIONS

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Abstract: Technology use in health education is growing and ever changing. Technology skills can greatly enhance the learning environment. Information and communication technology is an efficient support tool that enriches the quality of health education by delivering content through multiple modalities. The purpose of this review was to examine the existing literature on technology, particularly web 2.0, and social media integration within the health education classroom. Findings from the review indicate current trends in technology use can be beneficial in a health education classroom environment if introduced and used properly. Based on the results of the review, views on social media were mixed between being helpful for student use or hinder student performance. Use of social media is an area that health educators could improve upon to maximize the benefits of technology use in the classroom.

Keywords: Health education and technology, web 2.0, social media, public health, Facebook, information technology

Introduction

Technology use is a skill set used to enhance learning capabilities. Information and communication technology has quickly become an abundant and crucial support tool for well-crafted health education programs and also enriches the quality of education by delivering content through multi-modalities (Lee, Park, Whyte, & Jeong, 2013). However, with an array of technology forms to choose from, health educators must learn to choose the most effective method for their students' learning environment. This review investigates the overall use of technology in health education, particularly web 2.0 resources and social media.

Method

An extensive literature review was conducted via electronic databases including Academic Search Complete, CINAHL + Nursing, ERIC, Google Scholar, Medline Plus, PsycInfo, and SPORTDiscus. For the purpose of this review, the search included topics of technology use in health education, web 2.0 for public health, and social media in the health education classroom. The keywords used to search for the included topics contained *public health education, health education and web 2.0, social media, Facebook, Twitter, technology in health education, public health and web 2.0, Facebook and the classroom, and web 2.0 in education*. The criteria for the review search included literature that contained the keywords/theme and were published between 2006 and the present. Materials that were excluded from the search-included dissertations, theses, and any unpublished material. To better interpret the findings, Garrard's Matrix Method was used to color code articles that related to subthemes and provide brief notes on each such as to which form of technology was used, subjects included, number of subjects, purpose, and findings. After completion of the matrix, three main topics emerged. Further revision included only the three main topics of technology use, web 2.0, and social media. The search results yielded 29 relevant articles included within this review. The references were compiled to better illustrate the findings in relation to the review themes (Table 2).

Technology Use in Health Education

"We need technology in every classroom and in every student and teacher's hand, because it is the pen and paper of our time, and it is the lens through which we experience much of our world" (Warlick, 2014, p.1). In 2010, researchers from the University of Maryland conducted a study to determine which methods of technology are most commonly used in an online classroom environment. While the sample size was limited (n = 90) and the subjects' areas of study varied greatly, the technology used within their classrooms was very similar (Liebowtiz, 2013).

Researchers have found web 2.0, eBooks, virtual worlds, mobile computing and cloud computing respectively were most commonly used in classrooms (Liebowitz, 2013 & Löfström & Nevgi, 2006). However, within the next 2-3 years post study (2013-2014), educators felt they would adapt to utilize web 2.0 tools (81%), eBooks (78%), virtual worlds (50%), mobile computing (50%), and cloud computing (47%) (Liebowitz, 2013). Web 2.0 technologies were commonly found to be the most beneficial to the students' learning needs.

Learning through technology can be a useful tool for students' educational purposes. As the 'net generation' gains more popularity with innovation, more technological advancements have been created for educational purposes (Evans & Forbes, 2012). Net generation students are often more comfortable with an online learning environment or using technology in a face-to-face classroom. Online learning allows for students to maximize self-motivation, adopt time management skills, independently learn, acknowledge responsibility for one's own educational development, and actively participate (Figueroa & Lee, 2012; Evans & Forbes, 2012).

Evans & Forbes (2012) discovered that 'net generation' students often look for mentoring from health education faculty members. Within this relationship, the faculty learns from the students in a reciprocal relationship. Educators must constantly redefine themselves in order to remain current with present day practices (Hammond & Barnabei, 2013; Swenty & Titzer, 2014). 'Net generation' learners bring forth skills that older faculty members may not have yet acquired. The 'net generation' students have a specific skill set meaning they are digitally literate, constantly connected, experiential and often enjoy collaboration with others in a well-structured, task-oriented environment (Evans & Forbes, 2012).

Novice health educators face many challenges in not only using technology in the learning environment, but also finding the proper technology to use. Sinkinson (2014) discovered that pre-service health educators need more technological skills training in their programs. Pre-service health education teachers also feel that it is essential to know how to operate new and innovative technology to engage students (Sinkinson, 2014). Technology use in health education does have a promising future. Of the 51 pre-service health education teachers in a study conducted by Sinkinson (2014), most saw technology as being very helpful by allowing students to work together (16%) and supporting students in their in class work (19%). Within this study, one pre-service teacher wrote "I believe that technology is the way of the future in education and it is vital that teachers take an E-learning initiative to make learning more meaningful and relevant to students" (Sinkinson, 2014, p.240). Technology is also an area of interest where learners across the world can find a commonality. Sultan (2010) discussed the use of technology, specifically cloud computing, in various other areas of the world including Europe and Africa. With further training and continuing education, technology in health education can be a powerful tool for educators and students worldwide.

Advantages and Disadvantages of Technology Use

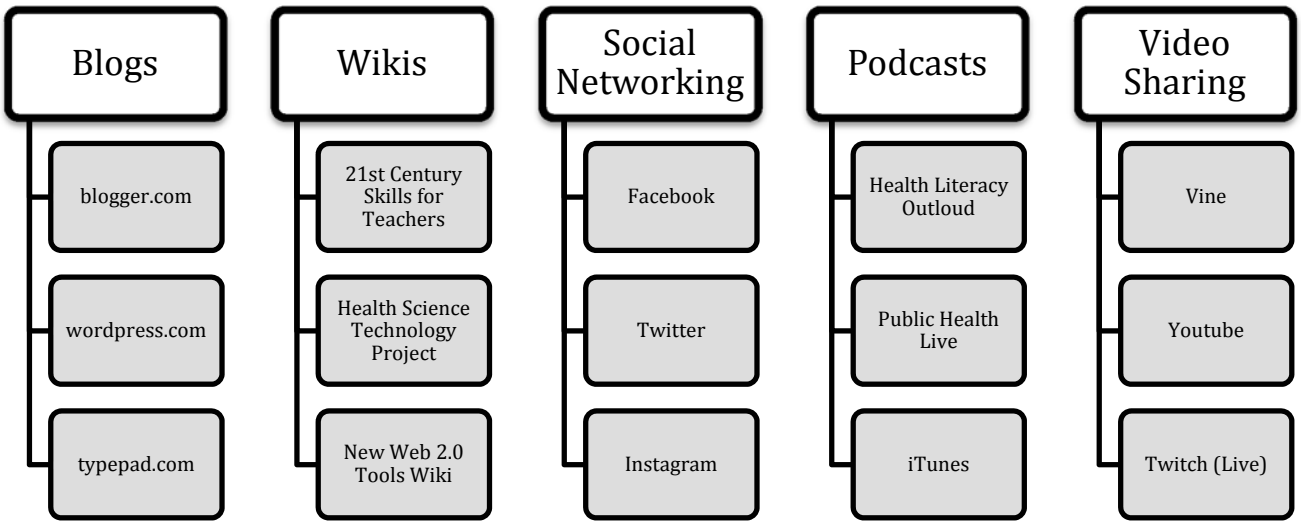
Integrating anything new comes with apprehension. While older generations of health educators may be apprehensive to use technology within the classroom, younger generations are more in favor of the integration (Sinkinson, 2014). If health education is presented in the form of virtual materials, Figueroa & Lee (2012) found that the learning

environment schedule is flexible, the students learn responsibility through holding themselves accountable for grades, and most importantly students must actively participate. Active participation allows for those who may have self esteem issues to have a voice. However, students must also be knowledgeable of how to operate the technology required. Whether face-to-face or virtual, students must also have access to technology. Not all students (of any age) own and know how to successfully operate technology such as computers, tablets, smartphones, etc. There are, however, typically public access computers available in libraries and other public venues. Another area of real concern is academic integrity. Figueroa & Lee (2012) discovered that with more materials being readily available online, plagiarism and cheating are a major concern. Whether a student is in a face-to-face or online environment, finding information online is easy and information could be easily copied. Also, without built in safeguards for online exams (e.g. using random question generation) students can easily cheat or work on an exam on the telephone with a friend by testing at the same time. Students must be cognizant of the consequences of academic integrity violations. These should be covered in detail in course materials and examples of technology violations clarified for students. Overall, there are thousands of technology tools and methods that can be incorporated into a health education-learning environment. The instructor must be knowledgeable so that they may choose appropriate applications; while students must be open to using and applying technology.

Web 2.0 in Health Education

What exactly is web 2.0? While many definitions were found, one in particular by Anderson (2007) that states that "web 2.0 is a socially connected web where anyone can access, edit, create, and collaborate within the information space" (p. 7). Tools often referred to as web 2.0 tools include blogs, wikis, social media, video hosting, photo processing, graphic arts services, and dating and relationship services (Boulos & Wheeler, 2007). Web 2.0 is designed to be more personal, connected, and integrative than web 1.0. How exactly would a health educator incorporate this into a learning environment?

Figure 1. Forms of Web 2.0 Technology Tools



Within Figure 1, a compiled list of findings for commonly used web 2.0 tools in health education can be found. Educators within health education often find that using a mixture of these integrative web 2.0 tools in the classroom is

best practice (Sarieva & Peytcheva-Forsyth, 2011; Swenty & Titzer, 2014; Ward, Moule, & Lockyer, L., 2009). The utilization of technological tools in a health education-learning environment may not be simple for health educators to implement. Adaption to technology among educators who are in a routine and may be unwilling to change could delay the implementation process. The most common form of technology used to better communicate and illustrate class activities is social networking (Sarieva & Peytcheva-Forsyth, 2011). To better understand what these commonly used tools are, Anderson (2007) briefly defines all of the above technological tools (Table 1).

Table 1. Forms of Technological Tools in Health Education

Type of Technology Used	Definition	Health Education Example
Blogs	Simple website with brief opinions and information in the form of posts	http://thehealthcareblog.com The Health Care Blog (compiled of current health trends and issues)
Wikis	A webpage that allows for anyone to add, omit, & edit information	http://www.webicina.com/public-health/public-health-wikis Public Health Wikis (9)
Social Networking	A webpage designed to connect users and allow for communication	American Public Health Association Facebook page https://www.facebook.com/AmericanPublicHealthAssociation http://hedir.org Email based platform to allow maximum communication amongst health educators
Podcasts	Audio recordings in the form of lectures, interviews, and chats	http://my.clevelandclinic.org/health/multimedia-center/healthtalks-podcasts Health Talks Podcasts – Cleveland Clinic This podcast includes 19 different health related topics
Video Sharing	A webpage that allows for video files to be uploaded to public or private viewers	https://www.ted.com/topics/health TED Talks in the Health topics http://hplive.org Health promotion webinars This website produces hundreds of video files on various health-related topics

Chou, et. al, 2013 state that there is a growing body of literature that indicates that the digital divide may be closing in. With this gap closing, it is good practice to keep learning outcomes in mind. Hanson (2008) presented

guidelines for health educators when using web 2.0 tools that include creating blogs and wikis, digital audio files (often mp3), a social networking website, and uploading digital photos and videos. In a study conducted by Prybutok (2013), health educators and the Centers for Disease Control and Prevention (CDC) found that YouTube reaches high levels of engagement and comfort for younger users. In this particular study, a group of 18-24 year old undergraduate students (n = 33) were divided into two groups. The first group (n = 15) watched an entertaining YouTube safe sex educational video and the second group (n = 18) watched a more focused and factual YouTube sex education video. Students in both groups reported the videos shown were health informing and could potentially lead to a healthy behavior change. Most importantly, students could easily remember the information relayed in the video (example: remembering what safe sex meant). The final and most important product of this study was to conclude that students felt YouTube was a reliable information channel for health-related information.

While web 2.0 has created many challenges for health educators, it allows for many potential benefits for students such as engaging with others, collaboration and creativity when working together. Web 1.0 experiences were somewhat engaging, but are very one-sided and only foster user communication and independent participation (Boulos & Wheeler, 2007). Now with web 2.0 utensils ready to use, health educators should find themselves in a good place to proceed forward using current technology to implement into classrooms, community centers, and workforce environments (Chaney, Chaney, & Stellefson, 2009).

Social Media Application

Using social media allows for a new set of skills to be established (Huffman, 2013). Usher (2012) claimed that when using web 2.0 technologies (social media specifically), qualities such as multimodality, networkability, message-editing capabilities, and temporal flexibility are often enriched. Each one of the above qualities is developed through technology use, which can also translate into specific health education applicable learning outcomes.

In a study conducted by Maloney, Moss, & Ilic (2014), 142 students in varying years of study, were asked 20 questions specifically related to their social networking site (SNS) use and the relationship between social networking site use for education. Interestingly, only two out of the 142 subjects did not use a social networking site. Facebook and YouTube were the most frequently used forms of SNS for educational purposes with 97 (60%) of subjects using these tools. The most beneficial finding of the study was that 85% of subjects believed that social networking sites could benefit their education (if used properly). Four common themes were found within this study. Subjects stated when using social networking sites, peer collaboration are highly used, communication is enhanced, complimentary learning (in addition to coursework) occurs, and there is a need for personal and professional realms (Maloney, Moss, & Ilic, 2014).

In addition, Huffman (2013) added more benefits to using social media. These social networking sites allow for youth of all ages to explore the boundaries of who they are as a person, through building relationships, self reflection, and exposure to other groups of individuals (specifically a set of diverse people). In many ways, using social media can benefit the student since students are most commonly using these means to communicate, collaborate, and develop materials together. Kelm (2011) found that traditional education methods without the proper use of social media often appear as teacher driven, non-interactive, and lecture based. Löfström and Nevgi (2006) created a list of objectives in which social media can be used to enhance learning. The table below provides those objectives along with a set of examples specific to health education.,

Table 3. Ways in Which Social Media Can Be Used in Health Education

Objectives	Example in Health Education via Social Media
Benefit from the process of working to achieve a goal	Constructing a Facebook page concerning heroin addiction within Northeastern Ohio
Emotions, actions, and thoughts lead to growth in responsibility, commitment, and empowerment	Reaching out to individuals within a specific region who are suicide survivors. Share survivor stories and information on support groups through social media
Collaborate with others, share knowledge, and receive feedback	Create a Twitter page with daily tweets about healthy eating habits. In addition, allow for "re-tweets" of your information
Connect information to the real world and use knowledge on new applications	Information learned and relayed through social media can be applied to daily life. Example: Sharing healthy recipes and incorporating healthy eating into your life
Develop knowledge as a collaborative activity	Actively discuss with others on social media sites health related topics of concern to develop and gain more knowledge
Build on previous knowledge	Collaborate with others through tweeting, posting, and resharing posts/tweets and retain the new information
Actively set objectives	Set objectives or goals for yourself, friends, family, or a specific group of individuals to begin daily physical activity & share these with your network
Reflect on the process and absorb new information	Share with others your successes by posting photos of a healthy meal cooked at home & inspire others to do so

The objectives provided by Löfström and Nevgi (2006) are derived from student-centered collaboration, exploration, and learning efforts. To support this idea, Vollum (2014) recognized that social interaction is one of the key qualities that using social media specifically in health education would enhance. Social media is a popular way of reaching out to others and creating social interactions. In both K-12 health education and K-12 physical education national standards, social interaction is a key developmental area that must be applied in order to obtain new knowledge (Vollum, 2014). In addition to social interaction, the development of relationships could lead to peer pressure with either negative or positive outcomes. In turn, with the continuous increase of social interactions via social media methods, comes the implication that informed decisions will be made (Vollum, 2014). By using social media, students can develop relationships that could possibly lead to health, lifestyle, and behavior changes.

Social media gives students an array of opportunities to work together. It also gives students the ability to spread messages to thousands of individuals. Social media gives health educators a platform from which to speak and educate others on current and relevant health information (Zailsakite-Jakste & Kuvykaite, 2012).

One main issue within the realm of using social media for health education purposes is how to evaluate the quality of the social media used or the information relayed. Frimming (2011) conducted a study where 127 subjects (learners, n=92; pre-health and fitness professionals, n=35) reflected on their social media experiences. Within the learner group, 51% believed that long-term use of social media sites benefit their fitness regimen (Frimming, 2011). Over half (52.9%) of the pre-health and fitness professionals stated they actively learned from their peers (Frimming, 2011). The main finding from this study was that the university is an ideal setting to use social media in order to

enhance students' health knowledge.

With social media being an effective learning tool in health education, health educators can disguise learning as entertainment. Polsgrove & Frimming (2013) identified several ways of doing so which included pairing returning students and entry year students in groups to foster a mentor-mentee learning environment. In many ways this type of relationship could be beneficial for both parties involved. The mentor (senior level student) learns effective communication methods, gains confidence, and strives to become a better leader. The mentee benefits in a different way where they can constantly access the information and knowledge from senior members of the group. In this environment, teachers, coaches, and health educators can offer a more comprehensive educational format for all students (Polsgrove & Frimming, 2013). In addition, Usher (2011) stated that four other skills/qualities emerge from using social media in health education that include an increase in self efficacy by having the ability to communicate and control information, manipulate text, and segment information specific to a population.

In terms of what form of social media is most popular, Facebook is the winner within the health education realm. While Pander, Pinilla, Dimitriadis, & Fischer (2014) found Facebook to be extremely useful for the support of education in the health field, there is a lack of conclusive evidence illustrating the effectiveness of learning via social media. In a literature review conducted by Pander, Pinilla, Dimitriadis, & Fischer (2014), Facebook was most often found to be used to find exam materials, share material, and organize face-to-face interactions. Overall, when used properly, social media can easily be implemented to enhance the health education student's learning goals through means of communication, collaboration, reflection, and interpretation.

Discussion

In this review, technology, web 2.0, and social media use was discussed in relation to health education practice. Through the article review process, many discoveries were made. One weakness within this area is that there is not an existing body of literature supporting the effectiveness of general technology use within health education (Sinkinson, 2014). On a positive note, more relevant studies are being published and most of the literature chosen for this review is 2012 and newer. A few of the studies were specific to various countries, Australia being a main one. A primary concern throughout the body of literature is that terminology is not consistent while discussing specific terms such as web 2.0 and social media (often referred to as social networking). While many of the terms overlap with each other, it would be difficult for a reader to follow if they do not have a technological background.

While many of these areas still have room for development, the more current studies published have included much detail and lay the foundation for further growth in this topical area. Studies conducted by Chou, et. al. (2012); Maloney, Moss, & Ilic (2014) & Sinkinson (2014) reflect the growing body of literature within this area and relay the message that with proper use of technology, all learners can benefit. Skills that are essential, everyday skills can be applied and learned through technology use within the health education discipline. Communication, collaboration, reflection, and interpretation are such skills that can flourish when using technology in health education (Pander, Pinilla, Dimitriadis, & Fischer, 2014).

An area of opportunity for research related to this topic is the training required and quality of training for instructors and health educators in general to effectively use technology. Sinkinson (2014) concluded that pre-service health education teachers needed more training time with technology. Allotting more time and resources for purposeful training of current teachers may potentially close the technology generation gap. Veteran health educators may feel more confident in their abilities to use unfamiliar equipment or resources with quality training. While technology use is

growing in all disciplines, health education could be in the forefront of technology utilization with the correct preparation and effort.

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Table 2. Themes of Technology Use in Health Education

		Theme Association		
Author(s)	Year Published	Overall Technology Use	Web 2.0	Social Media
Anderson, P.	2007		X	
Boulos, M. N. K. & Wheeler, S.	2007		X	
Chaney, J. D., Chaney, E. H., & Stellefson, M. L.	2009		X	
Chou, W. S., Prestin, A., Lyons, C., & Wen, K.	2013		X	
Evans, R. R. & Forbes, L.	2012	X		
Figueroa, R. & Lee, M.	2012	X		
Hammond, J. K. & Barnabei, C.	2013	X		
Hanson, E.	2008		X	
Huffman, S.	2013			X
Kelm, O. R.	2011			X
Lee, E., Park, H., Whyte, J., & Jeong, E.	2013	X		
Liebowitz, J.	2013	X		
Löfström, E., & Nevgi, A.	2006			X
Maloney, S., Moss, A., & Ilic, D.	2014			X
Melton, B., & Burdette, T.	2011	X		
Millery, M., Hall, M., Eisman, J., & Murrman, M.	2014	X		
Pander, T., Pinilla, S., Dimitriadis, K., & Fischer, M. R.	2014			X
Polsgrove, M. J. & Frimming, R. E.	2013			X
Prybutok, G.	2013		X	
Sarieva, I. & Peytcheva-Forsyth, R.	2011		X	
Sinkinson, M.	2014	X		
Sultan, N.	2010	X		
Swenty, C. L. & Titzer, J. L.	2014	X		
Usher, W.	2011			X
Usher, W.	2012			X
Vollum, M. J.	2014			X
Ward, R., Moule, P., & Lockyer, L.	2009			X
Zailsakite-Jakste, L. & Kuvykaite, R.	2012			X