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Dear TOJDE Readers,

Welcome to the Volume 17, Number 4 of TOJDE,

There are 14 articles and 2 book reviews in the last issue of the year 2016. The articles are written by 37 authors from 14 different countries. These countries are Canada, Colombia, Egypt, Indonesia, Iran, Kenya, Philippines, Saudi Arabia, Scotland, Spain, Tunisia, Turkey, United Kingdom and USA.

The 1st article is titled COMMUNITY TRACKING IN A cMOOC AND NOMADIC LEARNER BEHAVIOR IDENTIFICATION ON A CONNECTIVIST RHIZOMATIC LEARNING NETWORK. Aras BOZKURT, Sarah HONEYCHURCH, Autumn CAINES, Maha BALI, Apostolos KOUTROPOULOS and Dave CORMIER are the writers of this article. This article focuses on the literature on connectivism, connectivist MOOCs (cMOOCs) and rhizomatic learning by examining participant interactions, community formation. Besides, it highlights nomadic learner behavior in a particular cMOOC, #rhizo15, facilitated for 6 weeks by Dave Cormier. Twitter interactions among learners are also observed. The results are important to understand cMOOCs better in community-building dimension.

The 2nd article is written by Dr. Mehmet FIRAT, Dr. A. Nurhan SAKAR and Dr. Isil KABAKCI YURDAKUL. The title of this article is WEB INTERFACE DESIGN PRINCIPLES FOR ADULTS’ SELF-DIRECTED LEARNING. The aim of this study is to determine interface design principles for the development of educational web interfaces that will support the self-directed learning of adults. Determinations base on the views and recommendations of experts. The results underline five basic features, which include being user-directed, ensuring variety, being supported by learning analytics, being motivational, and being sharing-oriented.

The 3rd article is conducted by Nizar OMHENI, Anis KALBOUSSI, Omar MAZHOUD and Ahmed Hadj KACEM. ANNOTATION-BASED LEARNER’S PERSONALITY MODELING IN DISTANCE LEARNING CONTEXT is the title of the article. This study presents a new approach to build learners’ personality profiles based on their annotation traces yielded during active reading sessions. The results show the system performance to measure the scores of learner’s personality traits.

A COMPARATIVE STUDY ON THE MOTIVATION AND ATTITUDES OF LANGUAGE LEARNERS OF ONLINE DISTANCE AND TRADITIONAL IN-CLASSROOM EDUCATION is the 4th article, and written by Dr. Gulten GENC, Emine KULUSAKLI and Savas AYDIN. This study aims to determine and compare the motivation and attitudes of language learners of online distance and traditional in-classroom education, in a state university in Turkey. The findings of the study shows statistically significant relationships between motivation and attitudes of the participants and some individual variables.

The 5th article, titled ONLINE METACOGNITIVE TASKS FOR EFL DISTANCE LEARNERS, is written by Dr. Soraya GARCIA-SANCHEZ. This article proposes a debate on the awareness of strategic knowledge acquisition to particular situations providing interactive scenarios among students of English as a Foreign Language (EFL) in online courses. The findings provides information about useful online tasks for the adequate performance of communicative metacognitive skills required in an EFL language distance course.

The 6th article is written by Dr. Veysel DEMIRER and Cagdas ERBAS. TRENDS IN STUDIES ON VIRTUAL LEARNING ENVIRONMENTS IN TURKEY BETWEEN 1996-2014 YEARS: A CONTENT ANALYSIS is title of this article. This study aims to review studies on virtual learning environments in Turkey through the content analysis method. 63 studies
consisting of thesis, articles and proceedings published in Turkish and English between 1996-2014 years are analyzed. According to the writers, this study might guide researchers aiming to employ virtual learning environments in their educational studies.

The 7th article is written by four authors. Dr. Mohammad Reza SARMADI, Dr. Mehran FARAJOLLALI, Dr. Bahman SAEIDIPOUR and Dr. Mehrdad AHMADIFAR are the authors of the article titled THE IMPACT OF LECTURERS’ THINKING STYLES ON STUDENTS’ CREATIVITY IN DISTANCE HIGHER EDUCATION. This study aims to investigate the group creativity on thinking styles in distance education based on collaborative learning. Based on the results, there is no significant association between the average group member creative ability and the overall group creative performance.

USING BLOGGING SOFTWARE TO PROVIDE ADDITIONAL WRITING INSTRUCTION is the 8th article and written by Dr. Lin B. CARVER and Dr. Carol TODD. This study examined 29 fifth through twelfth grade classroom teachers’ survey responses about their perception of the effectiveness of using an online blogging tool, Kidblog, to plan and provide writing instruction for a struggling writer through survey responses and reflective journal entries. The results indicates that teachers like the opportunity for more face-to-face interaction with their students and they also highlight that students may need strong keyboarding skills to effectively use the Kidblog tool. Teachers also underline that practice is important for the teachers who find software difficult to use.

The 9th article is titled DIGITAL GAME-BASED LANGUAGE LEARNING IN FOREIGN LANGUAGE TEACHER EDUCATION. Dr. Yunus ALYAZ and Dr. Zubeyde Sinem GENC are the writers of this article. This study is conducted to investigate educational digital games in foreign language teaching, to identify the determining reasons behind the pitfalls in applications and to explore the contribution of a serious game to the development of professional language skills of pre-service teachers. The results are important in foreign language teacher education in terms of enhancing digital game-based language learning pedagogy for teachers.

Ouma OMITO is the writer of the 10th article. The title of this article is EVALUATING LEARNERS’ ABILITY TO USE TECHNOLOGY IN DISTANCE EDUCATION: THE CASE OF EXTERNAL DEGREE PROGRAMME OF THE UNIVERSITY OF NAIROBI. The study is aimed at investigating the students’ ability to use technology for distance education with specific reference to the University of Nairobi’s External Degree Program. The results conclude that any institution aiming at introducing e-learning in their institution should assess students’ technology literacy levels and prepare them in advance before the launch of e-learning.

The 11th article is conducted by Fathia LAHWAL, Ajlan S. AL-AJLAN and Mohamad AMAIN. The title is A PROPOSED FRAMEWORK BETWEEN INTERNAL, EXTERNAL AND PEDAGOGY DIMENSIONS IN ADOPTION OF INTERACTIVE MULTIMEDIA E-LEARNING. This study focuses on interactive multimedia e-learning aims to improve our understanding about the dynamics of e-learning. The findings supply a precise tool for measuring creative user adoption of interactive multimedia and e-learning services, providing further insights for researchers and may provide to guide research and practice in interactive multimedia and e-learning by using communication media.

THE ICT LEVEL OF CONFIDENCE OF COURSE SPECIALISTS IN DISTANCE EDUCATION: THE POLYTECHNIC UNIVERSITY OF THE PHILIPPINES EXPERIENCE is the title of 12th article. Dr. Caroline T. SUMANDE, Dr. Carmencita L. CASTOLO and Benilda Eleanor V. COMENDADOR are the writers of this article. The study addresses two questions: what is the ICT level of confidence of the course specialists handling Open University classes, and to what extent do course specialists integrated ICT applications such as word processing, electronic spreadsheet, presentation software, YouTube and etc. in their OUS classes? Based on the results, this study concludes that creating a long-term vision for the future of DE system in the country can be best achieved if DE providers or universities prepare the faculty members or the course specialists in teaching via online given proper training programs.
where technology is best utilized and makes a gratifying experience for both the students and course specialists.

The 13th article is written by Dr. Carmen Ricardo BARRETO and Dr. Jorge Mizzuno HAYDAR. The title is PEDAGOGICAL INTERCULTURAL PRACTICE OF TEACHERS IN VIRTUAL ENVIRONMENTS. This study presents some of the results of the project "Training and Development of Intercultural Competency of Teachers in Virtual Environments", carried out in ten Colombian Caribbean higher education institutions (HEI) offering virtual programs. It is performed in three steps: 1-diagnosis, 2-training, and 3-analysis of the pedagogical practice. Results show a changing process of intercultural conception both in the design and in the implementation and evaluation.

The 14th article, titled IMPROVING CURRICULUM THROUGH BLENDED LEARNING PEDAGOGY, is written by Dr. Ojat DAROJAT. The purpose of this study is to understand the issues related to the implementation of blended-learning pedagogy. The study provides practical recommendation that internet-based instruction is now becoming a strategic choice for open and distance learning in developing countries to widening access and to meet challenges for better future.

There are two book reviews in this issue. The title of the 1st book is OPEN EDUCATIONAL RESOURCES: Policy, Costs and Transformation. This is an editorial book and the editors are Fengchun MIAO, Sanjaya MISHRA and Rory MCGREAL. The reviewer is lecturer Can GULER.

Other book’s title is E-LEARNING SYSTEMS, ENVIRONMENTS AND APPROACHES: Theory and Implementation. The editors of this editorial book are Pedro ISAIAS, J. Michael SPECTOR, Dirk IFENTHALER and Demetrios G. SAMPSON. Recep ONDER is the reviewer of this editorial book.

Hope to meet you in the next issue of TOJDE.
Cordially,

Dr. T. Volkan YUZER
Editor-in-Chief
COMMUNITY TRACKING IN A cMOOC AND NOMADIC LEARNER BEHAVIOR IDENTIFICATION ON A CONNECTIVIST RHIZOMATIC LEARNING NETWORK

Aras BOZKURT
Ministry of Education, Eskisehir, Turkey

Sarah HONEYCHURCH
University of Glasgow, Glasgow, Scotland

Autumn CAINES
Capital University, Columbus, Ohio, USA

Maha BALI
American University in Cairo, Cairo, Egypt

Apostolos KOUTROPOULOS
UMass Boston, Boston, Massachusetts, USA

Dave CORMIER
University of Prince Edward Island
Charlottetown, Prince Edward Island, Canada

ABSTRACT

This article contributes to the literature on connectivism, connectivist MOOCs (cMOOCs) and rhizomatic learning by examining participant interactions, community formation and nomadic learner behavior in a particular cMOOC, #rhizo15, facilitated for 6 weeks by Dave Cormier. It further focuses on what we can learn by observing Twitter interactions particularly. As an explanatory mixed research design, Social Network Analysis and content analysis were employed for the purposes of the research. SNA is used at the macro, meso and micro levels, and content analysis of one week of the MOOC was conducted using the Community of Inquiry framework. The macro level analysis demonstrates that communities in a rhizomatic connectivist networks have chaotic relationships with other communities in different dimensions (clarified by use of hashtags of concurrent, past and future events). A key finding at the meso level was that as #rhizo15 progressed and number of active participants decreased, interaction increased in overall network. The micro level analysis further reveals that, though completely online, the nature of open online ecosystems are very convenient to facilitate the formation of community. The content analysis of week 3 tweets demonstrated that cognitive presence was the most frequently observed, while teaching presence (teaching behaviors of both facilitator and participants) was the lowest. This research recognizes the limitations of looking only at Twitter when #rhizo15 conversations occurred over multiple platforms frequented by overlapping but not identical groups of people. However, it provides a valuable partial perspective at the macro meso and micro levels that contribute to our understanding of community-building in cMOOCs.

Keywords: Rhizomatic Learning, connectivism, community tracking, nomadic learner behaviors, massive open online courses, MOOCs.
The term "MOOC" (Massive Open Online Course) was first coined by Dave Cormier (Cormier, 2008; de Waard et al., 2011) in order to describe the online course - Connectivism & Connective Knowledge (CCK08) facilitated by Siemens and Downes in 2008. In 2011, the term was adopted to refer to Sebastian Thrun’s facilitated Artificial Intelligence (AI) MOOC which had 160,000 learners from 190 countries. These latter types of MOOCs have become known as extension Massive Open Online Course (xMOOC) while the original style of MOOC, such as CCK08, became referred to as a connectivist Massive Open Online Course (cMOOC) to differentiate their pedagogical approach from that of xMOOCs (Siemens, 2012; Guàrdia, Maina & Sangrà, 2013). The MOOC phenomenon caught much attention as a disruptive innovation (Flynn, 2013; Yuan and Powell, 2013). Although both of these types of courses are called MOOCs, there are significant differences between them pedagogically. While many different categorizations and taxonomies of MOOCs have arisen since the original acronym was coined these do not fit the scope of this paper. While cMOOCs and xMOOCs are similar, in that they are open online courses that have potentially massive enrolment, they are two distinct learning models in terms of the pedagogies that they employ. xMOOCs, usually associated with established educational institutions, typically emphasize consumption of prerecorded media, while cMOOCs, often not affiliated with formal and established university courses, usually emphasize creation of media, autonomy of the learner, and a social networked learning environment (Mackness, 2013; Siemens, 2012, Koutropoulos, 2013 a/b, Glance et al, 2013). Though they have differences in terms of pedagogies, they both serve as lifelong learning opportunities to a diverse group of learners. However, the participatory nature of cMOOCs through open online learning communities is worth further investigation as this promises to provide enduring individual oriented and participatory learning opportunities.

Learners, both in physical and virtual worlds, are social beings. Vygotsky (1978) states that learners learn by socially interacting. In seeking to understand learning in online social networks we benefit from an understanding of the theoretical underpinnings of online learning communities. Within the Open and Distance Learning (ODL) perspective, the Communities of Practice (CoP) (Wenger, 1999), Community of Inquiry (CoI) (Garrison, Anderson, and Archer, 2000) and interaction types in online learning communities (Moore, 1989) are widely known as frameworks used by researchers and practitioners.

According to Wenger (1999), a social theory of learning must integrate community, identity, practice, and meaning to characterize social participation as a process of learning and knowing. CoP presents a theory of learning that starts with the assumption that engagement in social practice is the fundamental process by which we learn and in turn become who we are. In CoP, the primary unit of analysis is neither the individual nor social institutions but rather the informal communities of practice that people form or join as they pursue shared enterprises over time.

Garrison et al. (2000, 2001) additionally explain that, in CoI, presence is the key factor that provides deep, meaningful and active learning in an online milieu. They indicate that learning occurs within the community through the interaction of three core elements: cognitive, social, and teaching presence.

Moore (1989) further states that three types of interactions are needed in distance learning environments: learner-learner, learner-teacher, and learner-content interaction. Accordingly, interaction has a critical role as an important ingredient of online learning communities.

The above discussion indicates some of the essentials for an online learning network. Considering the theoretical necessities and the current use of online networks, it could be said that online networks have proven themselves as being a place where learning can occur, and have become a critical component of online learning in mainstream education. Presently, online networks include many diverse and global online communities, which can
act like global mega classes to those who seek knowledge as a lifelong learning endeavor (Bozkurt, 2016). Open online networks promise more than simply a network constructed by binary digits, but as a learning ecosystem that is alive.

THEORETICAL BACKGROUND

Online Learning Communities as Ecosystems

According to McLuhan (1966), all technologies are extensions of human functions. McLuhan used examples of both classical technologies and technologies of his time to demonstrate this. For example, the wheel is an extension of the foot, or similarly networks are extensions of the human neural system. Taking this into consideration it is plausible to suggest that as technologies advance they could be seen to represent extensions of more complex forms of the human experience. Hansen, Shneiderman and Smith (2010) state that online networks are formed from many physical processes and project themselves as structures within the World Wide Web. D’Andrea, Ferri and Grifoni (2010) further state that emergence network technologies and their evolution, enable people to present themselves as they do in the real world. This might suggest that open online social networks are more representative as organic ecosystems rather than synthetic structures.

Brown (1999), writing about learning, proposed that a learning ecology is “a collection of overlapping communities of interest (virtual), cross-pollinating with each other, constantly evolving, and largely self-organizing” (Brown, 1999, slide.19). Uden, Wangsa and Dmani then apply this to the digital realm, indicating that “a digital ecosystem is a self-organizing, digital infrastructure focused on creating a digital environment that supports the cooperation, knowledge sharing, and the development of open and adaptive technologies and evolutionary learning models” (Uden, Wangsa and Damiani, 2007, p.114). Richardson elaborates upon this model, noting that with digital learning ecologies, students can have “open and immediate access” to the learning materials that they need at the time that they need them, and can personalize that environment to suit their own needs. (Richardson, 2002, p.48). Supporting these ideas, Pata and Bardone (2014) claim that MOOCs are ecosystems at distributed cognition level that facilitate knowledge transformations.

As Cormier says, “[t]he idea is to think of a classroom/community/network as an ecosystem in which each individual is spreading their own understanding with the pieces...available in an ecosystem” (Cormier, 2012). The public negotiation of that acquisition is through aggregating, remixing, repurposing and feed forwarding (Downes, 2010) provides a contextual curriculum to remix back into the existing research, thoughts, and ideas in a given field.

Connectivism: A Learning Theory for the Digital Age

Connectivism, as a theory, explains how learning occurs throughout networks. Connectivism is a synthesis of Chaos, Network, Complexity and Self-Organization Theories (Siemens, 2004). It is an extension of constructivism, and is born in, and for, a digital age. The pioneers of connectivism, Siemens (2004; 2006a) and Downes (2005; 2012) claim that these traditional theories are incapable of explaining learning in digital era. Connectivism claims that “knowledge is distributed across a network of connections, and therefore that learning consists of the ability to construct and traverse those networks” (Downes, 2012).

According to Siemens (2004) the most important aspect of learning isn’t learning new content, but rather being able to “plug into sources” of knowledge and information to acquire the relevant information at the point that it is needed. In a world that continually grows and produces more knowledge, it is this access to the sources knowledge, that the learners do not currently have available to them, which are an asset to the learner, and not the memorization of current knowledge. This, in effect, positions the learner as a lifelong learner and not someone whose knowledge base will be obsolete or not applicable sometime after the knowledge is received.
The digital paradigm shift gives everyone a message that what happens in pedagogy today is a change from biological to networked digital theories which reflects characteristics of web culture, digital learners and learning (Bozkurt, 2014). Traditional theories of pedagogy have some limitations as they mainly concentrate on internal learning processes, biologically processing information in the brain, and are incapable of explaining learning with technology and how learning happens within organizations (Siemens, 2004). Connectivism focuses on where the knowledge is and how learners interact on networks, on the other hand rhizomatic learning focuses on how learners navigate and detour through the network and pursue knowledge as a creative quest for learning.

Rhizomatic Thinking
The notion of the rhizome is a metaphor for learning in the postmodern state of information sharing and knowledge building (Kjærgaard and Sorensen, 2014). Rhizomatic thinking, and by extension rhizomatic learning, is a philosophy, a heutagogical approach, a critical approach, and a combination of all these; yet most importantly it is a form of inquiry for those that excel in learning from informal experiences.

In *A Thousand Plateaus*, Deleuze and Guattari (1987) explain the difference between arborescent and rhizomatic thinking. Arborescent thinking is a model of thought which is hierarchically structured like a tree which branches out from one set of firm roots and a trunk. Rhizomatic thinking is messier and complicated, and is compared to a complex system of roots with many connections between them (Le Grange, 2007). These two types of thought are the very antithesis of each other: arborescences are “hierarchical, stratified totalities” while rhizomes are “non-hierarchical, horizontal multiplicities” (Bogue, 1989, p.107). In addition, Deleuze and Guattari identify six characteristics of the rhizome:

- 1 and 2. Principles of connection and heterogeneity: any point of a rhizome can be connected to anything other, and must be.
- 3. Principle of multiplicity: it is only when the multiple is effectively treated as a substantive, "multiplicity," that it ceases to have any relation to the One as subject or object, natural or spiritual reality, image and world.
- 4. Principle of asignifying rupture: against the over signifying breaks separating structures or cutting across a single structure. A rhizome may be broken, shattered at a given spot, but it will start up again on one of its old lines, or on new lines.
- 5 and 6. Principles of cartography and decalcomania: a rhizome is not amenable to any structural or generative model. It is a stranger to any idea of genetic axis or deep structure (1987:7-12).

Rhizomatic Learning
According to rhizomatic thinking, the problem situation—that is, the one requiring learning—is by nature a real experience that forms “an intrinsic genesis, not an extrinsic conditioning” (Deleuze, 1994, p.154). We learn nothing from those who say: 'Do as I do'. The only teachers who really help us learn are those who encourage us to take a ‘do with me’ approach, and are able to show us how to modify and reproduce what they do in different and diverse situations, rather than only allow us to copy them (Deleuze, 1994, p. 23, Semetsky, 2003). In rhizomatic learning, knowledge can only be negotiated in an experience that is collaborative and contextual. The metaphor of the rhizome represents a reframing of knowledge in order to deal with the unavailability of canonical knowledge and disciplines on the *bleeding-edge*, where knowledge does not exist and needs to be discovered (Cormier, 2008).

"Rhizomes grow and propagate in a *nomadic fashion*, the only restrictions to growth being those that exist in the surrounding habitat. Seen as a model for the construction of knowledge, rhizomatic processes hint at the interconnectedness of ideas as well as boundless exploration across many fronts from many different starting points" (Sharples et al., 2012, p.33). Within a learning structure, rhizomatic learning means that [nomads] are able to connect and traverse from any point to any other point according to perceived learning need (Lian, 2004). Therefore, whatever paths learners follow or whatever
destinations they reach in their rhizomatic quest are actually determined by identifying by themselves or by negotiating with other rhizomes (Lian, 2011).

Inspired by Deleuze and Guattari’s rhizomatic thinking, Cormier explains rhizomatic learning as follows: “[Rhizomatic learning] takes their view of knowledge as resilient, a linear, and uncertain and applies it to the learning process” (Cormier, 2015) Cormier uses the biological metaphor of the rhizome for this view of knowledge. As a metaphor the rhizome acts as a way to understand the branching and connecting of ideas that arises in the learning process, and the fact that there can be more than one conversation happening concurrently: “[t]his participatory view of learning has the advantage of allowing multiple narratives to exist around a given theme, while constantly running the risk of being subject to the normal push and pull of power that exists in any learning community” (Cormier, 2015). “In the rhizomatic model of learning, curriculum is not driven by predefined inputs from experts; it is constructed and negotiated in real time by the contributions of those engaged in the learning process. This community acts as the curriculum, spontaneously shaping, constructing, and reconstructing itself and the subject of its learning in the same way that the rhizome responds to changing environmental conditions.” (Cormier, 2008).

Nomadic Learners: The nth Learners
Just as the rhizome becomes a useful metaphor for describing a theory of learning, the nomad becomes an apt metaphor for the learner. If the rhizomatic theory of learning is a metaphor for the act or theory of learning in its natural state, the nomadic metaphor embodies that theory into a person. So, how do these kinds of learners function in an ecosystem of learning? "Nomads exist only in becoming and in interaction" (Deleuze and Guattari, 1987, p.430).

The rhizomatic nomad is intrinsically motivated toward the pursuit of what some call learning or knowledge. What the nomad really is, however, just another phase of becoming. This pursuit is defined by the appropriation of authority often held over knowledge by some distant other figure by the nomad him/her/itself. This is hard to understand if knowledge is thought of as a binary concept such as right/wrong, is/is not, or proven/unproven. To the nomadic learner knowledge is not a static component to be obtained, but rather a flexible changing element to be alchemically interacted with, and the only goal of which is further pursuit.

Nomads experience freedom by being unconstrained and through constant movement. Nomadic wandering in the discursive fields of education is "not as 'losing one's way' but as losing the way -- as losing any sense that just one 'way' could ever be prefixed and privileged by the definite article. Like rhizomes, nomads have no desire to follow one path” (Gough, 2005, p.13). "The space of [nomad] thought is qualitatively different from State space. Nomad space is "smooth," or open-ended. One can rise up at any point and move to any other. Its mode of distribution is the nomos: arraying oneself in an open space (hold the street), as opposed to the logos of entrenching oneself in a closed space (hold the fort)” (Deleuze and Guattari, 1987, p.xiii). In other words, informal and amorphous smooth spaces are about movement, while formal and structured striated spaces are about arrival (Bayne, 2004). For this reason, the complex and chaotic structure of the Web is a viable milieu, a smooth space for nomadic learners. Considering that cMOOCs have a nonlinear structure, they are a great learning opportunity for wandering nomads.

PURPOSE OF THE RESEARCH

Community detection is important in order to understand the global influence of networked learning communities through gates they open. It is also important to see the local influence of networked learners within the networked community because learning is a social process and learning cannot be understood only by focusing on local or global aspects. In addition, we are interested in analyzing how communities form and coalesce in order to understand how to emulate that process. With this in mind, the general purpose
of this research is to explore network dynamics in a connectivist rhizomatic learning environment with multiple perspectives.

Considering that networks are multi-layered, researchers of this article conducted the analysis within different levels to x-ray rhizomatic network from different angles and to better understand the nature of it. On this basis, community structure will be explored in macro, meso and micro levels through empirical observations of specific datasets and network visualization methods. Additionally, nomadic learner behaviors will be deciphered on distributed networks. Lastly, conversations on microblogging platform will be examined in terms of presence types of CoI.

**METHODOLOGY**

**Research Design**

In this research, a mixed method approach is employed and explanatory sequential design is used to collect, analyze and understand both quantitative and qualitative data. According to Creswell (2004), an explanatory sequential mixed methods design consists of two strands: First quantitative data is analyzed and then qualitative data is analyzed to help explain or elaborate on the quantitative results and have a better understanding. For the purposes of the research, social network analysis was employed in the first strand and content analysis is employed in the second strand.

**First Strand: Social Network Analysis**

As social media have emerged as a widespread platform for human interaction, the invisible ties that link each of us to others have become more visible and machine readable. As a method, social network analysis (SNA) can be used to study, track, and compare the dynamics of communities and the influence of individual contributions. SNA provides powerful ways to map, summarize and visualize networks and identify key vertices that occupy strategic locations and positions within the matrix of links (Hansen, Shneiderman and Smith, 2010).

The science of SNA claims that “our relationships, taken together, define who we are and how we act” (Tsvetovat and Kouznetsov, 2011, p.2) and on a broader view, it is the application of interpersonal relationships and connections on networks (Hansen, Shneiderman and Smith, 2010). SNA differ from other social science approaches because its focus is relationships between actors rather than the attributes of individual actors. It assumes with a holistic view that “types and patterns of relationships emerge from individual connectivity and that the presence (or absence) of such types and patterns have substantial effects on the network and its constituents” (Mika, 2007, p.27).

In SNA, networks are usually visualized in a social network diagram, where vertices are represented as points and edges are represented as lines to conceptualize and to analyze them (Bozkurt et al., 2015). Vertices are also called nodes, agents, entities, actors or items and they may represent people or social structures such as work groups, teams, organizations, institutions, states, or even countries. Edges can also be called links, ties, connections, arcs, and relationships and they may represent many different types of relationships like proximity, collaborations, kinship, friendship, trade partnerships, citations, investments, hyperlinking, transactions, and shared attributes. Visualizations that map these structures complement numerical measures to provide intuitions and insights into the shape, size, density, sub-regions, and key locations within a connected population. It offers a form of x-ray image of the organizational structure of a community in helping users to discover patterns, trends, clusters, and outliers, even in complex social networks (Hansen, Shneiderman and Smith, 2010). Within this perspective, SNA is thought to be an appropriate research methodology to seek some answers for the purpose of the research.
Second Strand: Content Analysis
Content analysis is a technique based on explicit rules of coding (Berelson, 1952) and can be used to analyze written (textual), spoken (aural) words or static (drawings, photos, charts, graphs, maps) and dynamic (video, animation) graphics. Content analysis, which uses both qualitative and quantitative approaches, is used to make inferences, interpretations, counting, summarizing or categorization of the different types of the content.

Sampling
Dave Cormier facilitated the cMOOC Rhizomatic Learning: A Practical View (also known as #rhizo15) for 6 weeks from April 14 to May 26 in 2015 (Cormier, 2015). This was the second iteration of a MOOC on rhizomatic learning after #rhizo14 the year before (Cormier, 2014). Facebook, Twitter and Google+ were used as the main discussion environments. Individual participant blogs were mainly used for reflection posts. Because the structure of Twitter is more convenient for hashtag tracking, Twitter was preferred as the platform for community tracking and identification in addition to deciphering #rhizo15 nomadic learner behaviors.

Network interactions started one week prior to the official start and lasted three more weeks after official end of the cMOOC. The interactions marked with the #rhizo15 hashtag continued to be used sparsely even three months after the official end. However, assuming that learners who followed this cMOOC did so through the Rhizo15 newsletters during its official running dates, a six-week Twitter interaction of rhizomatic learners was chosen as the sample of this study. The overall data visualization and metrics of the six-week time period is presented in Figure 1 and Table 1.

Figure 1:
The six week representation of #rhizo15 network interactions
Table 1
The six week SNA metrics of #rhizo15

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertices</td>
<td>1121</td>
</tr>
<tr>
<td>Unique Edges</td>
<td>2979</td>
</tr>
<tr>
<td>Edges with Duplicates</td>
<td>16316</td>
</tr>
<tr>
<td>Total Edges</td>
<td>19295</td>
</tr>
<tr>
<td>Self-Loops</td>
<td>2073</td>
</tr>
<tr>
<td>Reciprocated Vertex Pair Ratio</td>
<td>0.224179994578477</td>
</tr>
<tr>
<td>Reciprocated Edge Ratio</td>
<td>0.366253321523472</td>
</tr>
<tr>
<td>Connected Components</td>
<td>51</td>
</tr>
<tr>
<td>Single-Vertex Connected Components</td>
<td>43</td>
</tr>
<tr>
<td>Maxi. Vertices in a Connected Component</td>
<td>1061</td>
</tr>
<tr>
<td>Max. Edges in a Connected Component</td>
<td>19232</td>
</tr>
<tr>
<td>Maximum Geodesic Distance (Diameter)</td>
<td>6</td>
</tr>
<tr>
<td>Average Geodesic Distance</td>
<td>2,931887</td>
</tr>
<tr>
<td>Graph Density</td>
<td>0.003596</td>
</tr>
<tr>
<td>Modularity</td>
<td>0.105431</td>
</tr>
</tbody>
</table>

Data Collection and Analysis Procedure

First Strand

Twitter data was collected via NodeXL. A total of six weeks’ worth of data was analyzed. As directed graphs, vertices were grouped by cluster using the Clauset-Newman-Moore cluster algorithm (Clauset, Newman and Moore, 2004; Clauset, Moore and Newman, 2008) which is more efficient than other algorithms for community detecting (Rodrigues, Milic-Frayling, Smith, Shneiderman and Hansen, 2011). Clauset-Newman-Moore cluster algorithm is a probabilistic model of hierarchical clustering for complex networks which is used to detect community structure and extract meaningful communities from the network.

The graphs were laid out using the Harel-Koren Fast Multiscale layout algorithm (Harel and Koren, 2001). Harel-Koren Fast Multiscale layout algorithm is a force directed graph drawing approach which is used to find the multi-scale representation of a graph and to devise a locally nice, aesthetic layout. In graphs, the edge colors, widths, sizes and opacities are based on edge weight values. Edge weight is considered as the strength of relationships on the graph and represents interactions in the network. The vertices are based on betweenness centrality values. Betweenness centrality can be defined as the number of shortest paths from all vertices to all others that pass through that node. Hansen et al. (2010) stress that it is an important value because it represents a kind of bridge score, a measure of how much removing a person would disrupt the connections between other people in the network.

For each graph, overall Graph Metrics were calculated including total number of the vertices, unique edges, edges with duplicates, total edges, self-loops. Additionally, reciprocated vertex pair ratio, reciprocated edge ratio, connected components, single-vertex connected components, maximum vertices in a connected component, maximum edges in a connected component, maximum geodesic distance (diameter), average geodesic distance, graph density and modularity values were reported.

The analysis represents approximately 20,000 interactions which was pulled from the six-week cMOOC #rhizo15, in which maximum participation was 431 learners (week 1) and minimum participation was 205 learners (week 6) on Twitter which represents 47.5% overall persistent engagement. In this research, the operational definition of interaction refers to Rhizomatic Learning cMOOC participants’ engagements (all tweets, retweets and mentions) during their inquiry on Twitter. The data is extracted from tweets which included #rhizo15 hashtag.

The research findings were reported in macro, meso and micro levels. For the macro level, the ten most used hashtags for each week that were employed during Rhizomatic Learning cMOOC were identified and analyzed using descriptive statistics. Following that, SNA of hashtags was conducted with NodeXL in order to explore connections between members.
of the Rhizomatic Learning community and to track other communities that engaged with the #rhizo15 hashtag.

At the meso level, the overall findings were analyzed week by week and the community development process was examined. Additionally, clusters (sub networks or sub communities in #rhizo15) were identified.

At the micro level we performed a sequential analysis. The rationale for a sequential analysis is that an ecosystem consists of interrelated and independent elements and these elements interact and influence one another directly or indirectly to maintain their activity and the existence of the system. In order to perform a micro level analysis, week three was chosen with the assumption that a learning ecology will be settled by this time. Following that, in the first stage, the most active cluster in week three was identified, and in the second stage this cluster was subdivided into clusters on a separate SNA, and in the third stage, the most active cluster identified in the second were divided into clusters (continued till we get the smallest meaningful cluster which took six steps) using Clauset-Newman-Moore cluster algorithm. The purpose of this analysis was to x-ray the community structure and understand community formation at a micro level in addition to analysis in macro level.

Second Strand
Twitter conversations were analyzed using qualitative analysis tool NVivo10. 3,978 lines of textual conversations from week three were examined according to categories of CoI. As categories and indicators were defined previously, rather than employing emerging coding, Twitter conversations were coded according to the categories of CoI.

Reliability
Twitter conversations in the second strand were coded by one of the authors of the article according to three types of presences of CoI. Tweets were coded with most distinct presence types observed though one single tweet may contain more than one presence types. An independent researcher recoded Twitter conversations to increase reliability. Proposed by Cohen (1960), measurement of the agreement between two raters was calculated using the Kappa statistic. Accordingly, inter-rater reliability between two raters are $\kappa = .8543$, $SE = 0.0635$ 95%, $CI = 0.7298$ to 0.9788. Altman (1991) reported that 0.81 to 1.00 intervals very good. Therefore, coding in the second strand of the research can be considered as acceptable with .8543 Cohen’s Kappa value.

Strengths and Limitations
This research has some limitations in addition to strengths. First of all, distributed learning environments are not limited to one single social network site. For instance, the Rhizomatic Learning cMOOC was hosted on many other platforms such as Facebook group, a web page owned by the facilitator, blog posts, and many others. However, it would be beyond the scope of this research to include all interactions, because it is currently not feasible to collect a complete corpus of data on all of the other services. The tools used to collect Twitter data have provided us with a complete corpus of tweets posted during the time period analyzed. At the moment tools to collect similar interactions for other networks, blogs, and commenting services on blogs do not provide as complete a picture as does Twitter data collections. This lack of data completeness may, in-fact, portray a skewed image of what’s occurring in these networks. We have thus focused only on Twitter as a network, despite the inherent limitations. Thus, considering that our sample represents network interactions on Twitter, the following issues are also limitations of this research: Firstly, not all of the learners in this cMOOC engaged in all learning activities and some did not participate via Twitter at all. Secondly, though not many, not all the learners used #rhizo15 hashtag in their communications regarding the course. Therefore, the research findings do not include all the network activities.

This research provides findings derived from a large amount of data which is meaningful considering the diversity of networks, heterogeneity of the learner backgrounds and globally dispersed learners from different geographies and time zones. Analyzing this data
in multiple perspectives and levels poses as the first strength of the research. Secondly, it fills an important gap in MOOC literature. MOOC research has basically had two phases: cMOOC research until 2012 (Phase I) and a dominant focus to xMOOCs (Phase II) after 2012 (Ebben and Murphy, 2013). It is also stated that even though MOOCs generate a plethora of data in digital form, this volume has so far limited researchers to analyzing only a tiny portion of the available data, restricting our understanding of MOOCs (Liyanagunawardena, Adams and Williams 2013). In this sense, this research intends to improve and contribute to the existing literature by examining some of the massive volume of empirical data which is generated by a cMOOC. We believe that an exploration of a learning community structure will be helpful for future MOOC designers in terms of learning (for cMOOCs) and instructional design (for xMOOCs).

**FINDINGS AND DISCUSSION**

**Nature of the Network Ecology**

Developed by Brofenbrenner (1979), an ecological framework for human development explains human interaction in five environmental systems: Microsystem, mesosystem, exosystem, macrosystem and chronosystem. The ecological metaphor is a well suited framework to understand human interactions and learning in unstructured contexts (Jackson, 2013). Based on the same framework, yet limited to three systems, the research findings of this study are presented in three systems: Macro, meso and micro levels.

**Macro Level**

During the Rhizomatic learning cMOOC, the #rhizo15 hashtag was used 10,233 times. We used #rhizo15 as a core hashtag and identified other hashtags (Figure 2) that connect #rhizo15 community to other communities.

![Figure: 2 Hashtags used during Rhizomatic learning cMOOC (N=1589).](image)

To be able to further investigate, we conducted a SNA of hashtags using their frequency in edge width and node size (Figure 3.) and visualized an undirected graph.
The analysis of hashtags reveals some interesting facts. For example, hashtags have some roles as conduits that enable information to flow between different communities. Surprisingly, communities marked with hashtags may refer to past, present or future communities. For instance, the #rhizo14 hashtag (which is the previous version of the Rhizomatic Learning MOOC) belongs to 2014. #hpj101, #emoocs2015, #et4online and #dmlcommons were simultaneously occurring events while Rhizomatic Learning cMOOC was in progress. #clmooc was a past and future event and the future version of it did not exist at the time of #rhizo15. Based on these findings, it is clear that learning communities on distributed networks do not have fixed boundaries - they even intersect or overlap without time restriction. A nomadic learner may exist in multiple communities at the same time. It is obvious that hashtags fulfill some duties in a learning community. They are used to mark a community and additionally used as a social glue to keep the learners together in a CoP. They may also be seen to exclude to set boundaries as to whom was included in a conversation or not.

In addition, this analysis also shows that hashtags, without time and space constriction, tie multiple communities like a wormhole or Einstein-Rosen Bridge which can be defined as a shortcut through space-time. Nomadic learners can get in or out of different learning communities simply by tracking a hashtag. Bozkurt (2014) explains the situation with a metaphor: Accordingly, nomads follow the white rabbit to discover The Wonderland in our networked globe.

It is also clear that hashtags may refer not only to online learning communities formed by learners, but also ideas, discussions and other concepts which may physically not exist. As an example, #sna refers to social network analysis, #nodexl refers to an open source SNA software and #content refers to a discussion within the community. There are some native hashtags as well. #rhizopractice, #rhizoradio, #rhizo15dg and #rhizomatic hashtags were directly connected to #rhizo15 and posed as a secondary hashtag around which subnetworks were emerged within #rhizo15 network.

The macro level analysis demonstrates that communities in a rhizomatic connectivist network have chaotic relationships with other communities in different dimensions. In summary, nomadic learners appear in different open online communities and these communities are not completely separated from each other.
Meso Level

The analysis represents six weeks of data and is purposefully separated for each week in order to observe the process (Table 2).

<table>
<thead>
<tr>
<th>Metrics</th>
<th>1st Week</th>
<th>2nd Week</th>
<th>3rd Week</th>
<th>4th Week</th>
<th>5th Week</th>
<th>6th Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertices</td>
<td>431</td>
<td>351</td>
<td>368</td>
<td>217</td>
<td>239</td>
<td>205</td>
</tr>
<tr>
<td>Unique Edges</td>
<td>1102</td>
<td>902</td>
<td>856</td>
<td>482</td>
<td>510</td>
<td>528</td>
</tr>
<tr>
<td>Edges with Duplicates</td>
<td>3741</td>
<td>3271</td>
<td>3122</td>
<td>1737</td>
<td>1767</td>
<td>1277</td>
</tr>
<tr>
<td>Total Edges</td>
<td>4843</td>
<td>4173</td>
<td>3978</td>
<td>2219</td>
<td>2277</td>
<td>1805</td>
</tr>
<tr>
<td>Self-Loops</td>
<td>483</td>
<td>403</td>
<td>419</td>
<td>224</td>
<td>298</td>
<td>246</td>
</tr>
<tr>
<td>Reciprocated Vertex Pair Ratio</td>
<td>0,226429</td>
<td>0,212569</td>
<td>0,236084</td>
<td>0,261324</td>
<td>0,220779</td>
<td>0,252991</td>
</tr>
<tr>
<td>Reciprocated Edge Ratio</td>
<td>0,369249</td>
<td>0,350609</td>
<td>0,381987</td>
<td>0,414364</td>
<td>0,361702</td>
<td>0,403819</td>
</tr>
<tr>
<td>Connected Components</td>
<td>9</td>
<td>18</td>
<td>36</td>
<td>18</td>
<td>15</td>
<td>8</td>
</tr>
<tr>
<td>Single-Vertex Connected Comp.</td>
<td>7</td>
<td>15</td>
<td>27</td>
<td>16</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>Max. Vertices in a Connected Comp.</td>
<td>422</td>
<td>332</td>
<td>324</td>
<td>199</td>
<td>222</td>
<td>195</td>
</tr>
<tr>
<td>Max. Edges in a Connected Comp.</td>
<td>4829</td>
<td>4149</td>
<td>3937</td>
<td>2202</td>
<td>2258</td>
<td>1796</td>
</tr>
<tr>
<td>Max. Geodesic Distance (Diameter)</td>
<td>6</td>
<td>7</td>
<td>6</td>
<td>7</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Average Geodesic Distance</td>
<td>2,86565</td>
<td>2,962094</td>
<td>2,828672</td>
<td>2,974734</td>
<td>2,899548</td>
<td>2,879701</td>
</tr>
<tr>
<td>Graph Density</td>
<td>0.008913</td>
<td>0.010679</td>
<td>0.009536</td>
<td>0.015446</td>
<td>0.013220</td>
<td>0.017527</td>
</tr>
<tr>
<td>Modularity</td>
<td>0.149112</td>
<td>0.14168</td>
<td>0.143043</td>
<td>0.13722</td>
<td>0.150137</td>
<td>0.164116</td>
</tr>
</tbody>
</table>

The data in Table 1 demonstrates some dynamics and their effects in an open online learning community. There is an 18.5% decrease in the numbers of learners (vertices) in the second week. The first week seems to be a landing area in which Nomadic learners decide to settle in the community for a while or to wander on the networks to meet their learning needs. It can be further interpreted that the first week is a natural selection period in an open online ecology and what is left is dedicated nomadic learners. Within a heuristic perspective, it should be also noted that some learners joined in #rhizo15 experience in different weeks rather than the first week of the cMOOC and similarly these weeks are served in a similar manner. Koutropoulos et al. (2012) explains that learners can dip-in or jump-out anytime of the MOOC according to their learning needs which can be also related to type of MOOC learners. Hill (2013) identifies four types of learners: Lurker, active participants, passive participants and drop-ins. These learners can be categorized as drop-ins who are partially or fully active for their specific learning needs.

Secondly, the changing interaction pattern of the network is salient. Graph density is the metric between 0 and 1 indicating how interconnected the vertices are in the network. It is the ratio of the observed number of ties divided by the maximum possible ties. In other words, it is indicator of the total interaction within the network. When compared, there is an inverse ratio between the number of total learners and graph density measure. In MOOC literature, dropout rates have been a phenomenon and MOOCs are generally criticized because of high dropout rates. However, in contrast to what might be thought, as the number of the learners decrease, interaction increases. The graph density of the network increased gradually from 0.008913 to 0.017527 which can be interpreted as high because it is twice as high as the first week. We can further infer that smaller group formations, fluidity in those groups and less Transactional Distance reasoned with high graph density value.

In terms of community structure, metrics regarding connected components reveal some facts about the structure of the learning network. As mentioned previously, the pattern changes after first week which may be assumed to be an orientation week. According the SNA conducted before official opening, there were interactions on Twitter network which demonstrated an inward facing hubs and spoke, broadcast network pattern. This pattern can be result of promoting and orientation efforts for #rhizo15. In direct proportion to the decrease in the number of the learners, the number of connected components and single vertex connected components (isolated nodes/lurkers) decrease. However, reciprocated edge ratio (mutual interaction) increases.
According to the Milgram Experiment (Milgram, 1967), the six degrees, or steps, mean that even in large networks where most people are not directly connected, people can be reached from every other person through a small number of steps (Hansen, Shneiderman and Smith, 2010). In the #rhizo15 sample, the average geodesic distance changes from minimum 2.828672 (third week) to maximum 2.974734 (fourth week) which means that number of the steps to engage with other learners is ideal to form a community because it requires more steps in a physical world.

**Micro Level**

In order to bring to the surface the hidden pattern of a cluster, we selected the week three SNA and sampled the most connected cluster. In a similar manner to examining under the microscope, we grouped the vertices by using the Clauset-Newman-Moore cluster algorithm. We repeated the same process until we observed the smallest meaningful pattern (Table 3).

### Table 3

<table>
<thead>
<tr>
<th>Clustering week 3 SNA data into sub networks.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vertices</strong></td>
</tr>
<tr>
<td><strong>Unique Edges</strong></td>
</tr>
<tr>
<td><strong>Edges with Duplicates</strong></td>
</tr>
<tr>
<td><strong>Total Edges</strong></td>
</tr>
<tr>
<td><strong>Self-Loops</strong></td>
</tr>
<tr>
<td><strong>Reciprocated Vertex Pair Ratio</strong></td>
</tr>
<tr>
<td><strong>Reciprocated Edge Ratio</strong></td>
</tr>
<tr>
<td><strong>Connected Components</strong></td>
</tr>
<tr>
<td><strong>Single-Vertex Connected Comp.</strong></td>
</tr>
<tr>
<td><strong>Max. Vertices in a Connected Comp.</strong></td>
</tr>
<tr>
<td><strong>Max. Edges in a Connected Comp.</strong></td>
</tr>
<tr>
<td><strong>Max. Geodesic Distance (Diameter)</strong></td>
</tr>
<tr>
<td><strong>Average Geodesic Distance</strong></td>
</tr>
<tr>
<td><strong>Graph Density</strong></td>
</tr>
<tr>
<td><strong>Modularity</strong></td>
</tr>
</tbody>
</table>
This analysis demonstrates that after first cluster (3rd week’s data), the maximum geodesic value (from 6 to 3) and the average geodesic distance (from 2.828672 to 1.828402) decreases. This data further demonstrates that the nature of open online ecosystems is very convenient to form a community, it is even easier than physical world. This may be result of eliminating time and space constraints that exist in real world settings. Similarly, the graph density metric, which is directly relevant to interactivity, increases and peaks in fifth cluster. Though these results are natural after isolating one cluster from the network, it also indicates actual metrics regarding the learning community.

In terms of identifying nomadic learner behavior, the 6th cluster surface that learners start forming a community like a swarm. Some learners with high influence (who were nicknamed “Queen Bee” during #rhizo15) set the climate; facilitated, amplified and disseminated a single idea beyond the learners and networks. This behavior of learners also indicates the importance of curation in a connectivist rhizomatic learning network in order to form a tightly connected, highly interactive community.

Nature of the Learning Conversations
The Twitter conversation in week three is examined in terms of three types of presences of CoI in order to understand nature of the Twitter conversations. Elements of CoI (Garrison, Anderson and Archer 2000; Garrison, Anderson and Archer, 2001) are used as themes and categories are used as codes in content analysis. CoI coding template is given in Table 4.

<table>
<thead>
<tr>
<th>Elements</th>
<th>Categories</th>
<th>Indicators (examples only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Presence</td>
<td>Open Communication</td>
<td>Learning climate/risk-free expression</td>
</tr>
<tr>
<td></td>
<td>Group Cohesion</td>
<td>Group identity/collaboration</td>
</tr>
<tr>
<td></td>
<td>Personal/Affective</td>
<td>Self-Projection/Expressing emotions</td>
</tr>
<tr>
<td>Cognitive Presence</td>
<td>Triggering Event</td>
<td>Sense of puzzlement</td>
</tr>
<tr>
<td></td>
<td>Exploration</td>
<td>Information exchange</td>
</tr>
<tr>
<td></td>
<td>Integration</td>
<td>Connecting ideas</td>
</tr>
<tr>
<td></td>
<td>Resolution</td>
<td>Apply new ideas</td>
</tr>
<tr>
<td>Teaching Presence</td>
<td>Design &amp; Organization</td>
<td>Setting curriculum &amp; methods</td>
</tr>
<tr>
<td></td>
<td>Facilitating Discourse</td>
<td>Shaping constructive Exchange</td>
</tr>
<tr>
<td></td>
<td>Direct Instruction</td>
<td>Focusing and resolving issues</td>
</tr>
</tbody>
</table>

The analysis included 3,978 tweets, replies, and retweets from week three. Only tweets and replies were coded in data set. The results of the content analysis of week three are shown in Table 5. According to indicators of CoI, cognitive presence (80%), social presence (19%) and teaching presence (1%) were observed on Twitter chats.
Cognitive Presence
Cognitive presence was the most frequently appearing category in our analysis of week 3 tweets tagged #rhizo15. This analysis revealed that Twitter conversations often started with a thought provoking triggering event that resulted in a chain reaction of progress toward the exploration, integration and resolution phases. Triggering events pushed learners to think, question, and clarify with one another. Through this process individual thoughts were transformed into collective discoveries. In the integration and resolution phases, nomads often expanded their understanding of triggering events further by stepping outside of Twitter. In these phases, external artifacts (e.g. blog posts, collaborative writing projects, digital art, and music) were often shared via Twitter with a URL and are thus included in the analysis. This allowed nomads to expand their learning explorations past the 140-character limit on Twitter. A salient point being that nomads exhibit higher order learning skills by analyzing, evaluating and creating collaboratively.

For example, most of the conversations start with triggering events as the first tweet in Appendix 2 shows. Triggering event tweets, may contain only one or more triggering events or, after synthesizing information, the results can lead to another triggering event. In the Twitter conversation in Appendix 2, all of the phases of cognitive presence can be seen. One simple tweet transforms into an inquiry and end up with evaluation, synthesizing and creation of the knowledge. The conversation and phases of cognitive presence are a linear and interpenetrating. Each tweet has its own discourse and different audiences.

Story of a Conversation on Twitter
One person tweets the facilitator asking when the new prompt would be posted. They use the hashtag #rhizo15. Another person sees the tweet and affirms they are waiting impatiently, too. The facilitator reminds these two people that they are on a European time zone while he is on North America time. A conversation ensues where more than 6 other participants chime in about the impact of time zones on learning in a MOOC, whether it skews content, or makes the MOOC more energetic, and how it feels to wake up to find many tweets from a conversation others had while you were asleep. The conversation splits into different threads involving different people, and includes comparing synchronous and asynchronous communication and philosophical musings about conversations that span time and space. It ends with one of the participants posting a comic rendition of the conversation (a light-hearted way to view the conversation). This all takes place in the space of X number of tweets over Y number of minutes/hours and involves a total of Z
participants. What started out as an inquiry, spreads to some light-hearted banter, then some philosophical discussion, and some inferences about what it means to be learning and interacting online, and ends with some more light-hearted banter (The original Twitter conversation is given in Appendix 2).

This analysis also reveals some important findings that are not related to CoI. Firstly, linking external sources creates multiple layers on distributed learning environments. In other words, links tie different learning ecologies to each other which are used for exchange and reflection of ideas. Secondly, retweets serve not only to spread the words, but also to address a wider audience in learning ecology. Thus, the open structure of learning ecology poses as an important factor as different nomads can in and out to these conversations. Finally, this analysis also reveals an important finding: One of the essential point in connectivist learning ecologies are thought provoking questions that learners can pursue.

Social Presence
Social presence is the second most observed presence types. Indicators of open communication and group cohesion indicators were fewer when compared to personal/affective category. Indicators of personal/affective category mostly observed through emotional words or emoticons (Table 6). Though not included into analysis, many participants shared visuals that reflect their emotional presence which is defined as emotionally being there (Cleveland-Innes and Campbell, 2012).

| Table: 6 |
| Sample Twitter conversations for social presence (personal/affective) |
| • @dougysymington footsteps plus dog tracks #rhizo15 |
| • @NBCavillones oh my, what an awful image :O #rhizo15 |
| • @sensor63 @Autumm @dogtrax @NBCavillones @inspirepassion @willrich45 electronic dance music, u know ur soundtrack to everything ;) #rhizo15 |

Intimacy (Argyle and Dean, 1965) and immediacy (Wiener and Mehrabian, 1968) are two important factors that increase social presence in an open online learning environment. Intimacy usually observed in personal affective category, however it seems that immediacy is provided by learners from different time zones of the globe. As it was discussed in a Twitter chat (Appendix 2), learners provided 24/7 discussions. It is also worth mentioning that even though pace and flow of the discussions were constant, it was asynchronous in synchronous discussions in many cases for the learners that belong to the different time zones.

Teaching Presence
Teaching presence was the least observed presence type which could be a result of the autonomous, self-regulated, self-directed learners in this distributed learning network. Facilitating discourse and direct instruction indicators were vague and mostly provided by other learners rather than the facilitator of the cMOOC. The design and organization category was the most observed category within teaching presence (Table 7). These examples of teaching presence indicators were often not predefined by design of the cMOOC but rather were a kind of guiding from more experienced nomads to novice nomads explaining aspects of the course. There is a radical shift in teacher-student roles in cMOOCs. These empirical findings confirm Siemens’ (2006b, p.42) statement that “the learner is the teacher is the learner”.

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**CONCLUSION AND FUTURE IMPLICATIONS**

This study examines a connectivist rhizomatic learning environment within multiple perspectives and reveals research findings regarding cMOOCs, community formation, nomadic learners in a rhizomatic learning setting. Additionally, this research explains both rhizomatic thinking and rhizomatic learning through a literature review.

Macro level analysis reveals that hashtags link multiple past, present and future learning communities and serve as conduit for information flow among these communities. Nomadic learners use hashtags to traverse among these communities and additionally hashtags also function as a social glue to keep learners and learning communities. Meso level analysis surfaces that decrease in number of learners (dropout rates) increases interaction among the learners. Thus, dropouts in a cMOOC or drop-in learner types is part of evaluation process for community formation and interestingly affect learning process positively in some aspects. Micro level analysis demonstrates that open online ecosystems are relatively convenient environments to form a learning community in a global scale because it eliminates time and space constraints that exist in real world settings. Additionally, it is found that some learners have critical roles as they enrich learning experiences and pose like a rhizome which interacts with other rhizomes in a quest of learning according to their subjectives.

Examination of a conversation on twitter through lenses of presences from CoI led to an understanding that cognitive presence has a critical function for meaningful learning experiences and it is most observed presence type (80%) in connectivist rhizomatic learning environment. Social presence (19%) is the second most observed presence type with emotional words or emoticons. Teaching presence (1%), not surprisingly, is the least observed presence type which is quite natural for self-directed learners.

All things considered, it can be concluded that the chaotic, uncertain and distributed nature of open online networks as ecosystems embrace rhizomatic learning practices and nomadic learners. Based on the findings that reveals high cognitive presence, higher order learning skills and low dropout/high completion rate when compared to other MOOCs, it can be further concluded that rhizomatic learning and connectivist learning theory greatly match and complete each other, and promise a lot for online networked, distributed learning experiences.

Based on the research findings revealed in this study, the following future implications can be taken into consideration:

- This research focused on distributed learning environments on a cMOOC and examined connectivist learning ecology within different perspectives by employing both qualitative and quantitative approaches. Considering that MOOCs are an increasing trend in online learning, similar research that focus on xMOOCs can contribute to literature a lot.
- As a research methodology, authors of this study used a mixed research design employing SNA and content analysis. However, studies that employ qualitative approaches to explore participants’ views such as ethnography or phenomenology would be very beneficial to better understand both connectivist and extended MOOC phenomena.
- Social network sites (SNSs) may vary and they are not all the same. This research used a microblogging site to collect and analyze data. However, there
is a need to examine other SNSs’ potential for MOOC learners and rhizomatic learning opportunities.

- Both c and x MOOCs are globally distributed learning environments in time and place. Even a synchronous learning environment can transform into an asynchronous learning environment because of the limitations in time and space. It seems that globally connected learners from different time zones and geographies will be available in future. As it was explored in a Twitter chat in Appendix 2, this case can be further examined to investigate, understand and thus to design learning environments for those globally distributed learners.

Ethical Considerations: The data was collected from public domain of microblogging platform Twitter. The user names are explicitly used because it is publicly available open data that does not constitute human subjects research. This type of data is exempt from Institutional Review Board (IRB) clearance or permission. However, those whose names are appeared in Appendix 2 were informed about topic, purpose and authors of the research as a matter of courtesy.

Authors’ Notes:

1. Cormier reported that ‘D&G hate the word metaphor... I have certain feelings about how the word translates into English. It's the reason I use the word story [instead of other terms such as pedagogy, theory, framework or approach].' (Bali & Honeychurch, 2014).

2. Deleuze and Guattari used some words specially to explain rhizomatic thinking with a philosophic lens. They purposefully preferred to play with words. Besides, they used some words in capitals in the middle of the sentences. To stick to the original philosophic ideas, the authors have generally used direct citations from Deleuze and Guattari and kept paraphrased expressions regarding rhizomatic thinking to a minimum.

Biodata and Contact Addresses of the Authors

Aras BOZKURT received his MA and PhD degrees in Distance Education from Anadolu University. He serves as a reviewer for several journals in distance education field and he is also an editorial board member of eLearn Magazine. His current research interests are topics related to digital books, interactive e-books, gamification, game-based learning, research trends in distance education, social networks, online interaction, online learning spaces, online learning communities, online community formation and online learning. He is also interested in critical theories such as connectivism, rhizomatic learning, heutagogy and emerging research paradigms such as social network analysis, sentiment analysis, and data mining.

Aras BOZKURT, Ph.D.
Ministry of Education, Eskisehir, 26100, Turkey
Phone: +905058544404
e-Mail: arasbozkurt@gmail.com
Sarah HONEYCHURCH is a Learning Technology Specialist and Philosophy TA at the University of Glasgow in Scotland. She has a BA and MA in Philosophy from the University of Southampton and is currently studying for a PhD in Education at the University of Glasgow looking at how online peer interactions can stimulate learning. Her blog is http://www.nomadwarmachine.co.uk

Sarah HONEYCHURCH  
University of Glasgow, Learning and Teaching Centre  
Southpark House, 64 Southpark Avenue, Glasgow G12 8LB, Scotland  
Phone: +44 141 330 3026  
e-Mail: Sarah.Honeychurch@glasgow.ac.uk

Autumm CAINES is the Associate Director of Academic Technology at Capital University in Columbus Ohio. Autumm earned her MA in Educational Technology from The Ohio State University, her BS in Communication Technology from Eastern Michigan University, and an AA in Liberal Arts as well as a certificate in Web Design from Oakland Community College. In fall of 2016 she will start teaching a first year seminar on digital citizenship at Capital University. She also serves as a Co-Director at Virtuallyconnecting.org

Autumm CAINES  
Associate Director of Academic Technology  
Capital University, Center for Excellence in Learning and Teaching  
1 College and Main, Columbus OH 43209  
Phone: +1614-236-6633  
e-Mail: acaines@capital.edu

Maha BALI is Associate Professor of Practice, Center for Learning and Teaching, American University in Cairo. Editor at Hybrid Pedagogy and editorial board member of Journal of Pedagogic Development. Co-founder of Virtuallyconnecting.org and Edcontexts.org

Maha BALI  
American University in Cairo, Center for Learning and Teaching,  
113 Kasr El Aini St., P.O. Box 2511 Cairo, 11511, Egypt  
Phone: +20226153613  
e-Mail: bali@aucegypt.edu
Apostolos KOUTROPOULOS is the program manager for the online MA program in Applied Linguistics at the University of Massachusetts Boston. He is also an adjunct faculty member of the Instructional Design MEd program. Over the last few years he has participated in many massive online open courses (MOOCs) and has co-authored research papers with colleagues around the globe. AK holds a BA in computer science, an MBA with a focus on human resources, an MSc in information technology, an MEd in instructional design, and an MA in applied linguistics. He is currently an EdD student at Athabasca University. His research interests include online learning, knowledge management, educational technology, linguistics, and games in education.

Apostolos KOUTROPOULOS
UMass Boston, Applied Linguistics Department
100 Morrissey Boulevard, Boston, MA, 02125, The USA
Phone: +16172875990
e-Mail: a.koutropoulos@umb.edu

Dave CORMIER is an educational researcher and speaker on Open Learning, MOOCs and the impact of technology on the future of education. At the University of Prince Edward Island he has lead student retention, academic planning, domestic recruitment, first year advisement and is currently leading New Student Orientation and Web Communications.

Dave CORMIER
University of Prince Edward Island, 550 University Avenue,
Charlottetown Prince Edward Island, Canada C1A 4P3
Phone: 1902 566 0908
e-Mail: davcormier@upei.ca

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digital practice.


Appendix: 1
Definitions of SNA terms

- **Vertices (nodes, agents, entities, actors or items):** They can represent individuals or social structures.
- **Edges (links, ties, connections, arcs, or relationships):** They can represent any form of relationship or connection that occurs through exchange or interaction between two vertices.
- **Degree/Degree centrality:** Total number of unique edges (in and out) that are connected to a vertex. When the graph is directed, degree metrics can be indegree (points inward) or outdegree (points outward).
- **Betweenness Centrality:** It is a score that indicates a node's ability to bridge different subnetworks in a network. In other words, it is a measure of a node’s centrality in the network which is equal to the number of shortest paths from all other vertices to all others that pass through that node.
- **Closeness Centrality:** It is a distance score that is calculated by capturing the average shortest distance between a vertex and every other vertex in the network.
- **Eigenvector centrality:** It is a metric that indicates influence score for strategically connected vertices which takes into consideration not only how many connections a vertex has, but also the degree of the vertices that it is connected to. Similarly, the PageRank algorithm is a variant of eigenvector centrality.
- **Graph density:** It is a metric that measures the sum of edges divided by the total number of possible edges and demonstrates the level of interconnectedness of the vertices. The number from 0 to 1 indicates how interconnected the vertices in a network.
- **Component:** Communities, subnetworks, groups, or clusters in a single network.
- **Geodesic Distance (Diameter):** It is the length of the shortest path between vertices.
- **Modularity:** It is a metric for measuring the structure of a graph. It is used to measure the strength of division of a network into modules.
Appendix: 2
Sample Twitter conversations for cognitive presence

- @davecormier What do we have on #rhizo15 menu? I am hungry 4 learning :) That's wednesday night... Give an apple 2 eat in networked paradise
- Yes, @davecormier we are waiting for #rhizo15 week 3
- @NomadWarMachine @arasbozkurt kids go to bed at 830. It ll be after that ;)
- @davecormier @NomadWarMachine It is 01:15 am in my time zone ;) It is thursday now... See the massiveness in time and place #rhizo15
- @davecormier @NomadWarMachine Gonna catch #rhizo15 3rd week staff 2morrow... Maybe I can catch u all in my rhizomatic dream :)
- @arasbozkurt @davecormier @NomadWarMachine See ya on the flip side of your night (which will be flip side of my day?) #rhizo15 timezones
- @dogtrax @arasbozkurt @davecormier @NomadWarMachine yes someone should blog on how time zones skew content in #rhizo15
- @dogtrax @davecormier @NomadWarMachine Agreed @AnnGagne, it is important to keep the pace and flow of the MOOC #rhizo15
  - @arasbozkurt @dogtrax @davecormier @NomadWarMachine @AnnGagne Re: #rhizo15 pace/flow: why is it important?
    - @VCVaile @dogtrax @davecormier @NomadWarMachine @AnnGagne to increase the social interaction...
    - @arasbozkurt @dogtrax @davecormier @NomadWarMachine @AnnGagne but growing naturally esp if #rhizo15 is not only flow under cultivation
    - @AnnGagne @arasbozkurt @dogtrax @davecormier @NomadWarMachine so #rhizo15 is like an all night diner? Less the hours than the frenetic pace
    - @VCVaile @AnnGagne @ arasbozkurt @ dogtrax @ davecormier Good analogy for #rhizo15
  - @VCVaile @arasbozkurt @dogtrax @davecormier @NomadWarMachine it keeps engagement/idea expansion high #rhizo15
  - @AnnGagne @VCVaile @arasbozkurt @dogtrax @davecormier @NomadWarMachine These timezone issues make #rhizo15 energetic, as we are always here.
  - @JeffreyKeefer @AnnGagne @VCVaile @dogtrax @davecormier @NomadWarMachine #rhizo15 MOOC is 7/24 interactive wit branches all around the world
  - @VCVaile @arasbozkurt @dogtrax @davecormier @NomadWarMachine think one could argue that #rhizo15 timeframe span makes it more comprehensive
  - @AnnGagne @VCVaile @arasbozkurt @dogtrax @davecormier It’s nice to wake up and catch up with the overnight conversation in #rhizo15
- @dogtrax @davecormier @NomadWarMachine @AnnGagne time zones are a big obstacle 4 sync discussions... #rhizo15
  - @arasbozkurt @dogtrax @davecormier @NomadWarMachine @AnnGagne Though synchronous Tweet threads ebb and flow across #rhizo15
  - @JeffreyKeefer @arasbozkurt @dogtrax @davecormier @NomadWarMachine @AnnGagne though conversations if we chime in when we catch up? #rhizo15
    - @lisahubbell @arasbozkurt @dogtrax @davecormier @NomadWarMachine @AnnGagne Agreed; conversations can span space, so why not time? #rhizo15
    - @JeffreyKeefer @lisahubbell @arasbozkurt @dogtrax @davecormier @AnnGagne Agreed #rhizo15 allows for asynch
    - @lisahubbell @JeffreyKeefer @arasbozkurt @dogtrax @davecormier @NomadWarMachine definitely! #rhizo15 time is anytime- also allows to reflect
- @dogtrax @davecormier @NomadWarMachine @AnnGagne I see the that there two major groups: MOOCers from America and Europe #rhizo15
  - @arasbozkurt @dogtrax @davecormier @AnnGagne Interesting to see the viz about that #rhizo15
  - @dogtrax @davecormier @AnnGagne I was thinking about that @NomadWarMachine #rhizo15
- @dogtrax @davecormier @NomadWarMachine @AnnGagne That's why, the group discussions are going on day and night ;) #rhizo15
- @arasbozkurt @davecormier @NomadWarMachine @AnnGagne Time is elusive ... A #rhizo15 comic pic.twitter.com/x5JytFTe7Q
  - @dogtrax @arasbozkurt @davecormier @NomadWarMachine this is amazing, Kevin!
Time zones of #rhizo15 MOOCers. 3 distinct groups from all around the globe...
  [visual attached in original tweet]
WEB INTERFACE DESIGN PRINCIPLES
FOR ADULTS’ SELF-DIRECTED LEARNING

Assist. Prof. Dr. Mehmet FIRAT
Open Education Faculty, Anadolu University
Eskisehir, Turkey

Assist. Prof. Dr. A. Nurhan SAKAR
Open Education Faculty, Anadolu University
Eskisehir, Turkey

Assoc. Prof. Dr. Isil KABAKCI YURDAKUL
Education Faculty, Anadolu University
Eskisehir, Turkey

ABSTRACT
One of the most important features which e-learning tools and environments must possess within the scope of lifelong learning is self-directed learning, which can be considered as a form of self-learning. The aim of this study was to determine, based on the views and recommendations of experts, interface design principles for the development of educational web interfaces that will support the self-directed learning of adults. This descriptive study was conducted with the contribution of 12 academicians specializing in interface design and self-directed learning. Within the scope of the study, new interfaces features were identified based on an evaluation of the literature on interface designs for self-directed learning, and the views of subject experts. Based on the study results, it was determined that interface designs supporting self-directed learning must possess five basic features, which include being user-directed, ensuring variety, being supported by learning analytics, being motivational, and being sharing-oriented.

Key words: Open and distance learning, self-directed learning, adult education, e-learning, interface design.

INTRODUCTION
Given that computers began to be used in education approximately 20-25 years ago, the current availability of e-learning methods in thousands of universities around the world indicates the pace of improvement provided by e-learning tools. The number of universities that offer e-learning opportunities increases daily. In this context, file sharing platforms such as Dropbox, presentation software such as Prezi, and office packages such as Microsoft Office, could be listed among the most frequently used e-learning tools of today. Adobe Connect, Blackboard, WebCT, and Moodle could also be listed among the content management systems (CMS) and learning management systems (LMS). There are certain features that e-learning tools and environments should possess within the scope of lifelong learning. The most prominent feature is self-directed learning, which could be considered in terms of adult training and self-learning (Murray, 2015).

Self-Directed Learning
In the Open University, which is based on the self-learning of individuals independent from time and place, learners are expected to benefit from the available environment, tools, and
resources under their own control. Therefore, having the major compulsory competencies of self-learning and self-directed learning is essential for Open University students (Volery and Lord, 2000; Irizarry, 2002). Self-directed learning, which is an individual learning approach where learners plan their own learning experiences, implement their plans and evaluate their own learning experiences, accordingly, has an important role in the Open University practices.

Despite the absence of a universal definition, self-directed learning is used instead of self-learning in the literature, which is a concept where the learner is responsible for his/her own learning experiences (Caffarella, 2000; Hiemstra, 2000; Merriam and Caffarella, 1999; Murray, 2015). In this respect, it would be appropriate to define self-learning as an individual learning approach where learners plan their own learning experiences, implement their plans and evaluate their own learning experiences. According to Garrison (1997), self-directed learning occurs as a result of an effective integration among self-direction (contextual control), cognitive self-control in terms of self-monitoring (cognitive responsibility), and motivation in terms of willingness to learn. As the definition also indicates, the self-directed learning approach has a critical importance in the Open University practices. Figure 2 summarizes the relationship between the dimensions of self-directed learning.

As displayed in Figure 2, self-direction, which is one of the dimensions of self-directed learning, could be considered mainly as a concept related to the control of learning tasks. Accordingly, the main focus in self-direction is on the application of learning targets both socially and behaviorally. However, in cognitive self-control, cognitive and metacognitive processes are discussed. Additionally, learning strategies are followed and there is a requirement for awareness and competence in thinking to think. Learners with cognitive self-control make their own learning plan, modify the plan according to their requirements, and review their thoughts about learning goals and tasks within the learning process (Hammarlund, Nilsson and Gummesson, 2015). Learners with cognitive self-control have the responsibility of establishing individual meanings such as the integration of new concepts and ideas into the previous knowledge. Cognitive self-control, which is also known as self-inspection, reflects the obligation of establishing meanings through critical
motivation. Thinking, cooperation, and approval. Motivation reflects the value and expected learning achievement that is perceived throughout the learning process, which starts between content (control) and cognition (responsibility).

Widely used e-learning tools and environments are presented to learners with the help of educational Web interfaces. In order the learners to benefit from these available environments, tools and resources, they should be competent in utilizing technology; more importantly, they should be able to learn through self-direction. In other words, e-learning tools and environments should be supportive of learners’ self-directed learning. Self-directed learning naturally based on self-control skills of adults. Therefore, adult education and self-directed learning commonly mentioned together.

**Adult Education**

According to Siebert (2003), andragogy, also known as adult education, should be adapted as a part of educational science. Some of the principles that have been frequently emphasized in the literature regarding adult learning could be listed as follows (Knowles, 1970; Knowles, 1984; Merriam, Caffarella, and Baumgartner, 2012):

- Adults are better at learning certain aspects that are related to their experiences and lives.
- Adults are conscious learners.
- The duration of adults’ reactions to stimulus increases directly in proportion of their age.
- Reliability and participations facilitates the teaching of adults.
- Adults learn about the solution of an existing problem rather than simply learning.

Learning always starts with human experiences (Kolb, 1984). Therefore, while considering the andragogy model and certain environments that are appropriate to this model, the past life experiences of adults should be taken into consideration. In other words, the nature of adults should be considered in all activities regarding adult training. The concept of lifelong learning, which is related to the life experiences of individuals, also emphasized this phenomenon. Adult training, which has been shaped according to the studies of researchers and pragmatists since the 1980s, could be presented through the following five basic features (Knowles, 1970; Knowles, 1984):

- Adult students are self-directed.
- The life experiences of adults are the main source of their education.
- The perceived requirements of adults play a prominent role during their learning.
- The education of adult is oriented towards current events and cases.
- The motivation of adults towards learning primarily depends on the requirements.

Considering the characteristics of adult learners along with self-learning and andragogy, it could be concluded that they would like to be educated in relation to real life, which is self-directed, includes active participation, and is based on their own life experiences. Figure 1 shows that such characteristics of adults could be taken into account in educational environments created for adults.
It could be concluded that educational environments that are created based on the principles of the andragogy model about adult learning should be related to the real life, promote self-directed learning, ensure active participation, and be based on the life experiences of the learner. In this respect, e-learning environments and tools prepared for adult training are also expected to be related to the real life, promote self-directed learning, ensure active participation, and be based on the life experiences of the learner. With the growing concern about the use of ICTs in adult education, educational researchers, instructional designer and interface developer start to focus on developing successful educational interface designs for adults. It is possible to access different research and publications.

**LITERATURE REVIEW**

The review of the literature involved the examination of various studies describing conceptual frameworks regarding self-directed learning and interface designs. A study performed by Cennamo and Ross (2000), for instance, considered possible strategies for supporting self-directed learning among learners in a web-based course. In this context, they proposed nine different self-directed learning strategies, such as the holding records, monitoring, reviewing notes, and teacher support. Similarly, a study performed by Kashihara and Hasegawa (2003) evaluated potential strategies for forming self-directed learning environments on the web. To this end, they proposed a Learning Bench framework, which included a library as well as components for tracking user navigation. The library served to facilitate the learner’s transition from one subject to another, while the navigation tracker was developed to allow the learner to track his/her own learning path and web navigation.

In another study, Fischer and Sugimoto (2006) focused on supporting the self-control of learners in socio-technic environments. To this end, they created a conceptual framework that presented four new innovative concepts. These innovative concepts included effect-oriented design environment, system criticism, design, and exploratory cooperation. Based on the results of this study, Fischer and Sugimoto described various difficulties that can be encountered during system development and evaluation, and in the use of technologies to support learning.
The literature review we performed showed that studies discussed the necessary characteristics for educational web environments that support self-directed learning mainly within the frame of socio-technic, navigational and design models, and of components such as libraries. However, we were not able to find any studies that presented holistic design principles for use in the design of education web interfaces supporting self-directed learning among adult learners. Also Eyitayo, (2013) underline the requirement of future research on adult learning principles about learning in ICTs. In this context, we believe that the current study might contribute to filling this gap within the literature.

In this study, self-directed learning is defined as learners’ control in cooperation with individual responsibility, cognitive processes, and contextual processes with the aim of establishing and confirming meaningful learning outcomes. However, common e-learning tools and environments could be quite complicated structures for learners. In this respect, it is believed that creating familiar, meaningful, and guiding educational Web interfaces would have important contributions to self-directed learning of learners. In addition to the well-designed e-learning tools, in order for learners to learn through their self-control, self-motivation and self-direction, and educational Web interfaces, which could support self-directed learning, are required. These requirements have also been emphasized by Kinshuk, Chang, Dron, Graf, Kumar, Lin and Yang (2011).

**PURPOSE**

The current study aimed to determine the interface design principles that could be used in developing educational Web interfaces, which could support adults’ self-directed learning, through expert opinions and suggestions. In light of this aim, answers to the following questions were sought:

1. What are the opinions of experts in interface design and self-directed learning about the features that interface designs supportive of self-directed learning have, as described in the literature?
2. What are the opinions of experts in interface design and self-directed learning about the features that interface designs supportive of self-directed learning should have?

**METHOD**

This descriptive study investigated the views and suggestion of experts on interface design principles supporting adults’ self-directed learning by both qualitative and quantitative data. Participants, data collection tool and data analyses process given under this section.

**Participants**

Participants were determined through the purposive sampling method and the study was conducted with six experts with a doctorate degree, who actively design Web interfaces, along with six academicians, who perform studies on self-directed learning. Demographic information about the participants is presented in Table 1.

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</tbody>
</table>
As displayed in Table 1, all experts who participated in the study had doctorate degrees. Furthermore, it was observed that the number of male field experts was twice the number of female experts. Additionally, an equal number of experts participated in the study with respect to the fields of study in self-directed learning and Web interface design.

**Data Collection Tool**

In the determination of the interface design principles required for developing educational Web interfaces that are supportive of self-directed learning, an expert evaluation form was used (Appendix-1). In order to determine the data collection tools, interface design principles that could be used in developing educational Web interfaces supportive of self-directed learning were reviewed in the literature. Principles that were found through the literature review are presented in Table 2.

Among the 16 items obtained from the literature review, two were combined due to the fact that they had the same meaning, and one was removed since it was not related to interface design. As a result of this, 13 items were obtained. Additionally, certain items were changed in terms of their expressions according to the expert opinions and suggestions. A draft expert opinion form was evaluated by four field experts for the face and content validity. The form took its final form according to the feedback obtained. The first section of the expert evaluation form, which consisted of two sections, included the evaluation of the principles obtained from the literature review; and in the second section, experts were requested to suggest their own principles.

<table>
<thead>
<tr>
<th>Table: 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Principles Found in the Literature Review</strong></td>
</tr>
<tr>
<td><strong>Theme</strong></td>
</tr>
<tr>
<td>User-directed</td>
</tr>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td>Supportive</td>
</tr>
<tr>
<td>4.</td>
</tr>
<tr>
<td>5.</td>
</tr>
<tr>
<td>6.</td>
</tr>
<tr>
<td>7.</td>
</tr>
<tr>
<td>8.</td>
</tr>
<tr>
<td>9.</td>
</tr>
<tr>
<td>Open-ended</td>
</tr>
<tr>
<td>10.</td>
</tr>
<tr>
<td>11.</td>
</tr>
<tr>
<td>Sharing-oriented</td>
</tr>
<tr>
<td>12.</td>
</tr>
<tr>
<td>13.</td>
</tr>
<tr>
<td>Motivating</td>
</tr>
<tr>
<td>14.</td>
</tr>
<tr>
<td>15.</td>
</tr>
<tr>
<td>16.</td>
</tr>
</tbody>
</table>
Data Analysis

Data obtained from the first section of the expert opinion form were analyzed through descriptive statistics. A content analysis was performed from the data obtained from the second section of the form. In this method, which was developed by Osgood, Suci, and Tannenbaum (1957), the direction and intensity of the attitudes towards a subject were determined through the data obtained. Data obtained from the participants were encoded in accordance with the evaluative content analysis. In order to increase the level of reliability for the codes, expert opinions were obtained. Data obtained from the second section of the expert opinion form were analyzed according to the thematic analysis. Thematic analysis could be defined as a method that is used to determine, analyze, and report the themes within the data (Braun and Clarke, 2006). The aim of the thematic analysis was to obtain interface design principles identified by the participants as supportive of self-directed learning.

FINDINGS

This part of the study includes findings obtained from the evaluation of the self-directed learning interface design principles that were found in the literature review as well as the findings obtained from the opinions of the experts about the same topic. Firstly, the principles obtained from the literature review were analyzed and 13 basic principles were found. Principles obtained are displayed in Table 3.

<table>
<thead>
<tr>
<th>Principles</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. It must be ensured that learners are able to keep track of their own improvement.</td>
<td>Knowles, 1970; Knowles, 1984; Garrison, 1997; Fischer and Scharff, 1998; Siebert, 2003; Merriam, Caffarella and Baumgartner, 2012</td>
</tr>
<tr>
<td>2. Learners should be supported in terms of regular studying.</td>
<td></td>
</tr>
<tr>
<td>3. Previous learning should be recalled.</td>
<td></td>
</tr>
<tr>
<td>4. Learners should be enabled to add and remove interface components.</td>
<td></td>
</tr>
<tr>
<td>5. Components that could be regulated by learners according to themselves should be included.</td>
<td></td>
</tr>
<tr>
<td>6. Learners should be enabled to evaluate themselves.</td>
<td></td>
</tr>
<tr>
<td>7. Self-learning should be promoted.</td>
<td></td>
</tr>
<tr>
<td>8. Time management tools should be provided.</td>
<td></td>
</tr>
<tr>
<td>9. Clues that could establish a relationship with real life should be presented.</td>
<td></td>
</tr>
<tr>
<td>10. Image, video, and graphic support should be provided.</td>
<td></td>
</tr>
<tr>
<td>11. Design variety should be ensured.</td>
<td></td>
</tr>
<tr>
<td>12. Varied learning resources should be included.</td>
<td></td>
</tr>
<tr>
<td>13. Components that enable learners to communicate should be included.</td>
<td></td>
</tr>
</tbody>
</table>

As displayed in Table 3, 16 self-directed learning interface design principles that were obtained from the literature review were reduced to 13 items. These items were later submitted to 12 experts for their opinions. Opinions of experts about interface design features in the literature that were supportive of self-directed learning are presented in the next section.
Opinions Regarding Interface Design Features Supportive of Self-Directed Learning

The aim of the first section of the expert opinion form was to determine the opinions of experts about the interface design principles obtained from the literature review. Experts scored the features between 1 and 10. The total score of each item is displayed in Table 4.

Table: 4
Opinions of Experts/Specialists Regarding Design Principles for Interfaces

<table>
<thead>
<tr>
<th>Features</th>
<th>Total</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>It must be ensured that learners are able to keep track of their own improvement.</td>
<td>118</td>
<td>9.8</td>
</tr>
<tr>
<td>Self-learning should be promoted.</td>
<td>118</td>
<td>9.8</td>
</tr>
<tr>
<td>Image, video, and graphic support should be provided.</td>
<td>113</td>
<td>9.4</td>
</tr>
<tr>
<td>Components that enable learners to communicate should be included.</td>
<td>112</td>
<td>9.3</td>
</tr>
<tr>
<td>Components that could be regulated by learners on their own should be included.</td>
<td>111</td>
<td>9.3</td>
</tr>
<tr>
<td>Design variety should be ensured.</td>
<td>111</td>
<td>9.3</td>
</tr>
<tr>
<td>Learners should be allowed to add and remove interface components.</td>
<td>110</td>
<td>9.2</td>
</tr>
<tr>
<td>Learners should be enabled to evaluate themselves.</td>
<td>110</td>
<td>9.2</td>
</tr>
<tr>
<td>Varied learning resources should be included.</td>
<td>109</td>
<td>9.1</td>
</tr>
<tr>
<td>Time management tools should be provided.</td>
<td>105</td>
<td>8.8</td>
</tr>
<tr>
<td>Previous learning should be recalled.</td>
<td>103</td>
<td>8.6</td>
</tr>
<tr>
<td>Learners should be supported in terms of regular studying</td>
<td>102</td>
<td>8.5</td>
</tr>
<tr>
<td>Clues that could establish relationship with real life should be presented.</td>
<td>95</td>
<td>7.9</td>
</tr>
</tbody>
</table>

According to Table 2, the two items with the highest scores were: “It must be ensured that learners are able to keep track of their own improvement,” and “Self-learning should be promoted.” These two items were both related to the cognitive self-control dimension of self-directed learning. The item that received the lowest score was: “Clues that could establish a relationship with real life should be presented,” with an average of 7.9. This item was related to adult training and the motivation dimension of self-directed learning. An evaluation of the mean scores given by the experts indicates that all of the items received, on average, a score of 8 or above out of 10. This reflects the fact that the field experts largely supported the design principles identified in the literature.

The Features which Interface Designs Supportive of Self-Directed should Possess

Opinions of academicians and experts about the features that interface designs supportive of self-directed learning should have were obtained through an open-ended question in the second section of the expert opinion form. In the analysis of the qualitative data obtained, inductive content analysis was used and the themes were found. Expert opinions and the themes obtained are displayed in Table 5.
Table: 5
Expert opinions and themes obtained

<table>
<thead>
<tr>
<th>Direct quotes</th>
<th>Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;It must be ensured that instant feedback could be provided. All modules</td>
<td>User sensibility</td>
</tr>
<tr>
<td>should be structured automatically according to the user preferences in</td>
<td></td>
</tr>
<tr>
<td>the previous modules.&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;Students should be able to receive feedback about their states in the</td>
<td></td>
</tr>
<tr>
<td>interface whenever they wish.&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;[They] should be able to see where they are within the whole. [They] set</td>
<td></td>
</tr>
<tr>
<td>targets about how far they could go in the next study and the system</td>
<td></td>
</tr>
<tr>
<td>should be able to save this target.&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;There could be certain tools such as references and an index. That is how an</td>
<td>Ease of access</td>
</tr>
<tr>
<td>individual could find whatever they are looking for quickly.&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;Learners should be able to access any component they wish at all times (it</td>
<td></td>
</tr>
<tr>
<td>should be under the control of the learner).&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;Access from varied tools (tablet, pc, smartphone, etc...) should be enabled.&quot;</td>
<td>Compatibility</td>
</tr>
<tr>
<td>&quot;The learning environment should include a large group of current Web 2.0</td>
<td>Social Web-support</td>
</tr>
<tr>
<td>technologies in an embedded or accessible form.&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;In order for learners to plan their learning experiences, they should be</td>
<td>Analytics</td>
</tr>
<tr>
<td>able to access experiences or learning methods of other learners; and in</td>
<td></td>
</tr>
<tr>
<td>order to achieve a certain learning goal, learners should be able to</td>
<td></td>
</tr>
<tr>
<td>access the systems that could provide a list of the most appropriate or</td>
<td></td>
</tr>
<tr>
<td>alternative activities...&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;Interface analytics should be presented in order for learners to evaluate</td>
<td></td>
</tr>
<tr>
<td>the process, determine the learning methods, set goals and targets, and</td>
<td></td>
</tr>
<tr>
<td>monitor their own learning processes.&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;... such components that could create curiosity and willingness to learn by</td>
<td>Motivation</td>
</tr>
<tr>
<td>the learner should be added.&quot;</td>
<td></td>
</tr>
</tbody>
</table>

Expert opinions showed that there were six themes with respect to the characteristics that Web designs should possess in order to ensure self-directed learning. According to these themes, a Web interface design, which is supportive of self-directed learning, should be user sensitive, ensure ease of access, be compatible in diverse environments, provide social web support, make use of learning analytics, and be motivating.

**DISCUSSION**

This study concluded certain significant findings. The most important finding was the determination of the interface design principles for self-directed learning, which was obtained through field expert opinions. Principles obtained from the literature review and expert opinions are listed in Table 5 below.
Table 6
Comparison of interface design principles for self-directed learning

<table>
<thead>
<tr>
<th>Literature Principles</th>
<th>Expert Principles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. It must be ensured that learners are able to keep track of their own improvement.</td>
<td>1. It should be user-directed.</td>
</tr>
<tr>
<td>2. Self-learning should be promoted.</td>
<td>2. It should ensure ease of access.</td>
</tr>
<tr>
<td>3. Image, video, and graphic support should be given.</td>
<td>3. It should be compatible in varied learning environments</td>
</tr>
<tr>
<td>4. Components that enable learners to communicate should be included.</td>
<td>4. It should provide social web support.</td>
</tr>
<tr>
<td>5. Components that could be regulated by learners on their own should be included.</td>
<td>5. It should make use of learning analytics.</td>
</tr>
<tr>
<td>6. Design variety should be ensured.</td>
<td>6. It should be motivational.</td>
</tr>
<tr>
<td>7. Learners should be allowed to add and remove interface components.</td>
<td></td>
</tr>
<tr>
<td>8. Learners should be enabled to evaluate themselves.</td>
<td></td>
</tr>
<tr>
<td>9. Varied learning resources should be included.</td>
<td></td>
</tr>
<tr>
<td>10. Time management tools should be provided.</td>
<td></td>
</tr>
<tr>
<td>11. Previous learning should be recalled.</td>
<td></td>
</tr>
<tr>
<td>12. Learners should be supported in terms of studying regularly.</td>
<td></td>
</tr>
<tr>
<td>13. Clues that could establish a relationship with real life should be presented.</td>
<td></td>
</tr>
</tbody>
</table>

Table 6 shows that the interface design principles obtained from the literature, which are supportive of self-directed learning, were parallel to the principles obtained from the field experts. The principles deemed parallel to each other were presented in the same color in the table. Principles that were not highlighted in a color were combined under the motivation principle. Accordingly, through the combination of the principles obtained from the literature review with those obtained from the field experts, the study concluded with six principles. Since ease of access could be considered alongside the user-directedness principle, these two principals were combined. Compatibility in diverse environments was changed to “variety” in order to include design, media, and platform support. Social Web support was referred to as “being sharing-oriented,” while being relevant to real life was considered within the scope of the “motivation” principle.

In light of these findings, interface designs, which are supportive of self-directed learning, should possess five major characteristics, namely being user-directed, ensuring variety, being supported by learning analytics, being motivational, and being sharing-oriented. The five major principles are displayed in Figure 3.

With respect to the user-directedness and being supportive, the selection of task and purposes (including the learning opportunities provided) should be performed by the user and the support provided by the system should simultaneously be related to the user tasks. Interface design should be open-ended, complicated, and varied to the extent that the user should face certain challenges. That is how users could attribute meanings to the system, cope with the challenges faced, and learn from these experiences. Learning analytics are essential for the users in terms of monitoring their own improvement as well as comparing their learning process to that of the others. Furthermore, the inclusion of certain clues relevant to real life and those that create curiosity could be useful in promoting learner’s motivation. Finally, in interfaces supportive of self-directed learning, the provision of communication and sharing platforms where all stakeholders could learn from each other are quite essential.
CONCLUSION AND RECOMMENDATIONS

The current study, which is about the development of educational Web interfaces that support self-directed learning, is essential for the learners who take the responsibility for self-learning as well as the educational Web interface designers. Therefore, it is believed that the interface design principles determined in this study would be used in various fields. In addition to the interface design principles that are supportive of self-directed learning, certain new characteristics about self-directed learning were also identified in light of the opinions obtained from the expert participants. Among these characteristics, being user-directed, ensuring variety, being supported by learning analytics, being motivational, and being sharing-oriented stood out. These characteristics are generally in line with the characteristics determined by Fischer and Scharff (1998). In addition, support by learning analytics is similar to Kashihara and Hasegawa’s (2003) finding that components tracking user navigation in the web environment are necessary for self-directed learning.

Web interfaces are used in presenting e-learning tools and environments that are developed for learners. Thus, it is believed that the findings of this study would contribute to the self-directed learning of adults in e-learning environments provided that these applications are performed in line with the principles determined. Based on the study results, it was determined that the design of an interface supporting self-directed learning should present the following features:

- The selection of tasks and goals should be left to the preference and requirements of the learner.
- The components should be open-ended, complex and diverse only to the extent that the users would encounter few difficulties.
- The learner should be able to follow his/her progress and compare his/her learning process with others through learning analytics.
- The interface should provide cues relating to real life that arouses the learner’s curiosity.
- The interface should provide communication and sharing environments that allows the learners/stakeholders to learn from one another.
The presentation of e-books, e-activities, e-tests, educational simulations, and virtual classrooms, which are commonly used within the scope of e-learning opportunities, within educational Web interfaces that are supportive of self-directed learning, contribute to the e-learning tools and environment in achieving their goals. Further studies are recommended to work with a more comprehensive group of participants and to update the required characteristics for the interface designs supportive of self-directed learning. Additionally, experimental research could be conducted in order to determine whether the interfaces, which are designed according to the principles determined within the scope of this study, actually contributed to self-directed learning.

BIODATA and CONTACT ADDRESSES of the AUTHORS

Dr. Mehmet FIRAT is an Assistant Professor of Open and Distance Education at Open Education Faculty, Anadolu University. Dr. Firat gained his Ph.D. in Educational Technology at July, 2012. His academic interest areas are learning analytics, social network analysis, educational hypermedia and multimedia, educational interfaces, open and distance learning, education futures, e-learning, cyber behaviors and use of internet in education. He have over than 15 journal articles published in international indexes, 2 international book chapters and other national and international articles, papers submitted to international meetings.

Dr. Mehmet FIRAT
Department of Distance Education, Open Education Faculty
Anadolu University, 26470 Eskisehir, TURKEY
Phone: +90 222 335 0580 #2463
E-mail: mfirat@anadolu.edu.tr

Dr. Nurhan SAKAR is an Assistant Professor of Management at Open Education Faculty, Anadolu University, Eskisehir, in Turkey. She received her Ph.D. in Management from Anadolu University, MBA from the Baldwin Wallace College-USA and BEc in Economics from Anadolu University. She teaches, Management & Organization, her research interests include management of higher education institutions, managerial issues of small and medium sized enterprises, family businesses, and organizational elements of e-learning environments.

Nurhan SAKAR
Department of Distance Education, Open Education Faculty
Anadolu University, 26470 Eskisehir, TURKEY
Phone: +90 0222 335 05 80 (ext.27-68)
E-mail: nsakar@anadolu.edu.tr

Dr. Isil Kabakci YURDAKUL is an associate professor in Computer and Instructional Technologies Education Department of Education Faculty, Anadolu University, Eskisehir, Turkey. She received her Ph. D. in Computer and Instructional Technologies Education from Anadolu University, Turkey in 2005. She has articles published in international and national journals, papers presented to international and national meetings, published national books and chapters in international and national books about her academic interest area. She served in various projects as executive and researcher. Her academic interest areas are professional development, information and communication technologies integration, instructional design, internet and the child.
REFERENCES


APPENDIX

1. Expert Evaluation Form

EXPERT EVALUATION FORM FOR THE INTERFACE DESIGN PRINCIPLES SUPPORTIVE OF SELF-DIRECTED LEARNING

Dear Expert,

Self-directed learning is defined as an individual learning approach in which individuals plan their own learning experiences, implement their plan and evaluate their own learning experiences. In this study, it is aimed to determine the characteristics that the interface designs supportive of self-directed learning should possess. In the light of this aim, an expert evaluation form consisting of two sections has been created; the first section of the expert evaluation form involved the evaluation of the principles, which were obtained through the literature scan. In the second section, experts are expected to suggest their own principles with respect to interface designs supportive of self-directed learning.

Thank you for your contribution!

SECTION I

Please choose the best option that reflects your opinion about the appropriateness of each principle to interface designs that are supportive of self-directed learning through scoring the numbers on the right for each principle described below.

<table>
<thead>
<tr>
<th>In interfaces that are supportive of self-directed learning.</th>
<th>Poor</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>It must be ensured that learners are able to keep track of their own improvement.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learners should be supported in terms of regular studying.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Previous learning should be recalled.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learners should be enabled to add and remove interface components.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Components that could be regulated by learners according to themselves should be included.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learners should be enabled to evaluate themselves.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-learning should be promoted.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time management tools should be provided.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cues that could establish a relationship with real life should be presented.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Image, video, and graphic support should be provided.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design variety should be ensured.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Varied learning resources should be included.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Components that enable learners to communicate should be included.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SECTION II

Please write your personal suggestions for principles about interface designs supportive of self-directed learning.
ANNOTATION-BASED LEARNER’S PERSONALITY MODELING
IN DISTANCE LEARNING CONTEXT

Nizar OMHENI
Institute of Computer Science and Management
Kairouan University, Tunisia

Anis KALBOUSSI
Institute of Computer Science and Management
Kairouan University, Tunisia

Omar MAZHOUD
Institute of Computer Science and Management
Kairouan University, Tunisia

Ahmed Hadj KACEM
Faculty of Economics and Management
Sfax University, Tunisia

ABSTRACT

Researchers in distance education are interested in observing and modeling learners’ personality profiles, and adapting their learning experiences accordingly. When learners read and interact with their reading materials, they do unselfconscious activities like annotation which may be key feature of their personalities. Annotation activity requires the reader to be active, to think critically, to analyze what has been written, and to make specific annotations in the margins of the text. These traces are reflected through underlining, highlighting, scribbling comments, summarizing, asking questions, expressing confusion or ambiguity, and evaluating the content of reading. In this study, we present a new approach to build learners’ personality profiles based on their annotation traces yielded during active reading sessions. To validate our approach, we invited 100 volunteers ranging in age from 22 to 50 years old. The participators were instructed to utilize our system to achieve their reading and annotation activities. We apply the paired t-test to evaluate the system’s efficiency to measure user’s human traits versus the scores of his personality traits measured using the Neo-IPIP inventory. The experimental results show the system performance to measure, with reasonable accuracy, the scores of learner’s personality traits.

Keywords: Annotations, learner’s personality traits, personality computing, learning personalization, learner modeling.

INTRODUCTION

"It’s evident for anyone who has taught a course that students are not a homogeneous group. They come into courses with major individual differences among their level of knowledge about subject matter content, their intellectual and meta-cognitive skills, their beliefs and attitudes toward the topic and toward learning" (Ambrose & Lovett, 2014, p. 7) as well as their human personality characteristics. For such reasons, some students in some classrooms might learn more than students in the same or another classroom. Thus, it’s necessary to adapt teaching activities to different student characteristics.
Personality traits are one of the student's individual characteristics which extensively interest educational experts. Several works have shown the significant correlation of learners' personality characteristics to diverse learning parameters (academic performance, learning achievement, learning motivation, online course impressions, learning styles, learning approaches, etc.) which demonstrates the necessity to learn about students' personality to support them efficiently during their learning activities (Ariani, 2013; Jensen, 2015; Chue, 2015; Zhou, 2015; Xie, & Zhang, 2015; Al-Naggar, Osman, Ismail, Bobryshev, Ali, & Menendez-Gonzalez, 2015; Zhou, & Intaraprasert, 2015; Ghazi, Shahzada, & Ullah, 2013; Ibrahimoglu, Unaldi, Samancioglu, & Baglib el, 2013; Harley, Carter, Papaionnou, Bouchet, Landis, Azevedo, & Karabachian, 2016; Komarraju, Karau, Schmeck, & Avdic, 2011; Pornsakulvanich et al., 2012; Sahinidis, Frangos, & Fragkos, 2013; Shahri, Javadi, & Esmael, 2012). These scholars, as well as, others show how important to change the traditional "one-size-fits-all" educational system to respond to learner's individual characteristics and needs. Actually, students cannot be educated with the same pacing, resources, and instructional pedagogy due to their diversity.

For instance, (Al-Dujaily, Kim, & Ryu, 2013) show the impact of personality traits (introversion vs. extroversion) on learners' motivation and ability to learn with adaptive e-learning system. Such empirical works constitute theoretical basis for applications tending to develop classrooms that are student-centered (El Bachari, Abdelwahed, & El Adnani, 2010; Fatahi, Kazemifard, & Ghasem-Aghae, 2009; Fatahi, Moradi, & Kashani-Vahid, 2016; Faria, Almeida, Martins, Gonçalves, & Figueiredo, 2015).

Researchers in education emphasize the importance to consider learners’ personality differences in teaching which can lead consequentially to student’s positive academic outcomes (Ambrose & Lovett, 2014; Seifert & Sutton, 2009).

In the digital era, organizations and institutions are increasingly moving toward adopting distance learning. Several works show the students’ positive attitudes and views towards distance education (Gurbuz, 2014; Sad, Goktas, & Bayrak, 2014; Stanley, 2015; Chong, Francis, Cooper, Abdullah, Hmwe, & Sohod, 2016). The online method of learning uses the web as the medium for delivering instruction to a remote audience, so it is challengeable to diversify instructions according to students’ characteristics. To do so, we need to implement effective online instructional systems based on proven and sound theories from science of learning and to have a full imagine of any learner as a way for personalizing, monitoring and evaluating online teaching process.

By reference to the richer literature on relation between personality and learning process, experts in e-learning domain suggest that the attractiveness of virtual learning environments would be increased by inserting the human personality characteristics in these environments. For instance, (Fatahi et al., 2009) propose a new model presented according to the learning model based on emotion, personality and the model of virtual classmate. In first step, the proposed system identifies learner’s personality using the Myers-Briggs Type Indicator (MBTI) questionnaire. Thereafter, the virtual teacher and classmate express suitable instructional behaviors to improve the learning process according to the identified learner’s personality model and emotional status. The experimental results show the significance of the proposed instructional approach to increase learning quality and to satisfy learners. (Abrahamian, Weinberg, Grady, & Stanton, 2004) show the significant effect of personality-aware human-computer interface on learning process. Indeed, the authors design a set of user interfaces which fit personality types identified using the MBTI test. Then, they provide a given user interface to participants with the matching personality type. They find that users prefer user interfaces designed for their own personality type. This finding indicates the positive effect of personality-aware user interfaces on learning. (El Bachari et al., 2010) suggest an Adaptive e-learning model based on learner’s personality. The proposed system uses the MBTI psychometric test to recognize learner's personality and suggests a learning style that matches his preferences.
The previous works have mostly relied on self-report measures to explicitly acquire users' personality, which unavoidably demands user efforts. From users’ perspective, they are sometimes unwilling or unable to provide accurate reports of their own psychological attributes or just unwilling to answer the quiz for the sake of saving efforts or protecting their privacy. This method of personality measure has a potential inaccuracy because of its lack of objectivity and a bias due to cultural influences. To overcome these limitations, we are motivated, in this study, to show how to implicitly derive users’ personality from their behavior data. While personality manifests itself in an abundance of cues, this work focuses only on cues from reading and writing behaviors. Specifically, we are interested to personality computing based on users’ annotation cues.

The layout of the remainder of this study is as follows. First, we present the credibility issue of learner’s personality modeling in online learning context. Then, we show reader’s personality markers in handwritten annotations. Thereafter, we propose a computational model used to recognize learners’ personality traits through their digital annotations. Next, we evaluate the system’s performance to measure accurately the Big Five scores of learners’ traits. Finally, we discuss our results, we draw some conclusions and we suggest certain possible directions for future works.

ISSUE OF MODELING LEARNER’S PERSONALITY IN ONLINE LEARNING CONTEXT

Although the findings of previous works are fruitful, we believe these researches have left certain open issue related to the followed approach to collect required data to model learners’ personality profiles. In distance learning context using psychometrics standards which are a standards and scientific methods used to measure individuals’ mental capabilities, behavioral style and personality traits, to determine learners’ personality has many challenging aspects related to the validity of self-reported data. The crucial aspect to consider in user profiling process, is to model a credible student’s profile that reflects truly learner’s characteristics in the online learning environment (Chieu, Luengo, Vadcard, & Tonetti, 2010; Gong, Beck, & Heffernan, 2011; Lintean, Rus, & Azevedo, 2012). The contact with test-takers using online psychometric tests is indirect, and because of the diminished control over the testing situation, there is no way to confirm that they have understood instructions and/or items correctly or to provide them with ongoing guidance (Barak, 1999). This situation may affect the reliability of the test results. Furthermore, the users tend usually, to preserve their privacy over web, and they are not ready to reveal their personalities information through filling psychometric forms. Consequently, the test-takers, either, do not fill the forms or cheat the answer when the motivation to do is obvious (Barak, Buchanan, Kraus, Zack, & Stricker, 2004). According to psychology experts, the personality tests are designed to be administered under controlled and standardized conditions which are not the case of the Web-based assessments tests (Barak et al., 2004). As a way to collect a credible data from people, certain psychologists seek to alternative measurement instruments that reduce participants’ ability to control their responses and do not require introspection for the assessment of psychological attributes (Gawronski & De Houwer, 2014).

Several works shed the light on the possibility of personality computing through users’ observed actions or their captured digital behavioral-residues in different on-line working environments. In this scope, there is an increasing interest in understanding human perception based on reading and writing behaviors. Many researchers are interested to study the ability to profile users’ personality from human text production and peculiarities of reading behaviors. For instance, (Celli, 2012; Mairesse, Walker, Mehl, & Moore, 2007; Wright & Chin, 2014) show the opportunity to derive users’ personality from text and linguistic cues. Further works suggest extracting personality traits from users’ hand writing (Fisher, Maredia, Nixon, Williams, & Leet, 2012; Grewal & Prashar, 2012; Prasad, Singh, & Sapre, 2010; Rahiman, Varghese, & Kumar, 2013). Other researchers are interested to extract users’ trait from posts written in online social spaces (Iacobelli, Gill, Nowson, & Oberlander, 2011; Sumner, Byers, Boochever, & Park, 2012). (Mezghani, Zayani, Amous, & Gargouri, 2012) propose to derive personality from social annotations and (Jackson, 2001;
Omheni, Mazhoud, Kalboussi, & HadjKacem, 2014) show the relation between readers’ personality and their annotation traces made during reading activity.

We aim by the current work to present new mythology of personality modeling in computer-based learning systems. Our goal is to increase the credibility of learner’s personality profile by computing the required data, implicitly, based on learner’s observed annotation traces.

PERSONALITY MARKERS IN ANNOTATIONS

Annotation is a handwritten practice which bridges between reading and writing (Marshall, 1998) and constitutes the most prominent habit of reading activity (Lamb, 2007). The annotation activity is "basic and often unselfconscious ways in which readers interact with texts" (Marshall, 2009, p. 38). Furthermore, the annotation is described as a natural human activity that is used in daily life as an integral part of reading activity (O’hara & Sellen, 1997). Kirwan (2010, p. 5) considers reader’s marginalia (annotations) as: the “most direct, reactionary response to the text that can feasibly be considered” to study the relation between the reader identity and the text. According to (Kirwan, 2010), annotations provide the link between reader, text, and meaning and reflect the subjective individuality of the annotator’s responses to the text. Based on this subjective relationship, the author suggests expanding the psychology-based reader theory to include reader’s annotation practices.

Every annotator has unique individual patterns in making annotations (Naghsh, 2007). According to (Jackson, 2001, p. 5), “if you ask annotators today what systems they use for marking their books and where they learned them, they generally tell you that their methods are private and idiosyncratic”. Hence, the individuality of annotation patterns shows that there can be some sort of connection between annotation practices and annotator’s personality. (Jackson, 2001, p. 87) assumes that "marginalia [annotations] express a reader's impulsive and unguarded reactions to a book" and she "consider[s] them to be an exceptionally reliable guide to personality".

In this essay we suggest utilizing digital annotations to compute learner’s personality in online learning environment. In what follow, we explain which type of personality trait we are going to take into account in our study. Then we present our prior work that shown the connection relation between learners’ personality and their handwritten annotations.

The Big Five Personality Model

The big five personality model is the best accepted and most commonly used scientific measure of personality that has been extensively researched (Peabody & De Raad, 2002). Human personality is well described as five traits were discovered through the study of adjectives from natural language that people used to describe themselves. The five traits representing the main personality dimensions are: Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism.

Prior Work

In prior work, we conducted an empirical study to show the implicit relation between the reader’s annotations and his personality traits (Omheni et al., 2014). We consider a sample of 120 volunteers. The subjects selected were recruited with respect to certain criteria. In fact, the volunteers’ ages are equal or superior to 18 and they have different occupations and interests. In our sample we have the two sexes (44 women and 76 men). Furthermore, all the participants have the habit to annotate their documents while reading. Each subject was instructed to answer a standard Five Factor Model questionnaire (the NEO-IPIP Inventory). This step gives us the personality scores based on the Big Five Model for each volunteer. To associate personality scores to subjects’ annotative activities, we gathered annotation practices for each participant and we collected a simple set of statistics about his annotative activity (TNAA: Total Number of Annotation Act; ANAA: Average Number of
Annotation Act; NGAA: Number of Graphical Annotation Act; NTAA: Number of Textual Annotation Act; NRAA: Number of Reference Annotation Act; NCAA: Number of Compounding Annotation Act). The set of statistics tends to characterize quantitatively the reader’s annotation practices. We studied the Pearson correlation between subjects’ personality scores and each of the features obtained from analyzing their annotative activities. We reported the correlation values in table 1.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Openness</th>
<th>Conscientiousness</th>
<th>Extraversion</th>
<th>Agreeableness</th>
<th>Neuroticism</th>
</tr>
</thead>
<tbody>
<tr>
<td>TNAA</td>
<td>-.059</td>
<td>.128</td>
<td>-.138</td>
<td>.089</td>
<td>-.287*</td>
</tr>
<tr>
<td>ANAA</td>
<td>.003</td>
<td>.080</td>
<td>-.210*</td>
<td>.163</td>
<td>-.183*</td>
</tr>
<tr>
<td>NGAA</td>
<td>-.067</td>
<td>.040</td>
<td>-.130</td>
<td>.105</td>
<td>-.207*</td>
</tr>
<tr>
<td>NTAA</td>
<td>.001</td>
<td>.182*</td>
<td>.040</td>
<td>.085</td>
<td>-.211*</td>
</tr>
<tr>
<td>NRAA</td>
<td>-.075</td>
<td>.045</td>
<td>-.122</td>
<td>.077</td>
<td>-.207*</td>
</tr>
<tr>
<td>NCAA</td>
<td>-.059</td>
<td>.012</td>
<td>-.147</td>
<td>.014</td>
<td>-.219*</td>
</tr>
</tbody>
</table>

Note. *p<.05

Conscientiousness is positively related to number of textual annotations. The rest of the correlation values are not considerate because of p-value > 0.05. But this is not a reason to reject definitively the rest of annotation features as a larger sample size may produce other significant correlations. Extraversion is negatively correlated with the average number of annotation act. Neuroticism is negatively correlated with all the annotation features. Here, the sample size is sufficient to procure significant correlations for all the considered features.

Furthermore, we make predictions about subject’s personality based on multiple annotation features. Our findings show that Neuroticism and Conscientiousness can be predicted with reasonable accuracy using the different annotation features, whereas other traits are more difficult to be predicted (Table. 2). Based on the values of the coefficient of multiple determinations $R^2$ which measures the strength of the correlation fit and the F-test which measures the statistical significance of the collective influence that have the annotation features on the personality traits presented in table 2, we show that prediction regarding Conscientiousness is reasonably accurate, with $R^2$ value of 0.12, $F_{observed}$ value of 2.52 which exceeds $F_{critical}$ value and P-value of 0.03 which is lower than $\alpha$ value where P-value is the probability of the F-test statistic is larger than the observed F-value. For Neuroticism we obtained the model with the best fit, with an $R^2$ value of 0.14, $F_{observed}$ value of 3.11 and P-value of 0.01, indicating quite accurate prediction. The model for Extraversion has a lower fit and the model for Agreeableness is even less accurate. It seems that Openness is the hardest trait to predict using annotation features.
Table 2
Predicting Personality Traits Using Annotation Features through Multivariate Linear Regression

<table>
<thead>
<tr>
<th>Personality Trait</th>
<th>$R^2$</th>
<th>F-test</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Openness</td>
<td>.03</td>
<td>.57</td>
<td>.76</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>.12</td>
<td>2.52</td>
<td>.03*</td>
</tr>
<tr>
<td>Extraversion</td>
<td>.07</td>
<td>1.32</td>
<td>.25</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>.05</td>
<td>1.03</td>
<td>.41</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>.14</td>
<td>3.11</td>
<td>.01*</td>
</tr>
</tbody>
</table>

Note. *p<.05

EXTRACTION OF LEARNER'S PERSONALITY TRAITS FROM DIGITAL ANNOTATIONS

Based on what previously cited, it is plain that reader's annotation is really an expression of his personality traits. Indeed, we show very plainly that the considered annotation features in our study may appear insignificant in them-selves, but, they are nevertheless all very significant as indications of the annotator's personality traits.

Recent researches endeavor to replace the "pen-and-paper" paradigm for the annotation needs by employing the technology of free form digital ink annotations which add the flexibility and natural expressiveness of the traditional handwriting method to the digital annotation process. Such tools enable readers to annotate their digital documents similarly to "pen-and-paper" case. These tools refer to user studies examining the paper-based annotation that analyze readers' annotation behavior during the learning process (Nunes, Kawase, Dietze, de Campos, & Nejdl, 2012; Steimle, Brdiczka, & Mühlhäuser, 2009). Such works provide several insights to fully comprehend the desired annotation features needed on the digital support. Hence, the digital annotation context becomes very similar to the context of "pen-and-paper". Due to the proximal similarity among these two contexts, we are motivated to apply our previous findings in the digital context to automatically predict users personality traits based on their annotations.

The proposed system called "i-Read" is an online reading environment where learners can upload their reading materials, practice their habit of annotation and share their annotated documents with others. Figure 1 illustrates interactions between the various modules of "i-Read" system along with the flow of data. The system's architecture consists of user annotation interface, the annotation analyzer module, the profile constructor module and three databases with two servers. To avoid destroying the original version of reading materials, our system uses an independent annotation database, which differs from the documents database, to store annotations' parameters and contexts from learners. The annotation interface provides several powerful annotation functionalities, such as scribbling, highlighting, underlining, commenting, as a way to engage users actively with their reading contents.
The Annotation Analyzer Module
This module is used to observe reader’s annotations yielded during a reading session and to compute certain parameters related to the total number of annotations, average number of annotations (number of annotation per one page of document reading), number of graphical annotations, number of referential annotations, number of textual annotations and number of composed annotations. The Annotation Analyzer Module tracks annotations of the connected user and stored them in a relational database. In our concept, a user annotation trace is an act that affects an element of the document reading. The annotations are tracked and stored with their parameters which are the following:

1. **Target:** contains the values of coordinate points that define the annotated element in the logical structure of document reading,
2. **Body:** the content of the annotation trace
3. **Sign:** we classify annotations in three general categories. This categorization is based on how annotations can appear and be represented: (a) textual annotation expressed by a piece of text added to the annotated document; (b) graphic annotation expressed by a graphic mark added to a document; (c) reference annotation expressed by a link between two texts or two textual pieces in the same document.

Agosti & Ferro (2003) called the three categories of visual signs as the basic ways to represent annotations. Furthermore, they define the term sign as a formation of a meaning that can be combined together to express more complex signs of annotation.

In our work, we consider the annotation sign parameter as the main characteristic which constitutes the cornerstone to study quantitatively the digital annotation activity. In fact we compute certain features with reference to the visual sign of annotation traces (graphic, text, reference, composed). Technically, to implement the system annotation tool, we refer to Annotator.js library. The annotation model adopted in our work follows a simple JSON format with three fields:
Where “anchor” (target) is the specifications used to position the annotation on the reading material. Technically, we have used the anchoring strategy inherited from the Annotator project, which anchors annotations to their targets by saving exact locations in the form of XPath range descriptions to the involved DOM elements and the string offsets inside them. When the anchor needs to be located again, the DOM elements are found by using the same XPath expressions. Regarding the other annotation’s parameters, “text” is the body of the annotation to show, and “type” (sign) is the kind of annotation.

The Profile Constructor Module
The profile constructor module is used to predict readers’ personality scores through their observed annotations. To compute user’s traits we utilize the multivariate linear regression algorithm. The following equation represents the mathematical format of the collective influence of the considered annotations’ features on one single personality traits.

\[ Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 \]

*Y* is the predicted or expected value of the dependent variable representing the score of the focused user’s personality trait. *X_1* through *X_6* are the distinct independent or predictor variables representing the different annotation features considered in our study. *b_0* is the value of *Y* when all of the independent variables (*X_1* through *X_6*) are equal to zero. *b_1* through *b_6* are the estimated regression coefficients. Based on this mean function, we can determine the expected annotator’s personality trait as long as we know certain peculiarities characterizing quantitatively his annotation practices. We cite in table 3 the different estimated regression coefficients used to predict scores of reader’s traits given the values of the different considered features (x variables).

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Conscientiousness</th>
<th>Neuroticism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept (<em>b_0</em>)</td>
<td>21.82</td>
<td>70.06</td>
</tr>
<tr>
<td>Number of Graphical Annotations (<em>b_1</em>)</td>
<td>.66</td>
<td>.18</td>
</tr>
<tr>
<td>Number of Reference Annotations (<em>b_2</em>)</td>
<td>-.02</td>
<td>-.13</td>
</tr>
<tr>
<td>Average Number of Annotations (<em>b_3</em>)</td>
<td>.14</td>
<td>0</td>
</tr>
<tr>
<td>Total Number of Annotations (<em>b_4</em>)</td>
<td>-.81</td>
<td>-.38</td>
</tr>
<tr>
<td>Number of Textual Annotations (<em>b_5</em>)</td>
<td>.32</td>
<td>-.06</td>
</tr>
<tr>
<td>Number of Compounding Annotations (<em>b_6</em>)</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

System Operation Procedure
Based on the system architecture (Fig.1), the functional scenario of "i-Read" system is described and summarized as follows. First of all, the learner should connect to "i-Read" environment to upload his reading document. In second step, the system saves the document in the documents repository. Thirdly, the learner can start reading and annotating his document. Fourthly, the system saves learner’s annotations in the Annotations repository. In fifth step, the annotation analyzer module captures learner’s annotations and extracts certain quantitative features. Sixthly, the annotation analyzer
module sends the computed information to the profile constructor module to build learner's personality profile. Seventhly, the profile constructor module considers the received information as an input data to the multivariate linear regression algorithm used to estimate scores of learner's traits. Finally, the system saves the modeled user's profile in the Profiles repository.

**EVALUATION OF “I-READ” SYSTEM’S PERFORMANCE**

In this section, we are interested to check the performance of our system for personality recognition compared to the Neo-IPIP inventory which is the most scientifically based test of personality traits, and is generally accepted worldwide as one of the more highly regarded, and accurate, personality questionnaires.

**Participants**
We recruited 100 volunteers (35 women and 65 men) aged between 22 and 50 years. Most of the participants have the professorship degree in scientific or literary disciplines. All the invited people have participated in our prior experimentation. We have the decision to re-invite the same people because they have the required criteria to participate in present experimentation. Indeed, they are academic people who have the habit to annotate documents while reading. The majority of the selected participants are graduates. Generally, this category of people is serious and motivated to make annotations during their reading activities. Furthermore, they are good practitioners of annotations and conscious of its efficiency in academic achievement and learning performance.

**Procedure**
We instructed the participants to upload their textual materials on the "i-Read" environment and to use the system to achieve their reading and annotation activities (Fig.2). The volunteers are free to select their reading contents that interest them and the text’s written language (English, Arabic or French) all depends to their linguistic skill. The sample members did not differ on their reading comprehension abilities. The majority of participants indicated that they had prior knowledge in the topic of their reading materials. The selected documents aren’t hard, so they didn’t need much cognitive effort from readers’ side. We consider all the previous conditions because we are very careful to the comfortability of participants during their reading activities. These conditions may guarantee their spontaneous and natural reactions. In the second step, we instructed participants to answer the standard Five Factor Model questionnaire (NEO-IPI P Inventory) to compute scores of their personality traits. In third step, we are interested to evaluate system’s performance to compute accurately learner’s scores of conscientiousness and neuroticism traits compared to the values determined using the NEO-IPIP Inventory. We applied the Pearson Product Moment Correlation to measure the linear correlation between the traits scores obtained through the two different systems. We also measure the root-mean-square error (RMSE), which are the root mean squared differences between predicted values (scores measured with i-Read system) and observed values (scores measured with Neo-ipip inventory).
RESULTS and DISCUSSION

We report the statistical coefficients values in table 4 and 5 for the conscientiousness and neuroticism traits respectively. Given that correlations are significant ($p < 0.05$) for both consciousness and neuroticism traits and the lower values of RMSE and Mean, we show the regression models for the considered personality traits are well-fitting and the predicted values close to the observed data values which means that there is no significant difference between the scores of user’s personality traits computed using the "i-Read" system and those measured using the Neo-IPIP inventory.

<table>
<thead>
<tr>
<th>Scores measured with</th>
<th>Mean</th>
<th>RMSE</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;i-Read&quot; system</td>
<td>.</td>
<td>.</td>
<td>*</td>
</tr>
<tr>
<td>Neo-IPIP inventory</td>
<td>.02</td>
<td>.10</td>
<td>.03*</td>
</tr>
</tbody>
</table>

Note. *$p<.05$

<table>
<thead>
<tr>
<th>Scores measured with</th>
<th>Mean</th>
<th>RMSE</th>
<th>P-value</th>
</tr>
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<tbody>
<tr>
<td>&quot;i-Read&quot; system</td>
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<td>.</td>
<td>*</td>
</tr>
<tr>
<td>Neo-IPIP inventory</td>
<td>.03</td>
<td>.10</td>
<td>.01*</td>
</tr>
</tbody>
</table>

Note. *$p<.05$

Several works interested to design personality-based online learning systems utilize classical methods to recognize learners’ personalities which tend to focus on questionnaires. Such works enter their participants into a cash prize draw to externally motivate them toward the experimental task (Al-Dujaily et al., 2013; Kim et al., 2013). Without such external motivational acts, learners are not ready to answer a range of 40 or more questions about their personality information. Usually, learners prefer to preserve...
their privacy and refuse communicate their personal information with third party. Personality recognition based on learners’ annotations is not presented here as a replacement for psychometric tests, but rather as additional information that may help combat some of the difficulties encountered with questionnaires. Possibly the biggest advantage is that personality traits measurement through annotation traces can be taken in parallel with the interaction rather than wearying the learner to answer a long form or too many questions.

On the other hand, based on our findings, we show the neuroticism trait is negatively correlated to the different annotation features considered in our study. This result clearly indicates that learners with high level of emotional stability are more productive of annotation traces which reflect their deep reading of textual material. Thus, those who have low score of neuroticism are more stable and they have the ability to focus more on their current activities and they can deal with reading materials qualified with high level of complexity. Regarding the consciousness trait, we show this trait is correlated positively to annotation features. This evidence reflects that conscientious learners produce more annotation traces during their reading. We may interpret the case that learners who have high degree of conscientiousness choose to read their reading materials deeply.

Based on previous interpretations, we believe that learners with high degree of consciousness and high level of emotional stability are more able to deal with hard textual materials through using annotation skill, knowing that the process of annotation is viewed as learning strategy used to improve reading comprehension and favors deeper processing and understanding of text (Brahier, 2006; Brown, 2007; Huang, 2014; Porter-O’Donnell, 2004). For those who have low level of consciousness and high level of anxiety should be treated carefully to enhance their reading comprehension performance. These evidences may be viewed as guide to design personality-based learning system of online reading classes. Actually, many learning systems offer annotation functionalities to their users to increase their reading performance (C.-M. Chen et al., 2012, 2014; Yueh et al., 2012). Such works show the efficiency of annotation tools to enhance users’ learning experience. We think that our work is step forward for these works to use annotation traces as indicator of learners’ personality traits that reflects their reading performance level. This information may be helpful to assist learners having difficulties in reading comprehension. Finally, although our results are promising and constitute a new tendency in computing learners’ personality traits based on their behavioral residues of reading and writing activities in online learning environment, some limitations need further consideration. The most important issue is the sample size as we expect more significant results around the relation between annotations and readers’ traits (agreeability, extraversion and openness) with a larger sample. On the other hand, we limited our study to graduate students with experience in annotation. On this future work, we are interested to normal students who may have or not experience in annotation. Furthermore, our study is based on linear correlation model, but digital annotations and personality may not be linearly correlated. This consideration may be viewed as limitation of current work. We expect trying advanced non-linear models, or polynomial regression in future works. Also our research can be extended to study the influence of readers’ demographic characteristics (gender, age...) and further factors which may, likely, influence annotation behavior such as familiarity with annotation tools and interest in the content topic.
CONCLUSION

This study investigates the possibility of personality recognition based on digital annotations. This is a new tendency in personality-computing research area and a step forward for indirectly assessing learners’ personality in online learning environment. The relation between learners’ personality traits and their annotation activities may reflect their reading performance level, which is helpful to assist students who have difficulties in reading comprehension. To overcome shortcomings of reading online, we try to design a collaborative learning system which enables students to upload, annotate and share their personal reading experiences. This strategy has the potential to facilitate understanding of reading texts and helps to develop a reader into a writer and promote collaborative learning. We suggest classified learners, according to their scores of neuroticism and consciousness traits, to good reader, ordinary reader, and poor reader. Those suffering of reading comprehension will receive the annotations of skilled readers. In “i-Read” reading environment there is no instructors, just the students teach each other through sharing their learning experiences and knowledge. In future paper we’ll give more details about this work and the conducted experiments to show the efficiency of the proposed approach to support learners with low online reading abilities.

BIODATA and CONTACT ADDRESSES of the AUTHORS

Nizar OMHENI is Ph.D student at Faculty of Economics and Management, University of Sfax. He is a member of ReDCAD Laboratory, National School of Engineers of Sfax Department of Computer Science and Applied Mathematics. Omheni is Assistant Professor at High Institution of Computer Sciences and Management of Kairouan University.

Nizar OMHENI
Sahabi 4 city, Ukranian Street, House n°69, Kairouan 3100.
Phone: +216 29 214 107 / +216 58 914 107
e-Mail: nizar.omheni@isigk.rnu.tn

Anis KALBOUSSI received his Master’s degree and his PhD in Computer Science from the Higher Institute of Computer Science and Management of Kairouan and the Faculty of Economics and Management of Sfax in 2011 and 2015, respectively. He is currently an Associate Professor in Computer Science at the University of Kairouan, Tunisia. He is a member of the ReDCAD Research Laboratory. His current research areas include Technology Enhanced Learning, Semantic Web, Personal Information Management, Web Services, and Metadata-annotation.

Anis KALBOUSSI
Higher Institute of Computer Science and Management,
Street of Khmais Alouini, Tunisia, Kairouan 3100, TN.
Phone: +216 23 443 099
e-Mail: anis.kalboussi@isigk.rnu.tn
Omar MAZHOUD is Assistant Professor at High Institution of Computer Sciences and Management of Kairouan. He is Ph.D student at Faculty of Economics and Management, University of Sfax. Mazhoud is a member of ReDCAD Laboratory, National School of Engineers of Sfax, Department of Computer Science and Applied Mathematics.

Omar MAZHOUD
Street Khmaies Alouini Tunisia, Kairouan 3131, TN
Phone: +216 98 830 967
e-Mail: omar.mazhoud@isigk.rnu.tn

Ahmed Hadj KACEM is Professor in Computer Science at the Faculty of Economics and Management of Sfax University. He is Director of Faculty of Economics and Management, University of Sfax. He is a member of ReDCAD laboratory, Department of Computer Science and Applied Mathematics National Engineering School of Sfax (ENIS), University of Sfax, Tunisia ACM professional member. Kacem is IEEE professional member (Computer Society).

Ahmed Hadj KACEM
Faculty of Economics and Management, University of Sfax,
ReDCAD Laboratory, Road of the Airport Km4Tunisia, Sfax 3018, TN
Phone: +216 98 511 100
e-Mail: ahmed.hadjkacem@fsegs.rnu.tn

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A COMPARATIVE STUDY ON THE MOTIVATION AND ATTITUDES OF LANGUAGE LEARNERS OF ONLINE DISTANCE AND TRADITIONAL IN-CLASSROOM EDUCATION

Dr. Gulten GENC  
School of Foreign Languages  
Inonu University, Malatya, TURKEY

Emine KULUSAKLI  
School of Foreign Languages  
Inonu University, Malatya, TURKEY

Savas AYDIN  
School of Foreign Languages  
Inonu University, Malatya, TURKEY

ABSTRACT

In recent years, the increase in the use of computer and the internet has led to a change in the traditional concept of formal education today. Distance learning as a more student-centered system has been frequently used at universities. In this context, education has been applied to the individuals consisting of all age groups in accordance with their aspirations, expectations and interest in a more flexible way. This study aims to determine and compare the motivation and attitudes of language learners of online distance and traditional in-classroom education, in a state university in Turkey. Participants were 500 undergraduate university students in various disciplines. About 250 (half) of the participants studied English as a foreign language through traditional in-classroom education whereas the rest of the participants (250) studied English through online distance education in the same university by the same instructors. Two questionnaires (one to evaluate motivation level and one to evaluate attitudes of the participants related to English as a foreign language) and a background information form investigating individual information of the participants were used to collect data from the students of nine faculties at the University (including Faculty of Dentistry, Faculty of Pharmacy, Faculty of Education, Faculty of Arts and Sciences, Faculty of Fine Arts and Design, Faculty of Law, Faculty of Economics and Administrative Sciences, Faculty of Engineering, and Faculty of Medicine). According to the nature of the research, the study used descriptive statistics (frequencies, range, means, and standard deviations), t-test and ANOVA as the statistical analysis methods. All collected data were coded and computerized using the SPSS software and the alpha level for the tests was set at .05. After calculating each participant’s motivation and attitudes scores, their scores were compared to the variables selected for the study and each other. The findings indicated statistically significant relationships between motivation and attitudes of the participants and some individual variables. Some conclusions were reached based on the findings of the research and some recommendations and suggestions were made for future research into areas not covered by this study.

Key Words: Motivation, attitude, language learning, distance education.
INTRODUCTION

Technology offers many innovative features that can be used in language education. Distance education has been used over 100 years although the term is popular and new recently. As the primary means of distance learning; correspondence courses were the earlier forms of distance learning which started in Europe. Later, instructional radio and television became more popular and videotaped lectures have followed them. Videotaped lectures have been a standard in university and professional courses for the last two decades. Audiotapes and lessons sent through the mail have also been used in correspondence courses to teach subjects such as foreign language (Imel, 1998; Moore and Lockee, 1998; Teaster and Blieszner, 1999). Today, the Internet and compressed video have taken distance learning in new directions, allowing distance learning to occur in real time.

The term “distance education” has been used to describe the process of providing education where the instructor is distant (geographically separated) from the student (Gallagher and McCormick, 1999), or any instructional arrangement in which the teacher and learner are geographically separated to an extent that requires communication through media such as print or some other form of technology (Moore and Thompson, 1997, as cited in Spooner, Jordan, Algozzine, and Spooner, 1999; Perraton, 1988; Keegan, 1986; Garrison and Shale, 1987, as cited in Sherry, 1996). Greenberg (1998) defines distance learning as “a planned teaching/learning experience that uses a wide spectrum of technologies to reach learners at a distance and is designed to encourage learner interaction and certification of learning” (p. 36). Keegan (1995) states that distance education and training result from the technological separation of teacher and learner which frees the student from the necessity of travelling to “a fixed place, at a fixed time, to meet a fixed person, in order to be trained”. The benefits and drawbacks of distance education have been revealed and studied by various researchers (Wheatley and Greer,1995; Bisciglia and Monk-Turner, 2002). They suggest that distance education provides the learners to save travel time since students and instructors do not have to travel to and from a home campus. Another benefit suggested by them was that students can work on the class according to their own schedules. There are also some drawbacks of distance education mentioned in the previous literature. Baker (1986) thinks that students might have some problems understanding technical, quantitative or scientifically oriented course information. Kahl and Cropley (1983) assert that unlike the traditional classroom, distance education does not allow instructors to modify lecture plans on the basis of moment-to-moment feedback from learners and this can affect the experiences of a student about the distance learning.

Motivation of Language Learners

Gardner’s (1985) social psychological theory of L2 motivation has been used extensively to explore the structure of individual students’ motivation, and links between students’ existing quantity of motivation and their achievement in the L2. The theory comprises the construct of “integrative motivation”, a model of second language acquisition derived from it, and a matching battery of psychometric tests designed to measure a variety of motivational factors (the Attitude/Motivation Test Battery, or AMTB). Motivation in language learning is the “desire to initiate second language learning and the effort employed to sustain it” (Ortega, 2009, p. 168; VanPatten and Benati, 2010). According to Dornyei (1990), there are two basic assumptions underlying the research as motivation in foreign language learning contexts is different in some ways from motivation in second language acquisition contexts and language learning is a series of diverse learning behaviours rather than a uniform process, which is often treated as for simplicity’s sake.

Klesius, Homan and Thompson (1997) put forward that distance education is more likely to be perceived positively when students need the course content, enjoy little or no travel to the instruction site, and are intrinsically motivated. Intrinsic motivation is found to be a significant predictor of persistence and achievement in distance education (Coussement, 1995; Fjortoft, 1996). The novelty effect of the use of a new technology such as e-learning
systems can help create curiosity and increase motivation to learn (Egan and Gibb, 1997). Motivated by the curiosity and demand for knowledge rather than by external reinforcements, learners are more likely to become involved in distance education more deeply and thus experience and enjoy the knowledge acquisition processes to a greater extent (Klesius et al.; Hardy and Boaz, 1997). In another study (Rovai, et al. 2007), multivariate analysis of variance is used to determine if there are differences in seven measures of motivation between students enrolled in 12 e-learning and 12 traditional classroom university courses. Study results provide evidence that e-learning students possess stronger intrinsic motivation than on campus students who attend face-to-face classes on three intrinsic motivation measures such as knowing, accomplishing things, experiencing stimulation. Additionally, Hiltz (1994) supports that distance learning students may have more motivation to achieve than traditional students.

However, Hurd (2005) considers that maintaining motivation levels is a challenge at distance learning. The demands of self-instruction with the shift of control from teacher to learner can be overwhelming for many students. Some students may have difficulty in coping with the amount and range of material at the start and for others, perceived inadequacy of feedback, frustration at unresolved problems, and lack of opportunities to practise with others and share experiences may have an adverse effect on motivation levels.

There are no differences in either three extrinsic motivation measures or amotivation. Allen, Mabry, Mattrey, Bourhis, Titsworth, and Burrell, (2004) stated that there is evidence indicating that technologies involved in distance learning have active effects on the learning process. Besides perceptions of the technologies themselves, various human factors such as personality, attitudes, and skill emerge to influence user reactions to communication technologies used in distance education. They also emphasize that given the extra effort perceived to be required for distance learning (mastering the technology of the course), the achievement scores of distance learning students may be the product of higher levels of motivation than traditional co-present students. The self-selection issue may represent a fundamental threat to the comparison found in the investigations. If distance learning students can be considered non-traditional (sometimes older) compared to face to face students, differential motivation may function as a form of biased sampling when the participant pools are drawn from groups with different reasons and motivations to participate in the particular instructional format.

Attitudes of Language Learners

Attitude is usually defined as a disposition or tendency to respond positively or negatively towards a certain thing such as an idea, object, person, or situation. Students have positive or negative attitudes towards the language they want to learn or the people who speak it. Gardner (1985) sees attitudes as components of motivation in language learning. He states that “motivation ... refers to the combination of effort plus desire to achieve the goal of learning the language plus favourable attitudes toward learning the language” (1985, p: 10). He also adds that the motivation to learn a foreign language is determined by basic predispositions and personality characteristics such as the learner’s attitudes towards foreign people in general, and the target group and language in particular, motives for learning, and generalized attitudes. Wenden (1991) sees attitudes as including three components as the tendency to have a cognitive component, an evaluative component and a behavioural component. He emphasizes that certain attitudes tend to prompt learners to adopt particular learning behaviours. Starks and Paltridge (1996) submit a close relationship between learning a language and the attitudes towards the languages. Csizér and Dornyei (2005) also support the idea that attitude is an important factor in language learning on the internal structure of language learning motivation and its relationship with language choice and learning effort.

While comparing the attitudes of instructors and students towards distance learning, Hannay and Newvine, (2006) find that instructors have conflicting attitudes about distance education. Students may react differently to the online learning environment, depending
on their skill levels and attitudes. To Inman, Kerwin and Mayes, (1999) while the instructors are willing to teach a distance learning class, they rate the courses as equal or lower in quality than traditional courses taught on campus. The students, on the other hand, are highly satisfied with these instructors and the distance courses taught. The students are not concerned about the interaction with the instructor. Drennan, Kennedy, and Pisarski (2005) find in a recent study that student satisfaction is influenced by positive perceptions toward technology and an autonomous learning mode. Clark (1993) states that the instructors who are prefer distance learning are those that are more familiar with the educational technology. Haas and Senjo (2004) indicated that while most held positive views towards the use of technology, far fewer are actually integrating technology-based methods of instruction into their courses.

Thompson (2005) investigated Chinese graduate students’ experiences and attitudes on taking online courses in the USA. According to the results of the study, all participants indicate that online learning is an interesting experience for them but they have mixed attitudes toward this unfamiliar mode of learning. They emphasize that they enjoy easy resource sharing, easy record keeping and convenience of the discussion board the most. However, they are concerned about their writing skills in English, insufficient and deferred feedback and the lack of cultural exchange regarding online learning.

Much of the research about distance education favours it; however, in much of this research, only distance learning students are sampled. To achieve a more realistic picture of how students perceive distance education, it is important to question students who have participated in both traditional and distance education. This research will address this issue by comparing students’ motivation and attitudes towards online distance learning and traditional in classroom education. In 2013, the in the university where the research is conducted, the University’s Senate unanimously took a decision about teaching English as a foreign language through online courses by the instructors of the university. Since then students have been studying English through online courses provided by the university. English instruction is delivered by the lecturers of the School of Foreign Languages for three hours per week and at the end of the course students are expected to finish A1 level in reference to Common European Framework. Thus, the research questions of this study were formulated as follows:

- To reveal motivational orientations and attitudes of EFL learners of online distance and traditional in-classroom instruction
- Whether motivation and attitudes levels of learners from traditional in-class education and online distance education differ depending on age and gender
- Whether EFL learners of online distance and traditional in-classroom instruction differ in terms of motivational orientations and attitudes towards learning English

**METHOD**

**Research Design**

Data for the study was collected during the 2014-2015 academic year. After the subjects had been informed verbally that their participation in the study was completely voluntary and would not influence their grade in the courses, they were informed about the study. The research design chosen for the study was a quantitative design. The correlation research method identifies relationship among variables.

**Study Group and its Characteristics**

As was mentioned above participants (may also be referred to as ‘students’ or ‘learners’) in this research comprised of 211 (46.9%) females and 239 (53.1%) males, totally 450 students. Of the students, 195 (43.3%) studied English as a foreign language through traditional in classroom education whereas 255 of them (56.7%) studied English through online distance education in the same university by the same instructors. The age of the participants ranged from 17 to 32 with the mean score of 21.1±2.1. In the university where the research was conducted, randomly selected 500 students from different disciplines
(including Faculty of Dentistry, Faculty of Pharmacy, Faculty of Education, Faculty of Arts and Sciences, Faculty of Fine Arts and Design, Faculty of Law, Faculty of Economics and Administrative Sciences, Faculty of Engineering, and Faculty of Medicine) were asked to participate in the study. The researchers explained the purpose of the study to the students and participation in the study was entirely voluntary. The questionnaires were given in the participants’ mother language.

Research Instruments
The participants were asked to anonymously fill out a questionnaire involving three parts which respectively investigated their background information, attitudes and motivation of English as a foreign language. The first part of the questionnaire was a combination of open-ended and multiple-choice items concerning the participant’s age, gender and whether they studied English in traditional classrooms or through online courses. The second part of the questionnaire was “The Scale of Attitude towards English” which aimed to investigate the participants’ attitudes towards English. It was developed by Guven (2007) and was reported to have a Cronbach alpha of 0.75. The Scale itself contains 24 items, scored on a five point Likert scale, ranging from strongly agrees to strongly disagree. The scale involved 12 positively and 12 negatively worded items. The values of negatively worded items were reversed at data analysis stage. The third part of the questionnaire was taken from (AMTB) Attitude and Motivation Test Battery developed by Gardner (1985). In the Scale, only the foreign language “French” was replaced by “English”. The scale covered 20 multiple-choice items with three options, investigating the motivational aspects of the subjects. The Motivation part of AMTB used in this study was comprised of two subscales: Motivational Intensity (MI) and Desire to Learn the Language (DLL).

Validity and Reliability
The Cronbach-alpha coefficient value for the overall reliability analysis of the “The Scale of Attitude towards English” for this study was found as 0.93. The Cronbach-alpha coefficient value for the reliability analysis of the “motivational intensity subscale” was found as 0.87 and for “desire to learn” subscale it was 0.89. All the Cronbach-alpha coefficient values show a satisfying level of reliability beyond the minimum desirable level of reliability as stated by Pallant (2005): “Ideally, the Cronbach alpha coefficient of a scale should be above 0.7”.

Data Analyses
The data were analyzed through descriptive statistics (percentage, mean, median, and standard deviation) and t-tests and Pearson correlations. The level of significance was 0.05 for the analyses, which were conducted using SPSS.

FINDINGS
Motivational Orientations and Attitudes of EFL Learners of Online Distance and Traditional In-Classroom Instruction
Descriptive statistics were used to determine both groups’ attitudes towards learning English. In table 1, mean scores of motivational construct and attitude for the learners of distance education and traditional in-classroom instruction can be seen. The questionnaire of attitudes towards learning English was a 5-likert scale survey with 5.00 as the highest score and 1.00 as the lowest score. According to the statistical results, the mean score of the first group (distance education) for attitudes towards English was 3.25±0.88 while the mean score of the second group was 3.29±0.84. So, it was found out that 108 (42.4%) students
had negative; 147 (57.6%) had positive attitudes towards English from distance education group. Likewise, 75 (38.5 %) students had negative; 120 (%61.5) students had positive attitudes towards learning English as a foreign language from traditional in-class education group.

As for the motivation subscales; the highest score that could be obtained from each of the subscale was 30 while the lowest one was 10. Thus, when those scores are taken into account, for Motivational Intensity (MI) and Desire to Learn the Language (DLL) subscales, low level of motivation can be defined as a score between 10,0-16,6; moderate level between 16,7- 23,3; and high level between 23,4-30,0. The learners from Distance Education group had the mean scores of 3.10±0.89 for motivational intensity and 3.50±.94 for desire to learn subscales while the other group – from traditional in-class education- had the mean scores of 1.70±0.53 for motivational intensity and 1.90±.50 for desire to learn subscales.

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>N</th>
<th>MEAN</th>
<th>SD</th>
<th>MEAN</th>
<th>SD</th>
<th>MEAN</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude</td>
<td>Dist Ed</td>
<td>213</td>
<td>3.25</td>
<td>0.88</td>
<td>Dist Ed</td>
<td>156</td>
<td>3.29</td>
</tr>
<tr>
<td></td>
<td>Trd Ed</td>
<td>190</td>
<td>3.04</td>
<td>0.84</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motivational Intensity</td>
<td>Dist Ed</td>
<td>240</td>
<td>17.70</td>
<td>5.040</td>
<td>Dist Ed</td>
<td>190</td>
<td>17.64</td>
</tr>
<tr>
<td></td>
<td>Trd Ed</td>
<td>192</td>
<td>18.73</td>
<td>5.055</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Desire to Learn English</td>
<td>Dist Ed</td>
<td>226</td>
<td>18.73</td>
<td>5.055</td>
<td>Dist Ed</td>
<td>192</td>
<td>19.07</td>
</tr>
<tr>
<td></td>
<td>Trd Ed</td>
<td>192</td>
<td>19.07</td>
<td>5.040</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

When the scores of the students are handled on the basis of the classification above, it is quite clear that 84 (33.7) students had low; 121 (48.6%) students had moderate and 44 (17.7%) students had high scores in “Desire to Learn English” subscale whereas 110 (44.2%) had low; 113 (45.4) had moderate and 26 (10.2) students had high scores in “Motivational Intensity” subscale in the distance education group. As for traditional in-class education group, 65 (33.9%) students had low; 89 (46.4%) students had moderate and 38 (19.8%) students had high scores in “Desire to Learn English” subscale whereas 89 (46.8%) had low; 68 (35.8%) had moderate and 33 (17.4%) students had high scores in “Motivational Intensity” subscale in the traditional in-class education group. When the median scores of their motivational construct are considered, in general it can be said that both groups show similarities in their motivational construct and have moderately low level of motivational intensity and moderate level of desire to learn English as illustrated by Table 1.

**Motivation and Attitudes Levels of Learners from Traditional In-Class Education and Online Distance Education Depending on Age and Gender**

In order to look into male and female students’ difference in their attitude-motivation levels, an independent-measures t test was applied to data. As can be seen in Table 2, the results indicated that gender was a significant factor in both attitude and motivation levels of the groups from online distance and traditional in-class education. The results interestingly revealed similarities in terms of attitude-motivation scores of male and female students. In both groups, male students had higher scores in their attitude and lower scores in their overall motivation scores.
Table: 2
Mean Score, Standard Deviation and Range of Attitude-Motivation Scores in terms of Gender

<table>
<thead>
<tr>
<th>Descriptives</th>
<th>Gender (Online Dist Edu)</th>
<th>Gender (Trad. Edu)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male (Online Dist Edu)</td>
<td>Male (Trad. Edu)</td>
</tr>
<tr>
<td>Attitude</td>
<td>T</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td>3.32</td>
<td>0.00*</td>
</tr>
<tr>
<td></td>
<td>84.4±19.08</td>
<td>84.5±20.3</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>Female (Online Dist Edu)</td>
<td>Gender (Trad. Edu)</td>
</tr>
<tr>
<td>Motivation</td>
<td>T</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td>-3.89</td>
<td>-2.01</td>
</tr>
<tr>
<td></td>
<td>33.98±8.09</td>
<td>35.15±9.49</td>
</tr>
<tr>
<td></td>
<td>121</td>
<td>84</td>
</tr>
</tbody>
</table>

Regarding the effects of age on students’ attitude and motivation towards learning English, Pearson correlations were conducted and. Similar to the findings of gender, it was seen that age was not a significant factor in both groups suggesting that no relationship exists between age and attitude-motivation scores.

Table: 3
Pearson Correlations between Attitude-Motivation Scores of the learners and Age

<table>
<thead>
<tr>
<th></th>
<th>Online Distance Education</th>
<th>Traditional in-Class Education</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>r</td>
<td>p</td>
</tr>
<tr>
<td>Attitude</td>
<td>-0.118</td>
<td>0.087</td>
</tr>
<tr>
<td>Motivation</td>
<td>0.156</td>
<td>0.015</td>
</tr>
</tbody>
</table>

Comparison of motivational orientations and attitudes of EFL learners from online distance and traditional in-classroom education. Students’ attitude, motivational intensity and desire to learn English levels were compared in terms of the type of English education they are receiving as online distance and traditional in-class, by using an Independent Samples t-test and the results did not indicate statistically significant differences between them as can be seen in Table 4.

Table: 4
Mean Score, Standard Deviation and Range of Attitude-Motivation Scores of the Groups

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Dev</th>
<th>t/F Value*</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Online Distance Edu</td>
<td>213</td>
<td>3.31</td>
<td>0.88</td>
<td>-0.58</td>
<td>0.56</td>
</tr>
<tr>
<td>Traditional in-class</td>
<td>156</td>
<td>3.36</td>
<td>0.84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motivational</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intensity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Online Distance Edu</td>
<td>249</td>
<td>1.87</td>
<td>0.50</td>
<td>-0.70</td>
<td>0.48</td>
</tr>
<tr>
<td>Traditional in-class</td>
<td>192</td>
<td>1.90</td>
<td>0.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Desire To Learn</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td></td>
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</tr>
<tr>
<td>Online Distance Edu</td>
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<td>1.77</td>
<td>0.50</td>
<td>-0.00</td>
<td>0.99</td>
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<tr>
<td>Traditional in-class</td>
<td>190</td>
<td>1.77</td>
<td>0.53</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DISCUSSION AND CONCLUSIONS

The results found in this study can be summarized in five topics: First, majority of the students from both groups have moderate level of motivation towards learning English. Second, students from both groups mostly have positive attitudes towards learning English. Third, gender is an important factor in both attitudes and motivation levels of EFL students in both groups. Males have more positive attitudes but less motivated than females in both groups.
groups. Forth, age is not an important factor in attitudes and motivation levels of EFL students from both groups. Lastly, there is not a significant factor between the motivation and attitudes of EFL students from on-line distance education and traditional in-class education.

To begin with, it must be stated here that the research yielded interesting results and the conclusions reached in the study were not preconceived by the researchers since the students of distance education and traditional in-class education seem to have substantial similarities in terms of their attitudinal and motivational features. Specifically, it seems that no matter how they study English (traditional or online distance) they show similar tendencies towards their English studies such as having low-moderate level of motivation and mostly positive attitudes towards learning English. One possible explanation of these findings is that it is clear from the results that the aforementioned advantages of distance education do not necessarily help learners enhance and disadvantages decrease the motivation of the learners towards English. Another possible explanation for this result is that the use of technology is not as encouraging as expected in changing the levels of students’ motivation. This finding seems to be consistent with some previous studies (Dutton, 2002; Steven & Switzer, 2006) that indicate online and on-campus students had the same level of motivation to complete a course.

The result that indicates the uniformity of motivation levels between the groups seems to confirm Gardner (1985), who stated that a highly motivated learner will want to learn the language, enjoy learning the language, and strive to learn the language in any place. Nevertheless, the motivation level of the students from both groups is not promising on behalf of language learning. In the Desire to Learn Language sub-dimension of the motivation scale, one third of the students have low, almost half of them have low moderate and only one fifth of them have high scores from both of the groups. In the sub-dimension of Motivational Intensity, there seems to be a slight difference between the groups. From distance education group, it was reported that almost half of the students have low or low moderate and very few students, only 10 %, have high levels of Motivational Intensity. From traditional in-class education it was seen that half of the students have low, one third of them have low moderate and almost one fifth of them have high levels of Motivational Intensity. Hence, it might be stated that students from both groups do not seem to be highly motivated to learn English. Moreover, as emphasized in the previous literature (Oxford et al., 1993; Chan et al., 1999) enhancing and maintaining students’ motivation in distance education has a great importance on students’ achievement (Ergul, 2004).

Contrary to this research, some previous studies indicated that motivation levels of students from distance education are higher than those of traditional in-class education (Rovai, et al. 2007; Hiltz, 1994). This contradiction may stem from the students' readiness for autonomy in language learning since distance education requires much more autonomy in foreign language learning process which is beyond the scope of this research. As stated by White (1994: 12–13), “distance learners must regulate and oversee the rate and direction of their learning to a much greater degree than classroom learners”. However, the autonomous learning capacity of the students in the university where this research was conducted is in question. Additionally, some research

However, the number of the students who seem to have negative attitudes cannot be ignored. Even though more than half of the students from both groups have positive attitudes, more than one third of the students have negative attitudes towards learning English. Moreover, the number of students having negative attitudes from traditional in-class education group outnumber the number of the students from distance education group. Considering the results of some previous studies reporting that language learners had positive attitudes towards the online language learning and were highly motivated (Hotho, 2000; Ushida, 2005, Cinkara and Bagceci, 2013), it can be concluded that distance education may have helped the learners of the present study to get more positive attitudes towards their English courses. The previous literature also indicates that negative
attitudes, can impede language learning, since learners usually get those attitudes when they are not interested or have difficulties in their studies (Ellis, 1994). Those attitudes are usually expected to have a negative effect on learners. Above all, it should be kept in mind that students’ attitudes can change. They may have negative attitudes at the beginning of learning process but as they realize the advantages of learning a language, with the help of instructors, their attitudes may change.

Within the present study, gender was found to be significant factor on students’ motivation and attitudes towards learning English in both of the groups. Females seem to be more motivated than boys and have more positive attitudes towards learning English in the same way. It is clear that whether students are receiving English through online or face to face interaction does not affect their motivation levels and attitudes in terms of gender.

As a final point, the results indicated that distance education will be as good an alternative (if not better) than the physical classroom. Depending on the conclusions some implications can be noted. The low and low-moderate levels of motivation and negative attitudes of students towards foreign language courses found in the students of both groups (distance and traditional) in the present study have important implications for instructors in terms of course design. When attempting to design the courses, therefore, instructors should consider the importance of motivation and attitudes of the learners and look beyond the teaching methods, techniques, and materials that are currently being used. Since students from both groups look to need support to enhance their motivation and to get positive attitudes towards English, instructors had better help students to set goals for their language studies and control their feelings.

Further researches certainly need to be performed to suggest appropriate strategies that would help teachers to motivate their students, change negative attitudes of the students, and to train them as independent language learners that would facilitate students’ language learning. Also, further researches should be considered to determine the reasons of low motivation students have.

Some limitations of the research can be noted. One important limitation of the study is that the participants of this study are students at a specific university in Turkey. Therefore, selection of the participants is naturally regionally and culturally biased. Moreover, the findings of the research may not be generalized to the entire population of language learners. The study was also restricted with investigating attitudes and motivations of the students from online and traditional in-class education, with gender and age as the only variable and did not account other aspects such as student’s grades, academic achievements, proficiency, learning environment and autonomous learning capacity.

BIODATA and CONTACT ADDRESSES of the AUTHORS

Dr. Gulten GENC is a lecturer at Inonu University, School of Foreign Languages, Malatya/Turkey. She received her MA degree in ELT department from Ataturk University and MA and PhD degrees in Educational Sciences from Inonu University. Her main interests are professional development of foreign language teachers, language learners’ psychology, and using technology in foreign language teaching.

Dr. Gulten Genc
School of Foreign Languages,
Inonu University, 44280, Malatya, TURKEY
GSM: 0 533 446 40 53
e-Mail: gulten.genc@inonu.edu.tr
Emine KULUSAKLI is an English instructor at Inonu University, School of Foreign Languages, Malatya/Turkey. She received her MA degree in English Language and Literature department from Ataturk University and she is working on her PhD in Istanbul Aydin University right now. Her main interests are, discourse analysis, psycholinguistics, and sociolinguistics.

Emine KULUSAKLI  
School of Foreign Languages,  
Inonu University, 44280, Malatya, TURKEY  
GSM: 0 532 582 89 17  
e-Mail: emine.kulusakli@inonu.edu.tr

Savas AYDIN is an English instructor at Inonu University, School of Foreign Languages, Malatya/Turkey. He received her MA degree in ELT department from Ondokuz Mayis University and MA degree in Educational Sciences from Inonu University. He is working on his PhD in Inonu University right now. His main interests are educational administration, classroom management, and professional development.

Savas AYDIN  
School of Foreign Languages,  
Inonu University, 44280, Malatya, TURKEY  
GSM: 0532 205 14 86  
E-mail: savas.aydin@inonu.edu.tr

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ONLINE METACOGNITIVE TASKS FOR EFL DISTANCE LEARNERS

Assoc. Prof. Dr. Soraya GARCIA-SANCHEZ
Department of Modern Languages
Universidad de Las Palmas de Gran Canaria
Las Palmas de Gran Canaria, Spain

ABSTRACT

Online courses have benefited from the adequate use of digital resources that allow learners to be the center of their own learning process. More often online instructors not only aim at what students have to individually do but learners are also engaged in interacting with the educational community by means of a variety of metacognitive activities, which can be planned, thought and accomplished anywhere and at any time (ubiquitous learning). This article proposes a debate on the awareness of strategic knowledge acquisition to particular situations providing interactive scenarios among students of English as a Foreign Language (EFL) in online courses. Without communicative activities, the successful production of any foreign language is not complete since knowledge building and the understanding of the foreign language, either in written or spoken form, are the key points of an adequate performance of communication. The findings of this study will provide information about useful online tasks for the adequate performance of communicative metacognitive skills required in an EFL language distance course. Finally, some future research paths inclined to improve EFL distance learners from a metacognitive and ICT-based collaborative perspective are also suggested.

Keywords: Autonomous learning, communication, distance learning, EFL, u-learning.

INTRODUCTION

Nowadays, online instructors are regularly revising their programs and assessment criteria to adapt them to student feedback as well as changes in emerging technologies. This contextualized adaptation also aims at responding to learners’ needs so that the online learning community can provide the resources and the learning scenarios for the successful performance of competences. The use of appropriate technology in online courses is important for improving both learning and the relationship between students and teachers when creating and sharing knowledge (Spector, 2014). Online distance learners can benefit from a proper selection of ubiquitous learning (u-learning) tools that allow participants the flexibility and creativity to complete the required tasks at the best time and in the best place they choose to access their courses. The physical space of a traditional classroom is transformed into a variety of digital spaces by means of internet access and the use of u-learning technologies.

It is doubtless that technologies can offer opportunities to modify instruction, to transform assessment and to enhance online learning. Since analyzing students’ metacognitive performance and communicative skills in English as a Foreign Language (EFL) is the main goal of this article, a review of the literature on current pedagogical strategies that are suitable for online courses will be presented in the first part of this chapter. The interactive tasks necessary for attaining communicative language competences will be addressed in the second half of this paper. Next, examples of online tasks used with the intention of encouraging active participation in EFL online courses will be revealed. Finally, the results emerging from the combination of the communicative language skills in EFL with the formative assessment designed for these online courses will be discussed.
This case study is based on a compulsory subject of EFL in the distance learning Degree in Social Work at the Universidad de Las Palmas de Gran Canaria (ULPGC) in Spain. The main objective of this chapter is to demonstrate that a careful design of interactive tasks and assessment criteria will support u-learning distance learners in the conscious production of their EFL knowledge and communication.

BACKGROUND

Current EFL Pedagogical Strategies
It is a regular practice to see today’s learners using mobile devices such as laptops, tablets or smart mobile phones to, first, find any necessary information instantly, and, second, to access lecture videos, digital documents, interactive or downloadable activities and discussion forums posted on course platforms and social networks (Burbules, 2012; Garcia-Sanchez, Guerra-Artal & Afonso-Suarez, 2012). While the former action participates in informal learning, the second connects learners with a formal learning environment. Both behaviors often entail the approval of technology in education (Imtiaz & Maarop, 2014). Both would constantly improve present citizens’ knowledge and critical thinking.

Currently, a variety of pedagogies that focus on a participatory communicative approach in EFL has been necessarily implemented in the foreign language classroom (Andersen & Ponti, 2014; Cancino, 2015). Adair-Hauck and Troyan (2013) have even depicted interpersonal modes of communication at the time of dealing with the importance of feedback by means of the Integrated Performance Assessment (IPA). Equally, ubiquitous personalized learning is another strategy that emphasizes the importance of responding to the different type of learner, so that a diverse learning setting is considered (Chen, Lee & Chen 2005; Taraghi, 2012). Therefore, when delivering online courses, there is a more frequent need to offer interactive learning environments (ILE) that correspond with the reality of their online participants, who may need not only to exchange messages but they may also have the possibility of cooperating and/or collaborating in their knowledge building using digital tools.

A ubiquitous learning environment (ULE) not only allows for flexibility at the time of accessing u-resources but these u-learning materials are also designed to answer students’ needs and, consequently, they aim to become context-aware. U-learning happens anywhere else than the classroom. Technology has augmented this extended location, which is more open and no limited to unique situations happening in educational walls (Jones, Chew & Blackey, 2014). Different scholars have suggested that two remarkable differences between e-learning and u-learning is that knowledge is context-aware and it is accessed anywhere and at any time from any mobile devices that have an internet connection (Liu & Hwang, 2009; Liu, et al., 2014; Ogata & Uosaki, 2012). With a ULE, learners are able to constantly access, select and contrast information, as well as interact and share knowledge with others, which benefits their autonomous and collaborative u-learning (Garcia-Sanchez, 2014; Price & Rogers, 2004). Moreover, it is common to mention a more current terminology for the web 4.0 since its ubiquitous characteristics encourage the educative community to be hyper connected with changing technologies that focus on interaction and intercommunication (Garcia Aretio, 2014; Vizoso Martin, 2013: 243).

Since the focal point of this research is to observe students’ EFL interaction in online courses, it is paramount to apply a communicative approach that deals with successfully communicating and understanding messages so that learners are able to improve their communicative competence, and provide thoughtful arguments. This proposes being successfully able to use the foreign language words and rules; its appropriacy; its cohesion and coherence and its accurate use of communication strategies (Canale & Swain, 1980).

The design of the subject of this study, English Applied to Social Work (EASW), has been planned having in mind the communicative language skills that correspond with the correct written and oral expressions, and with the appropriate structures used when
communicating meaningful messages in the foreign language. Although this subject is based on English for Specific Purposes (ESP), it involves the use of English as a Foreign Language (EFL) approaches with a variety of technologies that aim to enhance language skills (Traore & Kyei-Blankson, 2011). Pirsl, Popovska and Pirsl (2013) argued that “ESP is essentially a training operation which seeks to provide learners with restricted competence to enable them to cope with certain clearly defined tasks” (p. 2). The ESP approach allows these future professionals of the field of Social Work to improve the specific communicative tasks designed for their profession but, at the same time, the approach establishes a dialogue with the general communicative language skills in English that students need to improve and demonstrate to succeed in the general communication of the foreign language. Consequently, the teaching material of EASW combines all-purpose foreign language skills with the ESP context of the area of social work in order to respond to these learners’ needs (Hutchinson & Water, 1987).

U-learning Metacognition for Online Interaction
In order to engage learners in distance interactive learning environments (ILE), an appropriate online system with a correct methodology needs to be applied so that interaction can happen between the learner and the system or among the members of the educational community, that is between learners, and between the learners and the teacher (Garcia Aretio, 2014; Pennings et al., 2014; Psotka, 2012). Suitable tools must be selected and satisfactory learning tasks should be designed by following both an ILE and communicative skills in EFL.

Research by Pirsl, Popovska and Pirsl (2013) suggests that “Metacognition is cognition about cognition or thinking about thinking. Thinking can be about what the person knows and what the person is currently doing” (p. 4). If this definition is considered, a distance learning course should combine both metacognitive abilities with metacognitive experiences. There is no doubt that distance learners are especially put into contexts that require their conscious independent thinking to solve problems. They need to demonstrate a thorough response to their autonomous abilities not only to learn but also to plan, organize and distribute their time and tasks (Martin-Santana & Garcia-Sanchez, 2014). Metacognitive activities involve active participation by learners and active monitoring by teachers in order to achieve both cognitive and communicative goals (Price & Rogers, 2004).

The interactive learning approaches applied in this study are based on Task-Based Language Learning (TBLL), Presentation Practice Production (PPP) and Project Based Learning (PBL). Although these practices can be a challenge when participating in online courses, they are focused on improving both cognitive and social skills, which can be either individually-oriented or cooperatively-oriented. TBLL is per se a communicative variety of the communicative learning approach since learners are structured in smaller groups in order to achieve various collaborative goals that require the correct use of the target language (Ellis, 2003). PPP is not a method but a pedagogical strategy (Criado, 2013; Harmer, 1996; Harmer, 2009) that implies communicating the second language by allowing students to create a context that may facilitate the production of the targeted language once the presentation and the practice of the new vocabulary has been delivered in the course. PPT is not new but the use of technology modifies the delivery of this instructive strategy in multiple ways. PBL also implies having small groups working collaboratively and dependently to finally achieve a goal, which may be a solution to a problem or to a question. The main difference, however, between TBLL and PBL is that the latter requires a longer period of time for learners to investigate and to formulate the answers to the project they are creating, while TBLL may be solved in a two-hour session, for instance.
METHODOLOGY

This case study results from two academic years of revision and research of the online course, English Applied to Social Work (EASW), as part of the Degree in Social Work in the Distance Learning Platform, Teleformación, at Universidad de Las Palmas de Gran Canaria (ULPGC), Spain. A descriptive qualitative approach was used as part of this case study to consider the learning task and the foreign language skills achieved by students. Furthermore, a digital u-learning approach was adopted in order to collect data from September 2012 to July 2014. These data were mostly gathered from a nonparticipant observation of all the activities and interactive exercises generated on the course platform.

EASW was delivered in the third year of the Degree in Social Work. The average number of students was 40 students each year. They resided in a variety of places in Spain. The majority were adults whose age was over 30 years old (70%). The design of this online course was planned using the Teleformación platform, which is based on Moodle. There were clear aims, exercise, deadlines and assessment criteria for learners to be accomplished at the end of each task and, correspondingly, at the end of the course.

The Learning Environment

Students in this study participated in a u-learning environment (ULE) that allowed them the flexibility of accessing course materials anywhere and at any time (Kalantzis & Cope, 2012; Wurst, Smarkola & Gaffney, 2008). In other words, the participants were afforded the use of context-aware methodologies that were adapted to their needs (Cope & Kalantzis, 2010; Chenol Mora, 2013; De la Torre et al., 2013; Garcia-Sanchez, 2012). A group forum for discussion, a course chat, YouTube video presentations, and the private tutorial conversations were the main online interactive tools used to promote learners’ expression in English.

For the learning plan, distance learners were aware of receiving independent learning input by accessing the textbook, which was designed and published for this purpose. They not only had the textbook in their hands, once they enrolled in this course, but they could also access the e-document all over again from their mobile devices, if they wanted to browse the course material online. Not only the book content but, equally important, the compulsory online tasks, the course forums, video lectures, PowerPoint or Screencast presentations, general feedback on common mistakes and good practice, individual feedback, the private online tutorial and the further practice links posted on the platform were the online u-learning resources that complemented this learning plan. Output was presented by means of learners’ participation in the course forums, the glossary, the online tasks they individually had to post on the platform, and the final exam.

The structure of the book was imperative for learners to achieve the learning outcomes. The six learning units that shaped this course were structured in titles, linked to a successful performance for social workers. Each unit had two reading texts and exercises (comprehension and lexis), a use of English section and a vocabulary section with the answer keys for all the activities suggested. The answers were deliberately given in order to promote independent learning skills in these distance learning participants. The topics presented in each of the six units dealt with some aspects of the communication process. The first unit introduced the different characteristics of the communicative process and it established some differences between verbal and non-verbal communication. The consequent four units of the course were more specific for the field of social work and they linked the general concept of communication with human services, family communication, child protection, and elderly people. Finally, there was a last unit devoted to managing communication in prisons. There was also a list of keywords organized at the end of each unit together with a conscious learning grid to allow learners to reflect upon their own learning process. The keys to all the exercises designed in each unit were also included in the textbook.
FINDINGS

Interactive Learning: Examples
First of all, the discussion forum in the distance learning course of EASW was proved to be a successful interactive learning tool with three varieties. The first forum, administered by the teacher, functioned as an indispensable notice board since it was devoted to posting news regarding the course. Each time a new topic was posted, learners automatically received the message on their institutional emails. No learners could open a new topic nor reply to any comments posted by the teacher. In this line, some of the messages, especially those that summarized the four face-to-face teaching sessions were often written in Spanish to make sure that students understood the core content of those key meetings. The second forum (see Figure1) was a discussion forum medium and English was the communicating tool used by the participating community. Although both the teacher and the students could open discursive topics, not so many students engaged in this step but just followed the proposals provided by the instructor (48%). The last forum was designed as a repository of group questions related to the course program or to the instructions of any specific task, for instance. Some learners preferred to post their questions on the course platform so that they could receive an answer from any other learner or from the teacher (68%). Other learners, on the contrary, chose to be reserved on their public contributions. They opted to use a more individual learning approach when using the tool of the private tutorial to directly ask the teacher any questions or seek clarification for any doubts they may have during the course (32%).

Dear students,
This forum is optional and only opened for you to actively participate in the discussions proposed by your teacher. Be an active contributor so that you can practice your English expression. Remember to use polite language and always be respectful with other opinions. Thanks and regards!

Figure: 1
The instructions for the course forum, “Your Discussions” to encourage active contributions in the foreign language

Secondly, the course chat, presented as synchronous interaction for learners, allowed participants to have a more real contact with each other. The times and dates planned for the voluntary chat to take place were previously posted on the notice board forum to inform learners. Although the chat could be presented as a resource for exchanging instant questions, suggestions or for just practicing the foreign language expression, it must be said that the distance learners of EASW did not actively participate in this interactive tool. Only twelve of eighty students involved themselves on this voluntary instant medium so that the chat task will be reconsidered as a smaller group exercise so that it could be promoted as a successful discursive tool in a future online course. The instructor may also present the chat as a tool for social interaction and small group work contributions before a collaborative task is finally delivered on the online platform.

Students’ Metacognitive Interaction
The tasks designed for the autonomous distance learning scenarios have motivated critical thinking linked to these learners’ professional field. As a result, students’ thoughts have highlighted what they know about a particular topic so that they have applied their ideas to a more practical approach that has aimed to find some solutions to different anticipated problems they may find in their profession. This reflective contextualization has proved to be efficient in this ESP learning community. Although some of these metacognitive tasks have been accomplished in autonomous learning environments, they would be more enriching when deliberately proposed in interactive online environments such as discussion
forums or synchronous chats (Kyei-Blanson & Donnelly, 2014). These students’ metacognitive abilities have demanded an active participation by learners and active intensive observation by teachers so that knowledge building and communication take place in each learner.

The tasks designed for monitoring students’ learning progress during the course were divided into three. The first corresponded with the contents of units 1 and 2, while activity 2 dealt with units 3 and 4 (see Figure 2). As a result units 5 and 6 were conveyed with the completion of task 3. These activities were designed to correspond with the performance of different language skills such as reading or listening comprehension, grammar and use of English, oral and written expression, and vocabulary. Activity 2, for instance, although individually created, demanded the combination of PPP, TBLL and PBL learning strategies since one of its exercises required the video recording of an oral presentation in which students had to answer some questions related to the course, which would additionally involve further research. The tool suggested for this video recording was YouTube or Present me so that they could send the video link for the task to be assessed.

In view of the TBLL, PPP and the PBL strategies, the u-learning tools that have contributed to enhance communicative competences in EFL and interaction among students and between students and the teacher in a distance learning environment have been the video lectures, the PowerPoint Presentations, the wiki, the online glossary, the course chat, and the discussion forum. Table 1 illustrates a clearer classification of tasks according to the learning outline used.

Table: 1
Interactive learning approaches for distance learning tasks

<table>
<thead>
<tr>
<th>English Applied to Social Work</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TBLL</strong></td>
</tr>
<tr>
<td>Individual tasks to hand in</td>
</tr>
<tr>
<td>Interactive exercises</td>
</tr>
<tr>
<td>Creation of exam questions with 4 options and only 1 is correct</td>
</tr>
<tr>
<td>External links for practicing listening, pronunciation, grammar, reading or writing skills</td>
</tr>
</tbody>
</table>

Although individually addressed, task 3 was also designed with the intention of using the EFL skills and a real-life problem solving (Beldarrain, 2006, p.147) with clear objectives, instructions and resources (See figure 3). Task 3 was presented as an example of exercises planned for students to accomplish, individually, the three strategies proposed for learning: PPP, TBLL and PBL. It had some listening exercises, reading, vocabulary, use of English and writing skills since students had to find out information about the two prisons in Gran Canaria, and how social workers would communicate with the inmates, their families and the professionals working in these institutions. Although these three strategies may depend on group work, the distance learners only presented their projects or tasks individually and there was not a chance for working in small groups as the TBLL or PBL would demand.
The plan of this course was created considering the core content, the interaction happening among the educational community and the correspondence between tasks and the assessment criteria. In this line, assessment was adaptive, formative, summative, informative, interactive, internet-based and progressive (Griffin, 2014; Griffin et al., 2010; Zafar & Albidewi 2015) since students were offered suggestions to improve their work and feedback on the good practice and common mistakes they provided in each task. The evaluation of EASW was designed following the rules proposed by the Teleformación organization at ULPGC so that the formative and summative assessment was especially individually-oriented. Students participated in a formative, summative and internet-based assessment that was also personalized and instant or almost quite short at the time of providing feedback or suggestions for improving learners’ work.

The formative evaluation of EASW had two obligatory items with a summative percentage of 50 each: the completion of the tasks and the final exam. The first item of the formative assessment was the accomplishment of the 3 online tasks designed for each unit of the course so that students could demonstrate an adequate understanding of the content studied in the course. The teacher could mark these tasks and intervene in the students’ progress with some suggestions for improvement if the activity was sent during the first
week of the evaluation period. This requires saying that each task was meant to be presented in a two-week period. Learners who sent the activity in the first week had the chance for a second correction, after having followed the suggestions provided by their teacher. This feedback was informative, individual, interactive, interventionist and progressive and it aimed at highlighting the weaknesses and strengths of each student. The final exam was the second item that fulfilled the other remaining 50% of the evaluation. It consisted of a multiple choice test of 30 questions corresponding with the 6 units of the course, and only one answer being correct. This test was previously designed on the course platform, following the rules of Teleformación, which implied, for instance having a minimum of 3 questions per unit that could be related to lexis, use of English and the reading exercises and syllabus studied in the course. Once the exam was created and accepted by the evaluation committee of the online Degree in Social Work, it was ready for the teacher to print it out and bring it to the face-to-face exam session on the date set for it. Distance learners had to physically sit at the Universidad de Las Palmas de Gran Canaria, if they lived near their campuses, or in any other official institution planned for sitting exams at Teleformación all over Spain.

Another rule of Teleformación established that no questions or comments would be provided by any teacher monitoring an exam, so that all learners in different spaces would have exactly the same conditions. Once the exams were finished, they were delivered to the secretary of Teleformación and sent online to the teacher in charge in 24 or 48 hours. The internet-based assessment offered that the exam marks were posted on the students’ personal assessment profile with the number of correct answers, incorrect answers and items not completed. If students had 1 answer wrong they were penalized with 0.33 marks. Figure 4 shows the teacher’s access to the assessment corresponding to all students with their marks for their three tasks (See columns UA02, UA04 and UA06), the average mark of the tasks (Media de Act.), the exam mark (EXAMORD), and the final grade (See last column for “Cal.ORD”) corresponding to 50% for the tasks + 50 % for the exam.

This study reveals that advances in assessing students’ performance either individually or in groups, together with their communicative competence have positive implications when delivering online courses due to technological resources and appropriate learning methodologies. The possibilities of having more interactive tasks to allow online learners to participate and exchange knowledge anywhere and at any time would improve the necessary communicative skills when learning EFL. Clearly, it is worth mentioning to underline that reexamining the adequate selection of tasks that best correspond with the proper technological tools would make the active learning process easier to flow so that successful communication in EFL takes place. Finally, the results also bring to light that
another arrangement that deals with tasks and assessment is also essential to improve interaction and the communicative competence in an EFL online course (Gikandi, Morrow & David, 2011; Hewson, 2012). Either way, tasks, tools and competences should be positioned in the same box when designing any EFL course that especially aims at improving interactive, digital and communicative skills.

Distance EFL educators must adapt their courses to their learners’ needs by paying attention to emerging technologies that can improve their communicative skills in the foreign language (Beldarrain, 2006, p.146). Equally, the combination of distance learning courses and English language learning can be a hard endeavor for some learners. This may imply that successful educators should also encourage EFL learners’ motivation to work online since teachers often have a significant influence on learners’ progress (Craft, Chappell & Twining, 2008; McEown & Takeuchi, 2014). Distance EFL teachers ought to also revise how their courses are delivered, how learners’ tasks are designed, how distance learners are performing the course abilities, and how assessment is corresponding with students’ progress. Moreover, distance EFL educators must innovatively adjust their course design to the most appropriate learning theories and metacognitive strategies that best correspond with a specific task or with learners’ needs to successfully achieve the course goals.

SOLUTIONS AND RECOMMENDATIONS

We have aimed to establish interactive learning approaches in this study based on TBLL, PPP and PBL but they have been mainly oriented for autonomous learning, with the exception of the discussion forums, the glossary and the creation of exam questions. Cooperative and even collaborative learning approaches can be applied in this study by means of designing tasks that can be clearly dependent on the small group participation. In this line, it would be positive to use, the Wiki tool and/or some collaborative video presentations (without having in mind their local areas) with clear instructions for each member to make their contribution in a well-structured group whose aim is to accomplish the goals of the cooperative work. In this line, the interactive experience between groups would improve cognitive, metacognitive, communicative and social skills. This group work could be considered part of the summative assessment describing the minimum aims each member of the group should accomplish.

The chat can also be part of the summative assessment if the teacher would establish clear instructions, specific dates and times for the small groups to exchange information, to discuss their projects and to establish some dialogues in English with the intention of creating their collaborative task. This interaction can also be added to the summative and formative evaluation so that the teacher can contemplate learners’ coordination and group work by accessing the chat once the activity is completed. This will have a positive result since not only students’ group work but also their communicative skills would be assessed when participating on the chat. Some general feedback regarding good practice and common mistakes could be provided once all the groups interact on their chat.

CONCLUSIONS AND FUTURE RESEARCH DIRECTIONS

Currently, distance learning courses should be designed for building interaction among the educational members of the community. Online courses should not only be individually-oriented, personalized and context-aware in order to answer learners’ specific needs but they ought to be collaboratively-oriented in order to enrich the social, communicative and interactive abilities of its participants. Learning English as a Foreign Language (EFL) implies long-term interaction between students and teachers, and regular access to information by means of ubiquitous learning (u-learning) environments. Since being an EFL learner is characterized by communicating with others, it is also beneficial to build knowledge together in interactive learning scenarios. Because today’s learners often use the internet for different purposes, and that includes for socially contacting their online friends, EFL distance learners at the Universidad de Las Palmas de Gran Canaria unsurprisingly demand more participation in discussion forums.
and in online spaces where they can use their metacognitive communicative skills when interacting with others. This is advantageous when applied to EFL courses that are focused on enhancing the communicative competence of their learners.

In order to deal with the performance and the assessment of communicative competences in EFL, a revision of current pedagogical strategies for distance learning spaces have been initially discussed in this paper. Secondly, it has been highlighted that the achievement of appropriate interactive tasks should correspond with the communicative language skills learners are performing. Finally, the internet-based assessment of the distance learning course has been typified for being formative, summative, interventionist, informative, interactive and progressive (Griffin, 2014; Griffin et al., 2010).

This study highlights that due to appropriate u-learning tools, distance learning participants are given flexibility to complete the required tasks at the best time and in the best place they choose to access their online courses. Nowadays, distance learning communities are immersed in a variety of interactive digital spaces, which can be advantageous as they can be accessed from any mobile device, by means of internet access and a u-learning methodology, *English Applied to Social Work*, in a distance learning environment has proved that using various online tools that are combined with competence-performance and interactive tasks can favor contextualized ubiquitous EFL learning. This is an advantage for today’s citizens that are constantly updating their education with ICT-supported courses. Further research should be pervasive in order to allow current citizens’ abilities to be professionally and personally adapted to the most demanding desires of an open-learning society that is constantly moving forward.

Some future directions to further continue this ubiquitous learning analysis would be related to collaborative learning in online distance learning courses. Learners’ immersion in technology, for their own individual and collaborative learning process, ought to be combined with multiple real-life scenarios that participate in a communicative approach for EFL distance learners. Since technology is changing daily, empirical research on current technologies that enhance not only students’ interaction but their adaptation to the newest digital learning spaces could also be another research point.

Equally, autonomous learning and individual /cooperative/collaboratively students’ creativity by means of online distance learning environments could be an area of additional research (Loveless, 2007) since the active involvement of learners makes the best learning happen. Learning is metacognitive and non-stop. Every learner should think about thinking and revisit the knowledge that has already transformed society. Everyone’s awareness of that learning is always exclusive and it can provide new insights of understanding.

**BIO DATA and CONTACT ADDRESSES of the AUTHOR**

**Dr. Soraya Garcia-Sanchez** is an Associate Professor at the Department of Modern Languages (English) of the Universidad de Las Palmas de Gran Canaria (ULPGC), where she has been teaching language, culture and literature courses both online and on a face-to-face basis. Soraya’s research areas are focused on e-learning and ubiquitous learning environments for EFL students at university level, and on women’s writing and literature in contemporary contexts.

**Dr. Soraya Garcia-Sanchez**
Universidad de Las Palmas de Gran Canaria
Campus Universitario de Tafira S/N
Edificio de Ingenierias, 35016
Despacho 3 (Módulo F), SPAIN
Phone: (+34) 928 45 8608
e-Mail: soraya.garcia@ulpgc.es
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TRENDS IN STUDIES ON VIRTUAL LEARNING ENVIRONMENTS IN TURKEY BETWEEN 1996-2014 YEARS: A CONTENT ANALYSIS

Assist. Prof. Dr. Veysel DEMIRER  
Faculty of Education, Suleyman Demirel University  
Isparta, TURKEY

Cagdas ERBAS  
Ministry of Education, Ankara, Turkey

ABSTRACT

This study aims to review studies on virtual learning environments in Turkey through the content analysis method. 63 studies consisting of thesis, articles and proceedings published in Turkish and English between 1996-2014 years were analyzed. It was observed that "Second Life" was mostly preferred as the virtual learning environment. Literature review and quantitative research methods were mostly preferred in the studies respectively. Most of these studies used surveys to collect the data and sample size in most studies was between 31-100 participants. Mostly, participants were undergraduate students, and purposive and convenience sampling method were preferred in the studies. The data was mostly analyzed using quantitative descriptive analysis method. The most studied variable was academic achievement and the least one was the cognitive load. The studies yielded varying results owning to their study purposes and showed that virtual learning environments fostered student academic success, diminished the cognitive load by concretizing the concepts and ensured social and collaborative learning. The findings of this study might guide researchers aiming to employ virtual learning environments in their educational studies.

Keywords: Virtual learning environments, research trends, content analysis.

INTRODUCTION

Education involves a process of changing behaviors through teaching intended behaviors to the individuals. Teaching and learning processes help this intended progress gain. People intentionally convey their knowledge to next generations. Schools and other educational environments are organized to achieve this learning process. From this point of view, learning is driven by the influence and support of these specially organized environments. The structure of learning environments has undergone various transformations by varying educational paradigms to date. The constructivist approach has also changed individuals’ roles and learning environments. Today, people learn in collaborative environments under the guidance of teachers (Murugaiah, Atan, Samsudin, & Idrus, 2004); however, permanence of learning is still a major problem. Considering that more efficient learning environments would yield more permanent learning, new learning environments are structured in line with varying approaches and evolving technological trends.

Evolving technology has induced variations in technologies employed in educational settings over the time. Thus, computer and Internet technologies have been incorporated into educational settings as electronic information sources. Development of computer and Web 2.0 Internet technologies have led to the birth of a new educational environments. This new educational setting was called "virtual learning" or "virtual learning environment".
Indeed, virtual learning environments were launched with learning machines in 60s and appeared as an extension of computer-aided learning tools in 70s and 80s (Atici, 2007). In particular, Web 2.0 technologies varied and enhanced the usability of virtual environments. Virtual learning environments are described as electronic environments capable of providing any kind of interaction between instructors and students including online learning (Berry, 2005). Atici (2007) defined the virtual learning environment as an educational environment that uses computer and Internet technology supporting students’ learning process and experiences.

The constructivist approach shifting the status of students as passive receivers to an active participant role in learning environments has been used since 90s (Jonassen, 1999; Marshall, 1996; Wilson, 1996). In the constructivist approach, students learn the target subject by experiencing, discussing, discovering and deducing as much as possible. The environments should be dynamic and interactive allowing new ideas to realize functions of the constructivist approach in the learning environments (Roussou, 2004), which is today supported in virtual learning environments. Researchers conduct various studies to identify whether virtual learning environments meet these needs, and they examine their effects in student’s performance. Finally, this study aims to analyze and discuss studies on virtual learning environments in Turkey and seeks to answers to the following questions:

1) What are the virtual learning environments preferred in the studies and how have they evolved over the years?
2) In the studies on virtual learning environments;
   a) What were research methods employed?
   b) What were data collection tools employed?
3) Regarding the sampling of virtual learning environments;
   a) What were the sample sizes employed?
   b) What were the sampling status employed?
   c) What were the sampling methods employed?
4) What were the data analysis methods employed?
5) What were the variables addressed by these studies?
6) What were the outcomes of these studies?

METHOD

In the study, content analysis method one of the qualitative research methods was used to analyze the studies on virtual learning environments in Turkey. Content analysis is a textual analyses of a set of data that typically involves comparing, contrasting, and categorizing to classify the data, and to divide it by different identified themes and concepts (Bauer, 2003; Fraenkel & Wallen, 2000). According to Tavsancli and Aslan (2001), content analysis is a scientific research approach allowing the objective and systematic examination of verbal, written and other materials. Content analysis is a method used to analyze the studies in a particular field and reach at conclusions based on the findings (Buyukozturk et al., 2012).

Sample of the Study

The sample of this study consists of the articles, proceedings and thesis conducted till the end of the 2014 in Turkey. The sample population of the study is constituted of databases accessible to the Suleyman Demirel University’s Information Centre, the Google Scholar and the thesis database of the Council of Higher Education of Turkey.

Data Collection Process

Review and selection criteria were established to determine the studies to be analyzed in the study. In the study, the keywords “virtual learning” and “virtual learning environment” were used both in Turkish and in English into the SDU's Information Centre, the Google Scholar and the thesis database of the Council of Higher Education to search studies.
Following the search, a total of 32 articles in 24 different journals, and 13 proceedings in six different conferences were found on virtual learning environments. 16 master thesis and two Ph.D. thesis were found on virtual learning environments in the Council of Higher Education's national thesis database. Finally, 63 studies carried out in Turkey between the years 1996-2014 were reached and analyzed in the scope of the study. Distributions of place and year of the studies are presented in Appendix-A.

Studies addressing the concept of teaching in virtual learning environments were chosen for the analyses. Data obtained from the studies were recorded in the "Publication Classification Form for Virtual Learning Environment" (Appendix-B) developed by authors utilizing the "Publication Classification Form" (Sozbilir, Kutu, & Yasar, 2012) and the "The Educational Technology Publication Classification Form" (Goktas et al., 2012).

Data Analysis
During the content analysis process, one faculty member and one MA student worked together. In the process of analysis and interpretation of studies; the stages of naming, developing category, ensuring validity and reliability, calculating frequencies and interpretation were carefully fulfilled. In order to achieve validity and reliability studies were analyzed on the basis of researchers’ agreement. Initial disagreements during the content analysis process were discussed and resolved, and then the rest of the studies were analyzed by collaborative work between the authors. Finally, the data were organized according to the research questions. The data obtained from the content analysis were analyzed by means of the descriptive statistics (percentage, frequency, etc.). The results were organized, classified and presented in tables and charts, and findings were interpreted.

FINDINGS

The results revealed that the first study on virtual learning environments in Turkey was published in 1996. Therefore, articles, proceedings and theses published between 1996 and 2014 were analyzed in this study. Number of studies analyzed within the scope of the research is 63. Majority of the studies were published in Turkish (f=51) and a small amount of the studies were published in English (f=12). Literature review studies and only development of virtual environment studies were not included in the content analysis.

Virtual Learning Environments Selected in the Studies
The analysis of the studies revealed that mostly preferred virtual environments were "Second Life" and "Active Worlds". It was further observed that "Opensim", "Quest Atlantis", "Fuvle", "Cubix Editor", "Celestia", "Stellarium" and "Solar Model" represented other virtual environments in the studies. Also, virtual learning environments for educational practice were developed in some studies (Kosaner, 2007; Tuzun & Ozdinc, 2010). The analysis revealed that the researchers did not utilize virtual learning environments in their studies before 2005. It was observed that the studies till 2005 were mostly literature reviews to create theoretical base for the field. Table 1 shows that studies on virtual learning environments display a progressive increase over the recent years. Although 63 studies were reviewed, only 43 studies were analyzed because some studies were used literature review method. Table 1 shows 51 virtual environments because some of the studies had more than one virtual learning environments.
<table>
<thead>
<tr>
<th>Virtual Environment</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second Life</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>7</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>Active Worlds</td>
<td>1</td>
<td>3</td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Moodle</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Opensim</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Celestia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Stellarium</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Solar Model</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
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<td>Web Quest</td>
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<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>VLE Development</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Quest Atlantis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Fuvle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Cubix Editor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
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<td>True Vision 3D</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
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<tr>
<td>EFL/ESL</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Other LMS</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td>13</td>
<td>4</td>
<td>51</td>
</tr>
</tbody>
</table>

Research Methods and Data Collection Tools

Figure 1 shows the distribution of research methods in the studies on virtual learning environments by the publication year. It was observed that the literature review method was mostly used in the studies and then quantitative, qualitative and mixed studies were used respectively. It was further observed that the literature review method was used in 20 studies, the quantitative research method was used in 16 studies, the qualitative research method was used in 16 studies and the mixed research method was used in 10 studies. Furthermore, virtual learning environments were developed in two studies (Kosaner, 2007; Tuzun & Ozdinc, 2010).

Figure: 1
Distribution of methodologies used in the studies by year
Data collection tools used in the studies on virtual learning environments are presented in Figure 2. As the data collection tool, "Scales" (35.41%), "Interviews" (18.75%), "Questionnaires" (17.71%), "Observations" (11.46%), "Achievement Tests" (8.33%) and "Diaries (4.17%)" were used in the studies. In addition, other data collection instruments (1.04%) were used such as "Cognitive Load Measurement", "Word Measurement", "Eye Tracking" and "Portfolio". Also, it was found that data collection tools were used only in 41 studies. Figure 2 shows 96 tools as some of the studies used a few types of data collection tools in the same study.

Table 2 shows detailed distributions for data collection tools of the studies. In majority of the studies, it was seen that scales (f=38) were preferred as the data collection tool. Thus, the most preferred type of scale were likert-type (f=35). Questionnaires (f=19) and interviews (f=18) used more often compared to the others. The results showed that Likert-type questionnaires (f=13) were preferred more than open-ended (f=3) and multiple-choice questionnaires (f=3). Semi-structured interviews (f=13) were found to be the most common tool used in the interview studies. Furthermore, it was seen that the observation tools (f=11) and the achievement tests (f=7) were other data collection instruments used in the studies. The fNIR cognitive load measuring device, word count and recording device and portfolios were used as the alternative data collection tools. Although Figure 2 shows a total of 96 data collection tools in the studies, detailed distributions for data collection tools reveal 97 tools because one of the studies included both multiple-choice questions and Likert-type questions.
Table: 2
Detailed distribution of the data collection tools

<table>
<thead>
<tr>
<th>Detailed distribution of the data collection tools</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semi-structured</td>
<td>9</td>
<td>9.3</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>2.1</td>
</tr>
<tr>
<td>Interview</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structured</td>
<td>1</td>
<td>1.0</td>
</tr>
<tr>
<td>Semi-structured</td>
<td>13</td>
<td>13.4</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>4.1</td>
</tr>
<tr>
<td>Achievement test</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple-Choice</td>
<td>7</td>
<td>7.2</td>
</tr>
<tr>
<td>Scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple-Choice</td>
<td>3</td>
<td>3.1</td>
</tr>
<tr>
<td>Likert-type</td>
<td>35</td>
<td>36.1</td>
</tr>
<tr>
<td>Questionnaire</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open-ended</td>
<td>3</td>
<td>3.1</td>
</tr>
<tr>
<td>Multiple-Choice</td>
<td>3</td>
<td>3.1</td>
</tr>
<tr>
<td>Likert-type</td>
<td>13</td>
<td>13.4</td>
</tr>
<tr>
<td>Alternative tools</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance identifier</td>
<td>2</td>
<td>2.1</td>
</tr>
<tr>
<td>Portfolio</td>
<td>1</td>
<td>1.0</td>
</tr>
<tr>
<td>Data resources</td>
<td>1</td>
<td>1.0</td>
</tr>
<tr>
<td>Total</td>
<td>97</td>
<td>100</td>
</tr>
</tbody>
</table>

Sample Sizes, Sample Education Levels and Sample Selection Methods

Table 3 shows the distribution of the 41 studies with sample details. It is seen that the most preferred sampling ranges are "31-100", "0-30", "101-300" and "301 and above" respectively.

Table: 3
Distribution of the sample size

<table>
<thead>
<tr>
<th>Sample size</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-30</td>
<td>15</td>
<td>36.6</td>
</tr>
<tr>
<td>31-100</td>
<td>19</td>
<td>46.4</td>
</tr>
<tr>
<td>101-300</td>
<td>6</td>
<td>14.6</td>
</tr>
<tr>
<td>301+</td>
<td>1</td>
<td>2.4</td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>100</td>
</tr>
</tbody>
</table>

The distribution of the education levels preferred in 40 studies are given in Table 4. As seen in Table 4, mostly undergraduate students (70%) were chosen as sample groups in the studies. However, primary and high school students and post-graduate students were preferred least often as sample groups.

Table: 4
Distribution of sample level

<table>
<thead>
<tr>
<th>Sample education level</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary School</td>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>High School</td>
<td>3</td>
<td>7.5</td>
</tr>
<tr>
<td>Undergraduate</td>
<td>28</td>
<td>70</td>
</tr>
<tr>
<td>Postgraduate</td>
<td>3</td>
<td>7.5</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100</td>
</tr>
</tbody>
</table>

In the study, 42 studies with sampling method details were analyzed and details are given in Table 5. The most common sample selection methods were the purposive (52.4%) and convenience (42.8%) sampling. However, random sampling (4.8%) were preferred least often as sample selection method in the studies.
Data Analysis Methods

44 studies that provide information on the data analysis method were analyzed. Table 6 shows the distribution of the data analysis methods. Qualitative data analysis method (37.7%) was the most common data analysis method. Besides the qualitative data analysis method, quantitative descriptive (32.8%) and quantitative inferential (29.5%) data analysis methods were also used in the studies. Although 44 studies included data analysis methods, the total number of data analysis methods in Table 6 is 61 because some of the studies used data analysis methods more than one.

Table 6
Distribution of the data analysis methods

<table>
<thead>
<tr>
<th>Data analysis method</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualitative</td>
<td>23</td>
<td>37.7</td>
</tr>
<tr>
<td>Quantitative Descriptive</td>
<td>20</td>
<td>32.8</td>
</tr>
<tr>
<td>Quantitative Inferential</td>
<td>18</td>
<td>29.5</td>
</tr>
<tr>
<td>Total</td>
<td>61</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 7 shows the detailed distribution of the data analysis methods. The quantitative inferential analysis method (f=25) was the most common data analysis method and ANOVA (f=7) was the most preferred analysis technique among quantitative inferential data analysis methods. The qualitative content analysis (f=16) method was preferred more than the qualitative descriptive analysis (f=7) method. It was also seen that quantitative descriptive data analysis method (f=18) was used less than quantitative inferential and qualitative analysis methods. It was further observed that means and standard deviations (f=14) were used more than the frequencies/percentages/tables (f=4) in quantitative descriptive analyses.

Table 7
Detailed distributions of the data analysis methods

<table>
<thead>
<tr>
<th>Detailed distributions of the data analysis methods</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantitative Descriptive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency/Percentage/Table</td>
<td>4</td>
<td>6.2</td>
</tr>
<tr>
<td>Mean/Standard Deviation</td>
<td>14</td>
<td>21.5</td>
</tr>
<tr>
<td>Quantitative Inferential</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correlation</td>
<td>4</td>
<td>6.2</td>
</tr>
<tr>
<td>t- test</td>
<td>5</td>
<td>7.7</td>
</tr>
<tr>
<td>ANOVA</td>
<td>7</td>
<td>10.8</td>
</tr>
<tr>
<td>ANCOVA</td>
<td>5</td>
<td>7.7</td>
</tr>
<tr>
<td>MANOVA</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>Factor Analyses</td>
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<td>1.5</td>
</tr>
<tr>
<td>Non-parametric</td>
<td>2</td>
<td>3.1</td>
</tr>
<tr>
<td>Qualitative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Content analysis</td>
<td>16</td>
<td>24.6</td>
</tr>
<tr>
<td>Descriptive Analyses</td>
<td>7</td>
<td>9.2</td>
</tr>
<tr>
<td>Total</td>
<td>65</td>
<td>100</td>
</tr>
</tbody>
</table>
Variable Types Explored in the Studies

In the study, 40 studies examining the influence of virtual environments on one or more variables for educational purposes were investigated. Table 8 shows the distribution of the variables studied in the studies. The most common studied variable was usability (27.5%) than academic achievement, skill development, motivation, presence, attitude, efficacy, cognitive load and spatial thinking variables respectively.

<table>
<thead>
<tr>
<th>Variables</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usability</td>
<td>14</td>
<td>27.5</td>
</tr>
<tr>
<td>Academic achievement</td>
<td>9</td>
<td>17.6</td>
</tr>
<tr>
<td>Skill development</td>
<td>8</td>
<td>15.7</td>
</tr>
<tr>
<td>Motivation</td>
<td>7</td>
<td>13.7</td>
</tr>
<tr>
<td>Presence</td>
<td>5</td>
<td>9.8</td>
</tr>
<tr>
<td>Attitude</td>
<td>4</td>
<td>7.8</td>
</tr>
<tr>
<td>Efficacy</td>
<td>2</td>
<td>3.9</td>
</tr>
<tr>
<td>Cognitive load</td>
<td>1</td>
<td>2.0</td>
</tr>
<tr>
<td>Spatial thinking</td>
<td>1</td>
<td>2.0</td>
</tr>
<tr>
<td>Total</td>
<td>51</td>
<td>100</td>
</tr>
</tbody>
</table>

Results of the Studies Conducted in Virtual Learning Environments

The studies showed that usability of the virtual learning environments are important to employ these environments for educational purposes. It was also indicated that virtual learning environments did not significantly have influence on academic success in some studies (Aslan, 2012; Esgin, Pamukcu, & Ergül, 2012) while other studies had positive significant influence on academic success. It was further concluded that the other variables addressed in the studies such as skill development, motivation, presence, attitude and efficacy were generally influenced significantly in virtual learning environments. Also, it was observed in one study learning and teaching processes in virtual learning environments generally decreased the cognitive load levels of participants (Cansiz, 2012). In addition, experimental studies showed that it was needed less time for activities in virtual learning environments compared to other learning environments (Sengel & Ozden, 2010).

DISCUSSION AND CONCLUSION

In this study, the studies conducted on virtual learning environments in Turkey were explored through the content analysis method. When the literature was considered, two content analysis studies were found about virtual environments (Kim, Lee, & Thomas, 2012; Tokel & Karatas, 2014). The outcomes of these global studies are consistent with the outcomes of studies in Turkey. Second Life appears as the most preferred virtual environment used in the studies in Turkey. Similarly, Second Life appears as the most common virtual environment in the world (Kim et al., 2012; Tokel & Karatas, 2014). In addition, consistent with the worldwide studies, Active Worlds, Opensim, Celestia, Stellarium, and Solar Model are used as the common virtual environments respectively. Furthermore, it was observed that specific virtual environments were developed in some studies conducted in Turkey (Kosaner, 2007; Tuzun & Ozdinc, 2010).

The literature shows that the studies on virtual learning environments around the world has increased obviously starting from 2008 (Kim et al., 2012; Tokel & Karatas, 2014). In Turkey, a significant increase in the number of studies on virtual learning environments has been observed since 2011. Studies both in Turkey and worldwide are generally literature reviews. Also, the analysis of the studies on virtual learning environments shows that number of quantitative and qualitative researches is close to each other in Turkey. While some of the studies reveal that quantitative and qualitative research methods are employed...
At similar rates in content analysis studies conducted in Turkey on different subjects (Tatar, Kagizmanli, & Akkaya, 2013), there are also studies indicating that quantitative research methods are more common than qualitative research methods (Ciltas, Guler, & Sozbilir, 2012; Goksu, Ozcan, Cakir, & Goktas, 2014; Selcuk, Palanci, Kandemir, & Dundar, 2014). Besides literature reviews, quantitative and qualitative methods employed in researches, the mixed research method is used and also development works are implemented to build a virtual learning environment in this field.

It is observed scales are the most common data collection tool, and mostly likert-type scales are preferred. Similarly, the study of Selcuk and his colleagues (2014) indicates that most common data collection tools employed in Turkey are the scales measuring perception, attitude, and other variables. On the other hand, some studies shows that the data collection tool that is mostly preferred is questionnaires (Ciltas et al., 2012; Goksu et al., 2014). In addition, studies on virtual learning environments in Turkey further show that interviews, questionnaires, observations and achievement tests are used as data collection tools respectively besides scales.

The results of content analysis also show that the most common sample size is the 31-100 range including undergraduate students, which is consistent with the findings of another content analysis studies (Ciltas et al., 2012; Tatar et al., 2013). It could be argued that the selected research method is effective in determining the sample size. It is observed in the studies on virtual learning environments in Turkey that some sampling criterion are defined prior to the sample selection, and mostly purposive sampling method is used. Furthermore, the key reason to select undergraduate students as a sample is that the academicians access easier to undergraduate students to conduct their studies.

In the study, it is seen that the most common studied variable in virtual learning environments is usability than academic success, skill development, motivation, presence, attitude, efficacy, cognitive load and spatial thinking respectively. The diversity of the variables is generally consistent with studies conducted in the field of education. The findings of the studies show that activities implemented in virtual learning environments have positive influence on the variables examined in the studies. On the other hand, the studies on the usability reveal that virtual learning environments may be used in teaching and learning processes.

**SUGGESTIONS**

This results of the study seems important to put forward the current situation by examining the studies on virtual learning environments conducted in Turkey. The opinion is that the findings of this study may guide researchers aiming to employ virtual learning environments. The main limitation of the study is that virtual learning environments used in the studies show different characteristics. In conclusion, some suggestions may be developed for future studies based on the results.

It is seen that single virtual environment is generally used and its impact on variables is examined in the studies. Therefore, two or more virtual environments may be used and their effects on variables may be compared. Also, the effects on different variables of virtual learning environment may be analyzed. Furthermore, researchers may conduct new studies to discover the influence of virtual learning environments on permanent learning. Moreover, some scales may be developed to use in the field studies and they may be used to obtain more reliable results about the effects of the virtual learning environments on several variables. Finally, longitudinal studies may be conducted to explore the long-term influences of virtual learning environments on wide samples.
BIODATA and CONTACT ADDRESSES of the AUTHORS

Dr. Veyssel DEMIRER has a PhD degree in Curriculum and Instruction. Currently, he is an assistant professor in Faculty of Education, Department of Computer Education and Instructional Technology, Suleyman Demirel University where he lectures on educational science, educational technology, and technology integration and teacher education. He specializes in teacher training, educational technology, and psycho-social aspects of technology use. In these areas of expertise, he has published articles, books, book chapters and given international presentations. He is an active member of the Association Turkish Information & Communication Technologies Educators. He currently lives in Isparta, Turkey with his wife and two daughters, where he enjoys running, tracking, travelling and driving.

Assist. Prof. Dr. Veyssel DEMIRER,
Suleyman Demirel University, Faculty of Education,
Department of Computer Education & Instructional Technology,
Isparta, 32260, TURKEY
Phone: +902462114583 Fax: +902462114505
e-Mail: veyseldemirer@gmail.com

Cagdas ERBAS has a Ma. Sc. degree in Computer Education and Instructional Technology at Suleyman Demirel University. Currently, he has a sponsorship from Republic of Turkey, Ministry of Education. He specializes in educational technology. In these areas of expertise, he has published articles, book chapters and given international presentations. He currently lives in Austin Texas in the US, where he is studying English.

Cagdas ERBAS,
Ministry of Education, Ankara, Turkey
Phone: +905053768391
e-Mail: cagerbas@gmail.com

REFERENCES


## APPENDIXES

### A. Distribution of the studies by year

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Appendix B. Publication classification form for virtual learning environment

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<td><strong>Publication title:</strong></td>
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<td><strong>Type:</strong> Article, thesis, etc.</td>
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<td><strong>Sample selection method:</strong> (Random, convenience, purposive, etc.)</td>
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<td><strong>Virtual learning environment used:</strong> (Second Life, Open Sim, etc.)</td>
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<td><strong>Data collection tools and details</strong> (Observation, interview, academic achievement test, attitude test, questionnaire, etc.) and (Multiple choice, Likert-type, open-ended, structured form etc.)</td>
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<td><strong>Variables:</strong> (Usability, academic achievement etc.)</td>
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THE IMPACT OF LECTURERS’ THINKING STYLES ON STUDENTS’ CREATIVITY IN DISTANCE HIGHER EDUCATION

Dr. Mohammad Reza SARMADI  
Faculty of Human Sciences  
Payame Noor University, Iran

Dr. Mehran FARAJOLLAHI  
Faculty of Human Sciences  
Payame Noor University, Iran

Dr. Bahman SAEIDIPOUR  
Faculty of Human Sciences  
Payame Noor University, Iran

Dr. Mehrdad AHMADIFAR  
Faculty of Human Sciences  
Payame Noor University, Iran

ABSTRACT

The purpose of this study was to investigate the group creativity on thinking styles in distance education based on collaborative learning. Sample included 120 students from three intact classes of the College of Education were selected as the participants for the main study. The instruments of measurement were the thinking styles inventory and the creative product semantic scale. Using the factorial quasi-experimental design, impact of thinking styles in the group creativity was tested. The results of the present study showed that male students tended to prefer the legislative thinking style more than the female students. There was no significant difference between male and female students in the overall creative ability. In addition, this study found that there was no significant association between the average group member creative ability and the overall group creative performance. The findings also supported Sternberg’s argument that ability is different from style.

Keywords: Thinking styles, distance learning, group creativity.

INTRODUCTION

Online collaborative learning environments have the potential to support teaching and learning relying on social interaction between group members (Kreijns et al., 2004). The best way of grouping lies in each single group containing students with different thinking styles, which bring forth better cooperative results. Teachers should create a learning environment in which students with different thinking styles can capitalize on their strengths and compensate for their weaknesses of thinking and learning, therefore proposed the theory of mental self-government to assist teachers to enhance the effectiveness of teaching and learning (Sternberg, 1990).

Thinking styles are among the major resources that give rise to creativity. A number of research studies have supported meaningful relationships between certain thinking styles and creativity (Yang & Lin, 2004). It is widely believed that the development of creativity is influential to the success of an organization. Empirical findings reveal that some styles of thinking have significant correlation with creative thinking. Scholars have recognized
that creative thinking is valuable for both individuals and society (Sternberg, 1997; Yang & Lin, 2004). Sofo(2008) characterizes thinking styles as the most comfortable ways of individuals responding to a situation, that lead to specific habitual styles that influence people’s cognition and emotion which guide and control people’s daily activities. Thinking style refers to the specific approach of individuals in processing and evaluating information, solving problems, and making decisions (Armstrong & Cools, 2009). Style of thinking is unique and adaptive. It has a different domain from other individual traits, such as personality, emotional intelligence and abilities (Fjell & Walhovd, 2004; Haller & Courvoisier, 2010; Murphy & Janeke, 2009; Zhang, 2010). The literature indicate that thinking styles link personality and cognition (Sujan, 1995). Moreover, style of thinking is identified as socialized, which means that thinking styles can be affected by intellectual, emotion, motivation, physical and mental well-being, and environment (Sofo, 2008; Zhang & Sternberg, 2006). Thinking styles may influence all human activities that involve learning, social and interpersonal functioning. (Zhang, 2003). Thinking style is partially developed through socialization and often operate unconsciously, therefore leading individuals to perceive a given situation variously (de St. Aubin, Blahnik, & Lucas, 2007). People may accommodate their styles through interaction with their surroundings; hence, the environment is one fundamental aspect that may influence a person’s preference of styles (Sternberg, 1997; Zhang & Sternberg, 2005). In work settings, environment can influence people’s thinking styles, therefore people who work in a more favorable environment are generally happier, thus more willing to take risks, to be innovative and to be persistent in trying different ways of solving problems. They tend to think more creatively and use a wider range of thinking styles (Zhang, 2005). Sternberg expanded the concept of thinking styles upon mental self-government theory; He used this theory to explain the thinking characteristics of creators. He divided thinking styles into 5 main categories and 13 detailed types (Sternberg, 1988; 1990; 1997). Table 1 shows main categories and detailed types of thinking styles.

Table: 1
Five main categories and 13 detailed categories of thinking styles.

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In the field of education, scholars identified that thinking styles contribute significantly to students’ academic achievement, learning approaches, cognitive development and social development (Bernardo, Zhang, & Callueng, 2002). Thinking styles also affect teaching behaviors, such as teaching approaches and interaction styles. (Zhang, 2011; Zhang & Sternberg, 2002). Teachers’ thinking styles characterize interpersonal behavior towards students, whether they are helping, understanding and allowing student freedom, or they are being strict, showing dissatisfaction and expressing anger. Thinking styles are among the major resources that give rise to creativity. A number of research studies have supported meaningful relationships between certain thinking styles and creativity (Yang & Lin, 2004). It is widely believed that the development of creativity is influential to the success of an organization. Empirical findings reveal that some styles of thinking have
significant correlation with creative thinking. Scholars have recognized that creative thinking is valuable for both individuals and society (Sternberg, 1997; Yang & Lin, 2004).

Sternberg also contended that although someone might have creative ability, they may not enjoy coming up with novel ideas challenging prevailing view points (Sternberg & Lubart, 1995). Conversely, that while someone might not be creative, they may prefer generating unorthodox ideas (Sternberg & Zhang, 2005). Creativity is the capacity to produce ideas under an observable form or to realize a production that is both novel, i.e. original and unexpected, and adapted to the situation in which it occurs (Bonnardel, 2006; Bonnardel, 2009; Bonnardel and Zenasni, 2010). Most creative acts occur in a collaborative context (Sonnenburg, 2004). For example, groups provide a sufficient pool of knowledge, experiences, and views to produce an optimal outcome at each stage of the problem-solving process (Lohman & Finkelstein, 2000).

In recent years, there has been increasing acknowledgment of a more complex view of creativity, highlighting the role of dynamic and interconnected social systems, such as mentoring an collaboration, in creative work. Some group researchers claim that by providing many different perspectives for consideration, diversity within a group can help the creative process and promote more innovative outcomes (Kurtzberg & Amabile, 2001; Kurtzberg, 2005; Mamykina et al., 2002). Empirical studies show that the impact of diversity on group performance may not be as positive as many would like to believe (Williams & O'Reilly, 1998). Sometimes, heterogeneity in group composition even decreases the initial degree of satisfaction of group members, and some researchers (Milliken et al., 2003; Nemeth & Nemeth-Brown, 2003) indicate that perceived individual differences among group members may have negative effects on both emotional reactions (e.g. group identification, emotional conflict, psychological safety, and group satisfaction) and cognitive processes (e.g. thinking differently about an issue), and may make it difficult for individuals to identify themselves as belonging to the group. Therefore, in the early formative phases of group interaction, differences can induce conflict and frustration among members, and this can carry over subsequent operational and performance phases (Paulus & Nijstad, 2003). “Diversity, thus, appears to be a double-edged sword that increases the opportunity for creativity as well as the likelihood that group members will be dissatisfied and fail to identify with the group” (Milliken & Martins, 1996, p.403). Milliken et al. (2003) believed that an important moderator of the relationship between diversity and a work group’s affective reactions is the perception of a super ordinate goal. When members perceive they are working toward a common goal, the negative effects of diversity on a group’s initial affective reactions may be attenuated. A critical factor promoting the perceptions of a super ordinate goal is the structure of a work group’s task and reward system (Tjosvold, 1986). Tjosvold (1988) noted that a cooperative orientation, with the exchange of resources and information, and openness to each other's ideas, could be induced by creating a common task requiring group collaboration. Wageman (1995) also found that a group task that has a high-level task interdependence leads to a greater sense of collective responsibility.

Milliken et al. (2003) stated seem to play a critical role in a group’s activities. Hinsz et al., (1997) also noted that group members’ affective reactions affect how groups approach their tasks. Milliken et al. (2003) indicated that members who identify more strongly with the group would tend to be more willing to contribute to the collaborative product. In addition, group members with substantial psychological safety are more likely to feel positive about the group and its task. In contrast, group members with low psychological safety generally feel disinterested in the group and are less like to engage with it. Moreover, negative moods are associated with a high level of emotional conflict and low levels of group satisfaction, and such conflict may lead to narrow and rigid thinking, thus reducing creativity. In contrast, a positive mood may enhance participation and increase members’ capacity to generate unusual and creative ideas. An additional factor that may reduce group performance is conformity, the desire for social consensus, which induces agreement without reflection and limits the ability of individuals' to think in alternative ways (Nemeth & Nemeth-Brown, 2003). Due to fear of social sanctions or the assumption that the majority is probably correct, people in groups often agree, and this conformity harms creativity.
Woo, Lee & Kim (2009) suggested that cooperative learning depends on not only group members’ capability, but also quantity and quality of interaction. Therefore, appropriate team composition strategies are necessary to enhance creativity within the group. Many researchers have a tentative conclusion that heterogeneous group composition is more effective than homogeneous group composition (Sawyer, 2007). In addition, group creativity is optimized when group members have different perspectives (Nemeth & Kwan, 1985). There are reports that discordance between team members thinking increases probability of finding novel and appropriate solutions (Nemeth et al., 2004). However, Woo (2010) warned extreme diversity is harmful to group creativity. Based on his finding, Woo (2010) recommend that group composition through cognitive diversity is one of the most effective methods. Also, Kim (2007) suggested that different working styles maximize synergy among group members. In conclusion, heterogeneous group composition creates a complementary relationship among group members so that group creativity is maximized. However, agreed specific strategies are still absent. Through empirical data, this paper aims to discover specific strategies that lead to a significant improvement in students’ group creativity. We are considering students thinking styles as the parameter of group creativity, and the affect of thinking styles during learning in distance education.

RESEARCH METHODOLOGY

The aim of this study was to investigate the students’ group creativity on thinking styles in distance education based on collaborative learning. The target population for this work was full-time university students in Iran. Students from the Payame Noor University, which is located in the Western part of Iran, served as the non-random convenience sample in this study. Thirty-second year students from three intact classes of the College of Education were selected as the participants for the study. 120 student from virtual courses took part in the research.

Because the researcher was interested in making comparisons as well as identifying cause-and-effect relationships, a quasi-experimental approach was adopted in this work. Nevertheless, the lack of random assignment means that it is necessary to make considerable efforts to determine the comparability of the comparison and experimental groups. The author thus tried to ensure the experimental and comparison groups were as similar as possible in the real study.

The 3 x 3 factorial quasi-experimental design employing a pretest-posttest comparison group, with thinking styles being a measured (i.e. naturally occurring) factor and conference structure being a manipulated factor. There are two major types of independent variables applicable to the research questions. First, there are attribute variables, which measure the preexisting characteristics of the research participants. The attribute variables in this study include thinking styles and creative thinking ability. If thinking styles are significantly related to creative thinking ability, then creative thinking ability would serve as a control variable. Second, there are manipulated variables, and these reflect a presumed cause and set up the conditions for comparison (Suter, 2006). In this study, the manipulated variables are group composition (homogeneous and heterogeneous) and conference structure (no, low and high). Moreover, the dependent variables reflect the presumed effects of the manipulation of the independent variables (Suter, 2006), and these are the measured outcomes. In this study, the dependent variables are group creativity and student perceptions of transactional distance. All of the variables are defined below.

The various types of data and collection methods are summarized in Table 2, and the processes of the instrument development along with the tests of instrument reliability and validity are described in more detail in the following subsections.
Table: 2
Types of data collection and methods

<table>
<thead>
<tr>
<th>Data</th>
<th>Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thinking Styles</td>
<td>Using the Sternberg-Wagner Thinking Styles Inventory</td>
</tr>
<tr>
<td>Creative Ability</td>
<td>Using the Abbreviated Torrance Test for Adults (ATTA)</td>
</tr>
<tr>
<td>Group Creativity</td>
<td>Adapting the Creative Product Semantic Scale to develop an evaluation form</td>
</tr>
</tbody>
</table>

The students’ thinking styles served as the grouping factor. Originally, participants were anticipated to be divided into Executive Group, Legislative Group, Judicial Group, and Mixed Group, with the last group containing the thinking styles of the first three groups. However, there were very few participants who had the judicial thinking style in this sample.

In this study, the medium used for group conferencing was Blackboard Academic Suite, an e-Education platform that enables users to post information and assignments, and to share their academic or social experiences. It has three key areas of utility, which are as a learning system, as a community system, and as a content system. The Discussion Board enables threaded and asynchronous discussions, and this was the collaboration tool for this study. The evaluation, of group creativity in terms of the group blogs, based on the Creative Product Semantic Scale was conducted.

All the collected data were organized and compiled for analysis using SPSS Statistics 19.0. The variables of interest were analyzed with descriptive statistics, Pearson correlation tests, the t-test, analysis of variance (ANOVA) and ANCOVA tests. Reliability and validity of the instruments; The internal consistencies of the scales were estimated with the Cronbach's alpha coefficients, and exploratory factor analysis was used to support the factor structures of these instruments within this specific sample.

RESULTS

The students’ thinking styles served as the grouping factor. Based on the TSI scores, every student was assigned to one of the following groups: Executive, Legislative and Mixed Students were informed that grouping was designed to facilitate online group collaboration, and thus the completion of the group assignments, which were to design two blogs. Group blogs were graded twice: once at the midterm and again at the end of the semester. All participants consented to use synchronous computer conferencing for the group discussions.

Findings Related to Gender, Thinking Styles and Creative Ability

**Question 1: Are there any relationships among gender, thinking styles and creative ability?**

- **Hypothesis 1.1:** There are differences between male and female students in thinking styles.
- **Hypothesis 1.2:** There are differences between male and female students in creative ability.
- **Hypothesis 1.3:** There is an association between individual creative ability and thinking styles.

This study first examined whether male and female students differ in their thinking styles, as measured by the TSI and in creative ability, as measured by the ATTA. The statistical results show that the males did not differ significantly from the females on the executive (p= .61) and judicial thinking styles (p = .11).
**Table: 3**
Means, standard deviations and t-tests for thinking styles between male and female students

<table>
<thead>
<tr>
<th>Thinking Style</th>
<th>Male (n=40)</th>
<th>Female (n=80)</th>
<th>t-test</th>
<th>p</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>T (df =133)</td>
</tr>
<tr>
<td>Legislative</td>
<td>5.69</td>
<td>.81</td>
<td>5.34</td>
<td>.84</td>
<td>2.14</td>
</tr>
<tr>
<td>Executive</td>
<td>5.03</td>
<td>.94</td>
<td>5.14</td>
<td>.97</td>
<td>-.51</td>
</tr>
<tr>
<td>Judicial</td>
<td>4.63</td>
<td>1.09</td>
<td>4.32</td>
<td>.97</td>
<td>1.6</td>
</tr>
</tbody>
</table>

Note. M = mean. SD = standard deviation. df = degrees of freedom. *p < .05.

Independent-groups t-tests assuming equal variances were performed to test whether there were any significant differences in thinking styles between male and female groups. Means and standard deviations of the thinking styles by gender and t-test results are reported in Table 4.

**Table: 4**
Means, standard deviations and t-test for overall creative ability between male and female students

<table>
<thead>
<tr>
<th>Measure</th>
<th>Male (n=33)</th>
<th>Female (n=84)</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>CI</td>
<td>61.7</td>
<td>6.48</td>
<td>60.29</td>
</tr>
</tbody>
</table>

Note. M = mean. SD = standard deviation.

Before the subsets of the ATTA were compared with regard to gender differences, the results of the preliminary Levene’s tests for equality of variances indicated that the variances of the two groups were not significant in the fluency (p = .93), originality (p = .64) and elaboration (p = .3) scores, whereas they were significant in the flexibility scores (p = .003).

The correlation analyses between thinking styles (legislative, executive and judicial) and creative ability (the creative Index, fluency, originality, elaboration and flexibility) were undertaken to find out any possible associations. Demonstrates that there were some slight relationships between thinking styles and creative ability, although there were no significant results between any pair of variables (p > .05).

**Table: 5**
Interco relations between thinking styles and creative ability.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Fluency</th>
<th>Originality</th>
<th>Elaboration</th>
<th>Flexibility</th>
<th>Creativity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index</td>
<td>-.13</td>
<td>.13</td>
<td>-.06</td>
<td>.05</td>
<td>.09</td>
</tr>
<tr>
<td>Legislative</td>
<td>-.15</td>
<td>-.06</td>
<td>.01</td>
<td>-.14</td>
<td>-.003</td>
</tr>
<tr>
<td>Executive</td>
<td>-.09</td>
<td>.11</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Findings Related to Individual Creative Ability and Group Creativity**

**Question 2: Is individual creative ability related to the overall group creative performance?**

**Hypothesis 2:** The average of group member creative ability is correlated with the overall group creative performance.

The results reveal that the correlation coefficient for these two variables was r = .007, p = .98, and thus there was no significant association between the average result for group member creative ability and that for overall group creative performance.
Table: 6
Correlation between the average of group member creative and the overall group creative performance.

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>Skewness</th>
<th>Kurtosis</th>
<th>Kolmogorov/Sig</th>
<th>Pearson's (r)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average of group member creative ability</td>
<td>60.96</td>
<td>4.42</td>
<td>.16</td>
<td>.23</td>
<td>.113/.20</td>
<td>.007</td>
<td>.98</td>
</tr>
<tr>
<td>Overall group creative performance</td>
<td>13.58</td>
<td>.70</td>
<td>.86</td>
<td>1.03</td>
<td>.100/.20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Findings Related to Factors Influencing on Group Creativity

Question 3: Do group composition and conference structure have an effect on group creativity?

Hypothesis 3.1: There is a difference between the types of group composition with regard to group creativity.

Hypothesis 3.2: There is a difference between the levels of conference structure with regard to group creativity.

As is evident from the table 7, there were no significant differences among the legislative, executive and judicial groups ($F(2, 15) = 1.33, p = .29, \text{partial } \eta^2 = .15$). Moreover, there were also no significant differences among the high-structured, low-structured and no-structured conferences ($F(2, 15) = 3.56, p = .054, \text{partial } \eta^2 = .32$). Furthermore, no significant interaction was found between group composition and conference structure ($F(4, 15) = 1.62, p = .22, \text{partial } \eta^2 = .30$).

Table: 7
Two-way ANCOVA table for group composition and conference structure

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
<th>\eta^2</th>
<th>Power \textsuperscript{b}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected model</td>
<td>5.93 \textsuperscript{a}</td>
<td>9</td>
<td>.66</td>
<td>1.53</td>
<td>.22</td>
<td>.48</td>
<td>.48</td>
</tr>
<tr>
<td>Intercept</td>
<td>9.37</td>
<td>1</td>
<td>9.2</td>
<td>21.8</td>
<td>.000</td>
<td>.59</td>
<td>.99</td>
</tr>
<tr>
<td>Covariance</td>
<td>.001</td>
<td>1</td>
<td>.001</td>
<td>.001</td>
<td>.97</td>
<td>.000</td>
<td>.05</td>
</tr>
<tr>
<td>Group composition</td>
<td>1.14</td>
<td>2</td>
<td>.566</td>
<td>1.33</td>
<td>.29</td>
<td>.15</td>
<td>.23</td>
</tr>
<tr>
<td>Conference</td>
<td>3.06</td>
<td>2</td>
<td>1.54</td>
<td>3.56</td>
<td>.05</td>
<td>.32</td>
<td>.57</td>
</tr>
<tr>
<td>Group composition</td>
<td>2.78</td>
<td>4</td>
<td>.70</td>
<td>1.62</td>
<td>.22</td>
<td>.30</td>
<td>.38</td>
</tr>
<tr>
<td>Conference structure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>6.44</td>
<td>15</td>
<td>.43</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>429.1</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected total</td>
<td>12.37</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. \eta^2 (eta squared) = effect size.
R squared = .469 (Adjusted R squared = .164). b. Computed using alpha = .05
As shown in above, when controlling for the pre-existing group creativity, no significant effects were found for either the group composition or conference structure factor on group performance. Moreover, no significant interaction was found between these two factors.

DISCUSSION
The purpose of this study was to investigate the group creativity on thinking styles in distance education based on collaborative learning in order to enhance the creativity expressed in an online learning environment.

The results of the present work showed that the male students preferred the legislative thinking style significantly more than the female ones. This study also found that the executive thinking style was negatively correlated with originality for the female group. Therefore, teachers should encourage students to develop different thinking styles, and provide them with opportunities to demonstrate their varied strengths by diversifying their teaching and assessment strategies, and designing a variety of group activities. Students’ awareness of their own styles, as well as those of their partners, could be instrumental to the effectiveness of conflict resolution and group cohesiveness (Zhang & Sternberg, 2009).

Some group researchers claim that by providing many different perspectives for consideration, diversity within a group can help the creative process and promote more innovative outcomes (Kurtzberg, 2005; Mamykina et al., 2002). A diverse group consists of members who are different from each other with regard to one or more characteristics (Milliken et al., 2003). However, in this study, there was no significant association between the average group member creative ability and the overall group creative performance. Furthermore, using an experimental method, no significant main effects were found for the group composition and conference structure factors on group creative performance, and no significant interaction was found between these two factors, either. That is, heterogeneous groups (mixed groups). present study, the findings reveal that overall creative ability is not related to thinking styles, as those individuals preferring a legislative style of thinking, a style related to a propensity for creativity, did not in fact have any greater creative ability. The following subsections present a number of interesting ideas about thinking styles, based on the findings of this study.
No significant relationships between thinking styles and creative abilities were found. Sternberg’s argument that ability is different from style was thus supported in this study. It did not demonstrate better creative performance than the homogeneous ones (legislative and executive groups). These findings reveal the complexity of group creative performance. Creativity is both a process and an outcome - if one cannot understand the process that created it, and then the outcome is also not well understood (Milliken et al., 2003).

In addition, group members with substantial psychological safety are more likely to feel positive about the group and its task. In contrast, group members with low psychological safety generally feel disinterested in the group and are less like to engage with it. Moreover, negative moods are associated with a high level of emotional conflict and low levels of group satisfaction, and such conflict may lead to narrow and rigid thinking, thus reducing creativity. In contrast, a positive mood may enhance participation and increase members’ capacity to generate unusual and creative ideas. An additional factor that may reduce group performance is conformity, the desire for social consensus, which induces agreement without reflection and limits the ability of individuals’ to think in alternative ways (Nemeth & Nemeth-Brown, 2003). Due to fear of social sanctions or the assumption that the majority is probably correct, people in groups often agree, and this conformity harms creativity. All of these factors may affect creative processes and outcomes, and are worthy of further exploration in future research.

CONCLUSION

The greatest strengths of online collaborative learning are its flexibility, independence, cost efficiency, as well as its powerful capability to enable direct interaction and communication. It is a challenge for the teacher to create an online environment that not only emphasizes the importance of learner autonomy, but also encourages distance students to participate in non-contiguous discussions. Advances in computer conferencing systems are facilitating new opportunities for two-way communication by which groups of students can practice reflection, critical thinking and problem solving (Sumner, 2000). In addition, the potential for greater enjoyment and relaxation when taking part in computer conferencing might help learners who had previously felt frustrated to overcome their fears, and thus build a more productive and structured learning environment with a social and subject-related consensus (Nipper, 1989). Besides, the implementation of computer conferencing, an open and democratic medium, will move the locus of control from the teacher to the group and the processes generated by it, and consequently contribute to less authoritarian concepts of learning and teaching.

This research aims to uncover whether grouping and structuring are related to group creativity, and individual perceptions of transactional distance. Specifically, it examines the effects of group composition based on thinking styles and conference structure based on transactional distance theory through innovative uses of Internet technology, specifically synchronous computer conferencing. The descriptive results show that most of the respondents had positive perceptions and attitudes toward their online learning experience. In light of the findings discussed in this chapter, as well as the open-ended comments pulled from the transactional distance questionnaire, the findings of this work can assist practitioners in guiding their efforts to develop more effective collaborative activities connecting distance learners, thus reducing transactional distance in an online learning environment. They can also inspire practitioners to consider how to use synchronous computer conferencing to encourage and promote student creativity.
BIODATA and CONTACT ADDRESSES of the AUTHORS

Dr. Mohammad Reza SARMADI is Faculty member of Payame Noor University in Iran. He graduated of Shahid Chamran Ahvaz with a degree in Education (PhD).

Prof. Dr. Mohammad Reza SARMADI  
Payame Noor University, Faculty of Human Sciences,  
Department of Education and Psychology, Tehran, Iran  
Phone: +9802122455419  
e-Mail: sarmadi@pnu.ac.ir.

Dr. Mehran FARAJOLLAHI is Faculty member of Payame Noor University in Iran. He graduated of Shahid Chamran Ahvaz with a degree in Education (PhD).

Prof. Dr. Mehran FARAJOLLAHI  
Payame Noor University, Faculty of Human Sciences  
Department of Education and Psychology, Tehran, Iran  
Phone: +9802122455419  
e-Mail: farajollahim@yahoo.com

Dr. Bahman SAEIDIPOUR is Faculty member of Payame Noor University in Iran. He graduated of Shahid Chamran Ahvaz with a degree in Education (PhD).

Assoc. Prof. Dr. Bahman SAEIDIPOUR  
Payame Noor University, Faculty of Human Sciences  
Department of Education and Psychology, Tehran, Iran  
Phone: +9802122455419  
e-Mail: bahman_saeidipour@yahoo.com

Dr. Mehrdad AHMADIFAR is Faculty member of Payame Noor University in Iran. He graduated of Shahid Chamran Ahvaz with a degree in Education (PhD).

Dr. Mehrdad AHMADIFAR  
Payame Noor University, Faculty of Human Sciences  
Department of Education and Psychology, Tehran, Iran  
Phone: +9802122455419  
e-Mail: ahmadifar.mehr@gmail.com
REFERENCES


USING BLOGGING SOFTWARE TO PROVIDE ADDITIONAL WRITING INSTRUCTION

Dr. Lin B. CARVER
Graduate Studies in Education
Saint Leo University, Florida, USA

Dr. Carol TODD
Early Childhood Education and Human Development
Rio Salado College, Arizona, USA

ABSTRACT

Classroom teachers sometimes struggle trying to find time during the typical school day to provide the writing instruction students need to be successful. This study examined 29 fifth through twelfth grade classroom teachers’ survey responses about their perception of the effectiveness of using an online blogging tool, Kidblog, to plan and provide writing instruction for a struggling writer through survey responses and reflective journal entries. In addition, qualitative data from 16 of the 29 teachers were collected through their journals. After eight weeks of using the blogging tool, teachers perceived the tool to be more effective than they had originally thought it would be. The teachers reported that they were able to evaluate their individual student’s writing progress to determine next steps in writing instruction. They perceived that student engagement with the writing process increased during the study. Additionally, using an online format encouraged teachers to incorporate other online tools into their instruction. However, barriers to using the blogging tool were also identified. Teachers reported that they would have liked the opportunity for more face-to-face interaction with their students and they also indicated that students may need strong keyboarding skills to effectively use the Kidblog tool. Additionally, prior to implementing the tool, teachers identified practice should have been provided for the teachers, as some found the blogging software difficult to use.

Keywords: K-12 writing instruction, blogging, struggling writers, Kidblog, technology, writing tutoring.

INTRODUCTION

Writing has been identified as a basic and essential skill for all individuals because it provides the basis for communicating information and learning (Graham & Perin, 2007). Even though it is a basic and essential skill, the National Assessment of Educational Progress (NAEP) found that only 33% of eighth graders and 24% of twelfth graders were considered to be proficient writers (Salahu-Din, Persky, & Miller, 2008). Consequently, many students are not proficient writers, and this places them at a “considerable disadvantage” (Graham, 2008, p. 1) in the school setting and in life. Writing is the “gateway for employment and promotion, especially in salaried positions”; this complex skill requires considerable time and effort to master (Graham, 2008, p. 1).

However, many of today’s 21st century learners embrace reading and composing information regularly using online technology. Lenhart and Fox (2006) reported that approximately 12 million Americans maintain a blog and 57 million read them. These blogs are particularly popular with upper elementary through middle school students (Lacina & Griffith, 2012). Blogs can have many purposes. They can be used for self-
expression; however, a blog can also serve as a place to publish writing or as a forum for receiving feedback on writing (Lacina & Block, 2012; Witte, 2007).

Given the ease and frequency with which blogging is used, it could also by teachers as venue to increase and individualize writing instruction to help students improve their writing proficiency. Leu and Kinzer (2000), in their research on literacy and technology, found that “the convergence of literacy instruction with Internet technologies is fundamentally reshaping the nature of literacy instruction as teachers seek to prepare children for the futures they deserve” (p. 111).

This study examined 29 teachers’ perceptions of the effectiveness of using blogs to provide additional opportunities beyond the classroom setting for individual writing instruction with secondary writers who scored below grade level expectations based on a Six Traits scoring rubric (Education Northwest, 2014). The Six Traits rubric was chosen because it is research-based, provides specific information about student performance, and can be used in conjunction with many classroom instructional activities. Because the rubric is not genre specific, it can be used with various types of content no matter the content area in which the teacher chooses to focus (Spence, 2010).

LITERATURE REVIEW

Much research has been completed examining the characteristics of effective writing instruction. Bruning and Horn (2000) indicated that writing teachers who were effective were passionate about writing while making the writing process creative and fun. Effective writing teachers had high expectations for students and were able to relate writing to their students’ daily lives. Teachers stated that they believed that all students had the ability to grow and improve in their writing (Santangelo & Olinghouse, 2009). Santangelo and Olinghouse (2009) found that effective writing teachers built a collaborative writing community by encouraging a positive supportive classroom environment showcasing student writing. Student-teacher relationships were strengthened through the support provided for struggling writers’ efforts and persistence. Effective writing instructors encouraged revision and refining of students’ writing through an iterative process for learning and improvement instead of focusing on having students complete a single graded piece (Bruning & Horn, 2000).

Writing instruction in the K-12 classroom typically occurred through whole and small group instruction supplemented by peer or teacher conferencing (Pressley, et al., 1997). Cutler and Graham (2008) examined elementary classroom instruction and determined that approximately one hour a day was spent on writing instruction. However, half of that time was spent on basic skills such as handwriting and spelling, about a quarter of it was spent on grammar, and about nine minutes were spent on instruction in the planning and revising stages of writing. Lenhart, et al. (2008) examined the secondary classroom where they found that writing instruction in planning, revising, and editing strategies occurred infrequently, but they did not identify an average amount of time. They indicated that struggling writers especially needed additional time, modeling, and instruction to meet their needs. Graham (2008) indicated that effective writing instruction needed to include significant time, effort, preparation, explicit teaching, extended opportunities, and differentiation of instruction for all students. These struggling writers also profited from guided practice with consistent feedback, scaffolding, and numerous opportunities to work on each of the phases of the writing process.

However, it is sometimes difficult in the classroom setting for teachers to find the time needed to provide specific, personal, differentiated feedback. With technological advancements teachers now have opportunities to continue the writing instruction outside of the classroom setting. Technology can also be used to increase student engagement. Olbinger (2003) found that millennial learners tended to respond more positively to teaching practices that included technology. K-12 students typically spend
more than six hours a day interacting through technology (Ellison & Wu, 2008). Wickersham and Chambers (2006) determined that when learning included hands-on opportunities, students were more engaged. A blog, which is basically an online discussion group, could be used to provide students a hands-on, technology based opportunity to interact with others resulting in increased engagement and learning.

Townsend, Nail, Chevallier, and Browning’s (2013) four-year study examined the effectiveness of extending classroom writing instruction using an online writing partnership between high school and college students. In the original phase of this study, eleventh grade students submitted a paper online and then the university students would comment on well-written sections and provide suggestions for revision. However, the researchers found that the lack of interaction between the two groups led to misinterpretations and hurt feelings. Because of these concerns, the researchers decided the format needed to be revised.

The online relationship was revised to include a face-to-face component. Townsend et al. (2013) found that using this format the secondary students were more receptive to the college students’ suggestions for refining their writing. The combination of both online and face-to-face interactions was effective in helping the high school writers improve their writing skills. Based upon the results of their study, Townsend et al. (2013) identified four recommendations for improving writing instruction. They determined that to be successful writers need a sense of purpose, topics should be related to the student’s personal interests, feedback needs to be given early in the writing process, and multiple opportunities for revision should be included.

These findings paralleled the results of Imig’s (2010) study. She found that online instructors needed to provide time, model writing strategies, encourage personal connections, and share written responses on a wide variety of topics. Imig’s findings indicated that to increase student engagement in the writing process, the online instructor needed to be involved in the beginning of the writing piece rather than at the final stages of the project. Simply grading and commenting when the project was completed was not effective in improving the quality of the final written project.

Technology might be an effective tool for expanding writing instruction for all writers; however, struggling writers may face more significant learning challenges in the online format because they tend to have weaker reading and writing skills. These students tended to have stronger oral and aural skills, so online instruction might not effectively match their learning style (Imig, 2010). Stine (2010) examined the effectiveness of online writing instruction with college students who were placed in remediate writing classes. She found that when she used both the online and the in-class format, those students operating at the basic writing level improved their writing ability. The face-to-face sessions allowed the instructor to demonstrate technology tools and provide students ample time to practice using them before they were expected to use the technology independently at home. Stine (2010) found that technology offered students many different types of learning and writing experiences. In addition, she determined that a series of small repetitive assignments decreased students’ anxiety about writing, improved writing quality, and guided students to more critical self-reflection. Stine indicated that blogs could be easily used for online writing instruction and were effective with struggling writers. These blogs allowed for a risk-free environment which led to improved critical thinking and encouraged self-reflection. Stine found that blended course, which included both online and face-to-face instruction actually provided better learning experiences for basic writers.

Graham (2008) provided extensive recommendations for effective writing instruction. The current study was structured in an attempt to address four of his recommendations; providing additional dedicated time for writing, increasing student knowledge about writing, taking advantage of technological writing tools, and using assessment to gauge students’ progress and need. Graham observed that technology was a particularly
important component because it enabled students to make revisions more easily than in a hand-written form and the final product looked professional. These advantages were particularly important for students who struggled with the writing process. He observed that providing additional time and increasing student knowledge were issues to consider when working with struggling writers.

Student writing was evaluated using the components of the Six Traits rubric (Education Northwest, 2014). Based on teacher evaluation, the identified struggling writers needed instruction in planning, revising, textual organization, and sentence construction. The use of KidBlog allowed for reteaching of skills and strategies that had not been mastered, the development of individual mini-lessons, and an increased frequency of teacher-student conferencing, all of which Graham (2008) identified as important components of writing instruction.

Research Questions

In this study the principles of effective writing instruction and the way these could be incorporated in writing instruction through an online blog, were examined as a basis for addressing the needs of the approximately two thirds of K-12 students who were considered not to be proficient writers (Salahu-Din, Persky, & Miller, 2008). Using blogging in conjunction with face-to-face instruction rather than focusing on student achievement this study examined teachers’ perception of the effectiveness of planning for and providing instruction for secondary writers who were unable to produce appropriate grade level written papers. This study attempted to answer the following two quantitative and one qualitative questions:

Quantitative Questions and Hypotheses

1) Since teachers typically conference face-to-face with struggling writers, how effective will teachers perceive online writing instruction to be for their identified struggling secondary writers?
   \( H_0 \): After using an online blogging tool, there will be no impact on teachers’ perception of the effectiveness of the tool.
   \( H_A \): After using an online blogging tool, there will be significant impact (\( p < .05 \)) on teachers’ perception of the effectiveness of the tool.

2) How will teachers compare the ease of planning for instruction as compared to the ease of providing instruction to the individual student using the blogging software?
   \( H_0 \): After using an online blogging tool, there will be no impact on teachers’ perception of the ease of planning for instruction or providing instruction using the tool.
   \( H_A \): After using an online blogging tool, there will be significant impact (\( p < .05 \)) on teachers’ perception of the ease of planning for or providing instruction using the tool.

Qualitative Question

3) When describing an online blogging experience in their journal entries, what themes will teachers identify as important to consider when working with struggling secondary writers?

METHODOLOGY

Twenty-nine teachers in the Graduate Studies in Education Reading program at a private southern university each identified one struggling secondary writer to work with during an eight-week term. The struggling writers were identified because their classroom essays were below grade level expectancy based on a Six Traits rubric (Education Northwest, 2014).
The classroom teachers had previously worked with the identified students through individual conferencing and wanted to continue providing the writing instruction using the online blogging software. Each teacher completed a pre and post instruction survey about their experiences providing writing instruction using blogging software. Sixteen of these teachers also volunteered to take part in the second phase of the research study. During this phase they completed a reflective journal about their experience.

Data were collected using two separate data collection tools. During the first week of their graduate course the teachers were introduced to an online blogging tool, KidBlog. KidBlog was chosen because it is a secure site and did not require the secondary students to use a personal email address. During the first week of the study, teachers created an account and independently practiced using the software. Then the teachers shared the web address for their specific account with their identified student. Only one teacher and his or her identified student had access to each specific blogging account. Each teacher then provided instruction for a student on how to use the blogging program and then used the program over the next seven weeks to provide writing instruction.

Teachers began by having each student post a one page expository essay that had been created for a school assignment. The teachers analyzed the assignment based on the Six Traits (Education Northwest, 2014) rubric and identified the specific areas where the students would profit from additional instruction. Over the remainder of the eight-week term the blogging tool was used to provide online individualized writing instruction of the same type the teachers would have previously provided during classroom conferences. This instruction took the form of providing specific suggestions for areas needing refinement, modeling ways to correct students’ errors, and identifying specified online tools to address students’ areas of difficulties.

A mixed method design was used to collect the data. Quantitative data was collected through a Likert scale survey ranging from 1 to 5 (with 1 being strongly agree and 5 being strongly disagree). The survey was administered twice online, once during the first week of the study and again at the completion of the eight-week term. Teachers’ responses were organized into three categories: general impressions about providing writing instruction through blogging, ease of planning for blogging writing instruction, and ease of providing blogging writing instruction. T scores for dependent means and probability levels were than calculated to determine whether the differences in the means between the first week and the eighth week were significant.

In addition to the survey, 16 teachers completed a reflective journal identifying the strengths and difficulties they experienced during the online writing instruction and their perceptions about the student’s learning. Qualitative data were collected through coding teacher reflective journals for emerging themes. The researchers employed open and axial coding methodologies.

**FINDINGS**

The individual survey questions are included in Appendix A. The data from the specific questions were combined into three categories. The participants recorded their responses using a Likert scale ranging from 1 (strongly agree) to 5 (disagree strongly). The quantitative data from each of the three survey categories are recorded in Table 1. Paired t-tests were used to analyze the means of the three categories from Week 1 and Week 8. The differences between the means in each category exceeded the 95% confidence interval, so in each case the null hypothesis was rejected. The higher the score, the more difficult the teachers perceived the use of the blogging tool to be. It is evident from the qualitative data that actually using the online blogging tool positively impacted teachers’ perceptions of its effectiveness as a possible tool for providing supplemental writing instruction.
Table 1

Mean Scores Comparing Week 1 and 8 by Survey Category

<table>
<thead>
<tr>
<th>Category</th>
<th>Mean Week 1</th>
<th>Mean Week 8</th>
<th>P*</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Impressions about using Online Blogging for Writing Instruction</td>
<td>2.978</td>
<td>2.575</td>
<td>.02230</td>
</tr>
<tr>
<td>Providing Instruction through Online Blogging</td>
<td>2.920</td>
<td>2.608</td>
<td>.00729</td>
</tr>
<tr>
<td>Planning for Instruction through Online Blogging</td>
<td>2.660</td>
<td>2.484</td>
<td>.00822</td>
</tr>
</tbody>
</table>

*p denotes probability

Figure 1

Mean Scores comparing Week 1 and 8 by Category. This figure illustrates the decrease in difficulty of using blogging by category.

To determine the mean for the general impressions category about using online blogging for writing instruction, data from four questions about blogging were combined. These questions included teachers’ perceptions about the ease of using blogging for: writing instruction, analyzing the relationship between teaching and student achievement, connecting new concepts to prior knowledge, and adjusting instruction to meet student needs. During the first week the mean was almost neutral (3.0) in the general perceptions area and by the end of the research study the mean was about half way between agree (2.0) and neutral (3.0).

The means from five questions were combined in each of the other two categories in Table 1. Teacher perceptions about ease of instruction in five of the Six Traits of Writing (Education Northwest, 2014) (ideas, organization, voice, word choice, and conventions) were examined in both the providing for Instruction and Planning for Instruction categories. The differences between the means in each of the categories exceeded probability of p < .05. In addition, the data indicated that the teachers had a more positive perception after using the online blogging tool than they did before they used the tool.

In the second phase of the data analysis, each of the researchers independently analyzed the 16 teachers’ qualitative reflective journals for emerging themes. The data were then transcribed, described, classified (open and axial coding methods) and interpreted forming the data analysis process. Using open coding methodology, the researchers read through the qualitative, narrative data several times to create “chunks” of data seeking meaning that emerged from the data. The researchers also used an inductive reasoning process to generate themes and ideas and axial coding methodology to identify
relationships from among themes. A deductive process to confirm or negate ideas or hypotheses was not utilized.

Each researcher coded the data and reviewed it for inter-rater reliability. During this process, the researchers debriefed to identify any variations in coding and coexistent themes. Following the interrater reliability check, the researchers finalized the data results in overarching themes leading to recommendations. Data interpretation allowed the researchers to theorize toward developing patterns and meanings or in other words to "make sense" of the data. Using an analytic inductive reasoning process, data coding and concomitant interpretation, the researchers were able to:

- Ascertain the common themes or recurring regularities that emerged from the data (Patton, 2002). This entailed internal homogeneity or the extent to which data belonged to a certain category or theme or dovetailed with a category of theme. This also entailed external heterogeneity or the extent to which the data did not belong in a category and to identify that the differences between categories was clear (Patton, 2002).
- Test the data for convergence, or identify how the data did not make connections with themes or categories or align with the research questions and broader environmental scan purpose.
- Identify deviations from the common themes and, when possible, to provide explanations of the deviations. Deviant cases or data that diverged from the categories or themes was given careful consideration and examination as to why it did not "fit" into the categories or themes.
- Bring forth the stories or a narrative enquiry that emerged from the data analysis from which to draw recommendations.
- Bring forth patterns or themes that may suggest additional data that needs to be collected.
- Align the themes and narrative stories that emerged with the review of literature.

Data analysis and interpretation provided the structure for the ensuing results, analysis, and recommendations. Interrater reliability was evident in the themes identified. In the reflective journals both positive themes and barriers were apparent. References to the four positive themes occurred more frequently than references to the barriers. Table 2 indicates the most common positive themes. About a third of the teachers (n = 6) indicated that students found using the software enjoyable and motivating (n = 6) and that the blogging tool helped to build students’ confidence (n = 6). Almost half of the teachers (n = 7) reported that they were able to evaluate student progress, while about a quarter (n = 4) indicated that they were able to effectively incorporated other online tools to provide additional practice and further increase student engagement.

Four barriers were also identified (see Table 3). A quarter of the teachers (n = 4) reported students were frustrated trying to navigate the software and the students did not have strong enough keyboarding skills. Although not as frequent, teacher frustration with the software (n = 3) and missed face-to-face interaction (n = 2) were also reported.

<table>
<thead>
<tr>
<th>Theme</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blogging built student confidence in writing</td>
<td>6</td>
<td>37.5%</td>
</tr>
<tr>
<td>Students found blogging software enjoyable and motivating</td>
<td>6</td>
<td>37.5%</td>
</tr>
<tr>
<td>Teachers were able to evaluate student progress</td>
<td>7</td>
<td>43.75%</td>
</tr>
<tr>
<td>Teachers combined blogging software with other online tools</td>
<td>4</td>
<td>25%</td>
</tr>
</tbody>
</table>
Table: 3  
Barrier Themes Identified from the Teachers’ Reflective Journals and their Frequency  
<table>
<thead>
<tr>
<th>Theme</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students were frustrated using the blogging software</td>
<td>4</td>
<td>25%</td>
</tr>
<tr>
<td>Teachers were frustrated using the blogging software</td>
<td>3</td>
<td>18.75%</td>
</tr>
<tr>
<td>Teachers missed personal interaction with students</td>
<td>2</td>
<td>12.5%</td>
</tr>
<tr>
<td>Teachers thought students needed more proficient keyboarding skills</td>
<td>4</td>
<td>25%</td>
</tr>
</tbody>
</table>

In addition to identifying recurring themes, the researchers also classified each of the journals as to whether they conveyed positive or negative comments about their blogging experience. Slightly more than half of the teachers (56.25%) reported only positive comments about using blogging software for writing instruction. About a third of the teachers (31.25%) recorded both positive and negative comments about their experience using the blogging software. Only about one tenth (12.5%) of the teachers recorded only negative comments about the blogging experience.

DISCUSSION

The data from the surveys and the journals revealed that individual teachers had mixed reactions to the blogging experience. Some teachers found using the blogging software for writing instruction to be a positive experience while others experienced some difficulty operating the software program. However, overall both the quantitative and qualitative data seemed to lead to the same conclusions. Even though the teachers were initially unsure about whether blogging would be an effective way to provide additional instruction for struggling writers, after using the blogging tool for eight weeks most of the teachers agreed that instruction using the blogging tool was effective in helping struggling writers improve their writing skills.

Similar to Townsend et al.’s (2013) study a few of the teachers noted the need for personal interaction with students. For example, teachers wanted to have the one-on-one, face-to-face, personal interaction in addition to blogging. The results supported the findings noted in Pressley et al.’s (1997) and Imig’s (2010) research studies. In fact, one teacher wrote “[student’s name] is a student who would benefit greatly from direct teacher instruction with her writing...she needs explicit oral directions and one-to-one teacher assistance to improve her writing.” Consequently blogging by itself did not provide enough for these struggling writers. Blogging used in conjunction with classroom instruction seemed to be perceived as a more effective approach.

The data from the two Likert scale surveys indicated that teachers’ impressions of the effectiveness of using blogging software improved between the beginning and the end of the study in all areas. Teachers originally indicated that providing instruction would be more difficult than identifying areas of need and planning for instruction. Teachers indicated at the end of the study that identifying the area of need remained easier than providing the actual instruction. Although the teachers indicted that both areas were easier than they thought they would be.

The most frequently recurring themes in the journals were (a) the effectiveness of the blogging tool for evaluating student progress and (b) using the blogging tool increased student engagement and motivation in the writing process. However, the process was not positive for all teachers or students. Some of the teachers indicated they and/or their student found the software frustrating and they wished they had more time to learn the software before using it with a student.

Teachers need to be thoroughly familiar with the blogging tool before attempting to use it with students. One week of practice was not enough for some teachers to effectively incorporate the blogging tool into their teaching practice. Consequently, teachers might need more practice before feeling confident enough to use the tool with students.
Moreover, even when teachers noted secondary students’ progress using blogging as a way to improve writing, hesitation to use technology was noted by some teachers. On the positive side, one teacher recognized this and stated "... I had a harder time adjusting than my student did however. It was hard to get used to not being able to meet with my student one-on-one." Still another wrote, "When I first began on KidBlog, I did not agree that I could teach writing skills that way...by the end of blogging, I could see that it was actually doable." It is of particular interest that after the study was completed, this teacher decided to use KidBlog with her entire class. Having begun with just one student, she felt confident about implementing it with a larger group.

In addition to answering the research questions, the teachers’ journals provided some suggestions that might make the use of the blogging software even more effective. Teachers indicated that when using the online tool, it was more effective if students had strong keyboarding skills. Students who had less well-developed typing skills, found the software to be difficult to use. In addition, teachers also observed that using the blogging tool was an effective format for incorporating other online tools. Since the students were already online it was easy to include links to direct them to other sites that could be used for additional practice or to expand the writing instruction.

CONCLUSIONS

The data indicated that both of the alternate hypotheses should be accepted. After using an online blogging tool, there was a significant impact on teachers’ perception of the effectiveness of the tool. And after using an online blogging tool, there was a significant impact on teachers’ perception of the ease of planning for or providing instruction using the tool.

The analysis of the themes revealed that individual teachers had mixed reactions to the blogging experience. While most teachers agreed the blogging experience had instructional benefits, some found the experience frustrating for them and their students. They also indicated that one week of practice was not sufficient for mastery of the blogging tool.

FUTURE STUDY

As other research about online instruction has found, the data from this study supported teachers’ perceptions about the effectiveness of using blogging software to provide additional instruction for struggling secondary writers. But because of the limited time frame and focus on a single assignment, pre and post Six Traits scores were not compared consequently quantitative measures of student achievement were not included in this study.

The small sample size and the limited time frame make it difficult to generalize the findings to a wider population of secondary students. Teachers perceived that the blogging software was effective for working with an individual struggling secondary writer who already had a relationship with the teacher. However the particular software used, was not as user friendly as some of the teachers would have preferred. It would be interesting to know if writing instruction through blogging is effective if the teacher-student relationship is not already established.

In addition, a comparison of students’ academic writing growth between struggling writers who receive supplemental writing instruction online and those who receive the same supplemental writing instruction face-to-face setting would provide additional information. Not all teachers in the study used the blogging tool in the same way. Further studies could explore the impact of constructing online lessons in various ways and the impact these varying formats have on student writing progress.
This study attempts to present teachers with another option for providing support for struggling writers. But, as with any study, the study raises more questions beyond the few that it answers.

**BIODATA and CONTACT ADDRESSES of the AUTHORS**

**Dr. Lin B. CARVER** earned her Ph. D. in Literacy Curriculum and Instruction and has additional cognates in Educational Leadership and Instructional Design. She worked in public and private K-12 schools for twenty years as a classroom teacher, math specialist, reading specialist, and a literacy coach. She is currently the Reading Program Administrator at Saint Leo University where she has designed and taught reading, assessment, and leadership courses in the Reading, Exceptional Student Education, and Instructional Leadership programs. She serves on various committees and her research interests include student motivation and engagement, assessment, and literacy. She has written three books (Teaching Syllable Patterns, Reading Basics for All Teachers, and Coaching: Making a Difference for Students and Teachers) and numerous articles and chapters.

Lin B. Carver, Ph. D.
Graduate Studies in Education
Saint Leo University, 33701 State Road 52
Saint Leo, FL 33574-6665
Phone: (352) 588-8387
E-mail: melinda.carver@saintleo.edu

**Dr. Carol TODD** is the Coordinator of New Program Development, Early Childhood Education and Human Development, Rio Salado College in Tempe, Arizona. Throughout her career she has taught and designed courses in special education, educational leadership and research at public and private universities. She has presented and published her work in special education, autism and effective uses of technology at national and international conferences. She consults with foundations and organizations in school and nonprofit leadership and capacity building.

Carol TODD, Ph.D.
Coordinator of New Program Development
Rio Salado College
2323 West 14th Street
Tempe, Arizona 85281 U.S.A.
E-mail: caroltodd@caroltodd.com

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APPENDIX

Indicate the extent to which you agree or disagree with each statement. Mark each statement with Strongly Agree, Agree, Neutral, Disagree, or Strongly Disagree.

Pedagogical Reflection on Writing Instruction using an Online Blogging Tool

1. Using an online blogging tool, I am comfortable providing writing instruction for an individual student.
2. Using an online blogging tool, I am able to provide instruction in ideas for writing.
3. Using an online blogging tool, I am able to provide instruction in organization of writing.
4. Using an online blogging tool, I am able to provide instruction in voice for writing.
5. Using an online blogging tool, I am able to provide instruction in word choice for writing.
6. Using an online blogging tool, I am able to provide instruction in conventions of writing.
7. Using an online blogging tool, I am able to analyze the effectiveness of instruction in ideas for writing.
8. Using an online blogging tool, I am able to analyze the effectiveness of instruction in organization of writing.
9. Using an online blogging tool, I am able to analyze the effectiveness of instruction in voice for writing.
10. Using an online blogging tool, I am able to analyze the effectiveness of instruction in word choice for writing.
11. Using an online blogging tool, I am able to analyze the effectiveness of instruction in conventions of writing.
12. Using an online blogging tool, I am able to analyze the relationship between teaching practices and student learning.
13. Using an online blogging tool, I am able to connect new writing concepts to students’ prior knowledge.
14. Using an online blogging tool, I am able to adjust methods and strategies based on students’ relative performance.
ABSTRACT

New technologies including digital game-based language learning have increasingly received attention. However, their implementation is far from expected and desired levels due to technical, instructional, financial and sociological barriers. Previous studies suggest that there is a strong need to establish courses in order to support adaptation of game-based learning pedagogy through helping teachers experience digital games themselves before they are expected to use them in teaching. This study was conducted to investigate educational digital games in foreign language teaching, to identify the determining reasons behind the pitfalls in applications and to explore the contribution of a serious game to the development of professional language skills of pre-service teachers. Pre- and post-tests were applied to measure the contribution of the game to the development of their language skills. In addition, a game diary and semi-structured interviews were used to elicit information about the problems pre-service teachers had and their perceptions on the whole process. The analysis of the data illustrated that there was great improvement in pre-service teachers’ professional language skills and attitudes towards using these games while teaching in the future. This is important in foreign language teacher education in terms of enhancing digital game-based language learning pedagogy for teachers.

Keywords: Digital game-based language learning, DGBLL, serious games, foreign language teacher education, German learning.

INTRODUCTION

The advent of new mobile technologies over the last decade has considerably changed the experience of learning processes in foreign language education. One such new technology implemented in language teaching contexts is Digital Game-Based Language Learning (DGBLL). Digital games are considered as primary components within the field of Computer Assisted Language Learning (CALL) (Cornille et al., 2012; Reinhardt et. al, 2014), just like the traditional games are regarded as part of Second Language Acquisition (SLA) (Wright et al., 1984; Ersoz, 2000). CALL software packages have so far provided small digital games such as hangman, puzzle and sentence production device to teach vocabulary and grammar in addition to various materials and activities to develop language skills (see Tell Me More, Einblicke Multimedia Language Trainer, etc.). Furthermore, web and mobile versions of these kinds of stand-alone games are developed and some of them are integrated into foreign language learning process. (Browne & Culligan, 2008; Kocaman & Kizilkaya Cumaoglu, 2014b). There are 108 German language learning applications offered by Appstores. The majority of the applications are for young learners’ vocabulary and grammar progress, and only 17 of them are games. However, this kind of mobile or web games are not as comprehensive as commercial off-the-shelf (COTS) adventure-entertainment games widely played by the youth in terms of form, technical and linguistic content. Regarding the
fact that COTS are widely played, games are developed on the basis of mechanics, structure and content of COTS games in the last decade. Thus, digital games in DGBLL literature are divided into two main categories: COTS adventure-entertainment games (e.g. World of Warcraft) and educational games, also called serious games (SG) or edutainment (e.g. Mingoville, The English Minnits, Language Trap, The Mystery of the Sky Disc, A Mysterious Mission) (Prensky, 2001; Gerhardt, 2008; Squire & Klopfer, 2008; Thorne et al., 2009). Then, they are divided into subcategories such as Simulations (e.g. Digibahn, Mingoville), Synthetic immersive Environments (e.g. Croquelandia, EVEIL-3D) and role play games (RPG) (e.g. The English Minnits, A Mysterious Mission etc.).

DGBLL literature shows that previous studies have been conducted mostly on COTS adventure games. Studies on learning a foreign language through COTS games investigated the effects of player attributes, in-game and non-game variables and reported mainly positive results (Cornille et al. 2012; Peterson, 2012; Turgut & İrgin, 2010). However, the studies focusing on serious games just offered technical and instructional suggestions (Breuer, 2010; Cai et al., 2013) and examined mostly learners’ opinions towards SGs. All the previous studies, except one (De Grove et al., 2011), reported that students had positive attitudes towards SGs and that their motivation was a determining factor in their positive perceptions of the games (Doe, 2014; Jantke & Hume, 2015; Howland et al. 2013; Romero & Barma, 2015). The factors affecting learners’ success in SGs included player attributes (i.e. age, gender, game literacy, attitudes and playing frequency), in-game elements (i.e. games narrative structure, multimedia, interaction) and non-game variables (i.e. motivation, autonomy, immersion, social interaction). SGs and CALL software contributed to learners’ vocabulary knowledge (Muller, 2012; Peirce & Vade, 2010) and SGs led to more positive attitudes and higher motivation than CALL software (Kocaman & Kızılkaya-Cumaoglu, 2014b). The positive impact and instructional advantages of DGBLL materials over printed course materials have been reported in relation to improvements in learners’ listening skills (Bernet-Rehaber & Schlemminger, 2013; Levy & O’Brien, 2006; Roy & Schlemminger, 2014), in vocabulary knowledge (Kocaman and Kızılkaya-Cumaoglu, 2014b) and writing skills (Levy & O’Brien, 2006; Neville et al., 2009) in communication, grammatical accuracy and writing skills (Berns et al., 2013) and in learners’ general fluency, pronunciation and reading skills in the target language (Levy & O’Brien, 2006). Along with language skills, positive results have also been reported in raising learners’ intercultural awareness and intercultural communicative competence (Guillén-Nieto & Aleson-Carbonell, 2012; Levy & O’Brien, 2006) because serious games provided learners an invaluable opportunity to truly experience the target culture. On the other hand, teachers’ aspects are the least explored issue in these types of studies. In addition, the studies conducted so far on teachers’ attitudes towards DGBLL have not consistently produced positive results. Indeed, the findings of the previous research are quite contradicting since positive, unsure and negative attitudes have been reported in various studies. However, the widely-held view is that teachers do not always have positive attitudes and they are not as enthusiastic as the learners in using digital games in classrooms due to the generational divide. Even in cases where teachers’ positive attitudes were reported, it has been shown that they have low digital game literacy and DGBLL pedagogy (Chandler, 2013; Karadag, 2015; Millstone, 2012; Yılmaz Ince & Demirbilek, 2013), which was observed especially with elder generation teachers (Blamire, 2010; Breuer, 2010; Sandford et al., 2006). In cases where teachers were unsure in using digital games, it was clear that they were actually interested in integrating these games but worried about the classroom implementation due to various pedagogical and technical constraints. Findings of the previous research suggest that there is a strong need to establish teacher training courses in order to support adaptation of game-based learning pedagogy through helping teachers experience the digital games themselves before they are expected to use them in teaching.

DGBLL has received increased attention especially in recent decades since successful implementations have been reported in various studies. However, its implementation is far
from expected and desired levels due to technical, instructional, financial and sociological barriers. Teachers and parents may have negative opinions as these games are considered to cause addiction, loss of time and violence (Demirtas Zorbaz et al., 2014; Allsop et al., 2013; Breuer, 2010). Moreover, the number of studies focusing on languages other than English, or investigating the use of serious games with longer scripts and implementations of DGBLL with pre-service foreign language teachers are very limited. As stated by Backlund and Hendrix (2013), no longitudinal empirical study has been conducted so far. The purpose of this study as a part of a larger project is to investigate the contributions of serious games with long scripts to the development of professional language skills of pre-service German teachers. In other words, the study aims to analyze the status of utilizing m-learning applications and educational digital games in foreign language teaching, to identify the determining reasons behind the pitfalls in applications and to explore ways of contributing to the linguistic and professional development of pre-service teachers. The study has two major parts: to identify pre-service teachers’ position in utilizing Mobile Assisted Language Learning (MALL) and DGBLL, and to examine the contribution of a serious game to the development of vocabulary, language skills and professional development of pre-service teachers.

This paper reports the first phase of a longitudinal study and explores possible ways for contributing to the development of linguistic and professional skills of pre-service teachers through serious games with long scripts. The study in which the participants can be viewed as both learners and future teachers sought answers to the following research questions:

1) What are the pre-service teachers’ beliefs about the integration of digital games into lessons and about the effects of these games on the linguistic and professional development?
2) Does the serious game ‘A Mysterious Mission’ help pre-service teachers acquire professional terminology?
3) Does learning success vary depending on foreign language learning strategies, especially compensatory strategies used by pre-service teachers?
4) Do the participants’ age, gender, game preferences and language priming affect their success in learning?
5) Are “games multimedia features” as an in-game variable and “motivation” as a non-game variable involved in the learning process?
6) Does the work with “A Mysterious Mission” contribute to the participants’ teacher qualifications in the context of DGBLL?

**METHOD**

The study used embedded mixed research design (McKay, 2006; Yildirim & Simsek, 2013). The major database for the study were the quantitative data obtained through vocabulary knowledge test and the responses regarding the contribution of digital games to the professional development of pre-service teachers. Qualitative data were collected to support the quantitative data mentioned above.

**Participants**

The sample group for the study consisted of 60 second-year pre-service teachers (53 females and 7 males) attending the department of German language teaching at a state university in Turkey in 2014-2015 Spring Semester. All second-year pre-service teachers taking educational technologies and materials design course was chosen as the sample group. The age pattern of the participants ranged between 19 and 35, the average age was 22.33. Information about the participants’ owned mobile devices and their intended use was gathered and reported in Table 1 below.
Table: 1
Owned Devices and Extramural MALL Activities of the Participants

<table>
<thead>
<tr>
<th>Owned devices and Internet Connection</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smartphone</td>
<td>60</td>
<td>100</td>
</tr>
<tr>
<td>Tablet</td>
<td>25</td>
<td>41.7</td>
</tr>
<tr>
<td>PC</td>
<td>14</td>
<td>23.3</td>
</tr>
<tr>
<td>Game Console</td>
<td>13</td>
<td>21.7</td>
</tr>
<tr>
<td>Internet Connection (ADSL &amp; Mobile)</td>
<td>47</td>
<td>78.3</td>
</tr>
<tr>
<td>Internet Connection (Only Mobile)</td>
<td>13</td>
<td>21.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of using mobile devices for extramural language learning purposes</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dictionary</td>
<td>48</td>
<td>80</td>
</tr>
<tr>
<td>Listening (Radio broadcasting, music, etc)</td>
<td>26</td>
<td>43.3</td>
</tr>
<tr>
<td>Watching movies (TV channels, Videocastings)</td>
<td>17</td>
<td>28.3</td>
</tr>
<tr>
<td>Vocabulary learning</td>
<td>17</td>
<td>28.3</td>
</tr>
<tr>
<td>Reading (Newspapers, instructional material)</td>
<td>16</td>
<td>26.7</td>
</tr>
<tr>
<td>Grammar</td>
<td>9</td>
<td>15</td>
</tr>
<tr>
<td>Pronunciation</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Interactive exercises (for different skills)</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Translation</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

As the data analyzed illustrate, 76.7 % of the participants (n=46) indicated that they played games with their mobile devices for four hours a week on average; and 39.13 % of those playing with mobile devices (n=18) stated that they played massively multiplayer online role play games (MMORPG), simulation/virtual world or other types of entertainment/adventure games having long text instructions (walkthroughs or in game instructions/quests). Half of the participants (52.17 %; n=24) played small games without or with short text instructions, and 8.7 % (n=4) played games for learning language such as word games. Majority of the participants (86.7 %; n=52) wanted to play the serious game integrated into the Educational Technology and Material Design course, and 13.3 % (n=8) stated that they were not sure about it.

**Instructional Materials**
The serious game Adventure German-A Mysterious Mission (2013) - developed by Goethe Institute as a type of role play game (RPG) was chosen. Thus, the cost and copyright problem which prevent DGBLL was resolved. The game has a long script and 18 different characters, two of them are the main characters. The setting of the game was located in 7 different indoor and outdoor places (Figure 1) in 12 episodes and the game was based on a detective story in which a person was kidnapped for a secret project and rescued.

![Figure: 1](image-url)

Two screenshots showing game's indoor and outdoor places
The game can be implemented in classroom context as a language teaching material and has rich language content with the elements of game tutorials, characters’ introductions, game story, audio dialogs, and reading texts, personal and business letters/e-mails and consists of 70 pages in total (16,572 words, 2,407 single items). The scenario of the game is written in standard German variety. Instructional materials for the game was designed in cooperation with the game’s developer team from Goethe Institute, who provided valuable support in analyzing linguistic features and preparing achievement tests and extra exercises for the game text before the project was started.

Data Collection Instruments
In the study, an information form was used to identify the pre-service teachers’ demographical data, their personal digital belongings and their purpose of using them, whether they play digital games, their preferences and their views on the contributions of digital games to language learning. Also, a vocabulary knowledge test and a vocabulary learning strategies scale were used. Furthermore; the participants also kept a diary to note down the words, grammatical structures and cultural elements. At the end of the process (i.e. eight weeks), pre-service teachers’ experiences were assessed via semi-structured interviews.

Information Form
The information form to gather the participants’ individual characteristics has been developed by the researchers. It contains 24 items to identify the kind of digital belongings they have, their general or language learning purposes of using them (MALL), whether they play digital games, their game preferences, what kind of games they play, how they play (on their own, with their friends, with their parents), language preferences, how much time they spend playing games, the effects of the games on their language progress and their views on integrating games into classrooms.

Vocabulary Learning Strategies Scale
A vocabulary learning strategies scale which was developed and tested for reliability and validity by Kocaman and Kizilkaya Cumaoglu (2014a) was used. The scale is the only language learning strategy scale that contains technological items for compensatory strategies. It consists of 32 items at 5-point Likert scale and the participants responded the items by giving 1-5 points (1=never; 5=always). In the present study, only the findings for the compensatory strategies gathered were compared to the participants’ success.

Achievement Tests
The researchers formulated a list by choosing 620 words from the game text (357 nouns, 208 verbs and 55 adjectives) to identify the progress of the pre-service teachers’ professional vocabulary size. The actual game ‘A Mysterious Mission’ consists of 2407 single word repetition and in total 16,572 words at B1-B2 level and the content of the game is in professional German. Therefore, daily language words were eliminated and only the professional words about job search, job application, interview and presentation were selected. All the words, except some new words and Anglicisms (e.g. das Management), appear in Profile Deutsch Register. This means students at B1-B2 levels are supposed to know these words as specified by the CEF. Vocabulary Knowledge Test was applied via pre- and post-test and the participants were expected to write the equivalence of the words in Turkish. The test was provided to the participants as a digital text document before and after the serious game activity through LMS platform and expected to complete the task during the classroom hour. 1 point was given to the participants for each correct answer.

Game Diary
The pre-service teachers were expected to submit their game diaries comprised of seven items through the Learning Management System of the university. These subcategories are the hardware they used to play games, daily/weekly time periods that they spent, words that they learned during the games (equivalents in Turkish and the sentences including the words), new grammatical structures, new information about the target culture and world knowledge, activities that they had to resolve while playing the game, some properties of
the game such as motivating/amusing/boring parts and difficulties they experienced, whether they preferred using games for their future classes at the end of the period. The first version of the game diary form consisted of nine items. This original form was sent to two experts for revision. Two items were excluded by the experts because they were related to pre-service teachers’ personal development, not to their language development.

In-Class Interviews
The participants were assessed via semi-structured interviews which were based on the notes in their game diaries. They were interviewed on their overall evaluation of the game; whether they found the game efficient or not, whether they thought they progressed in a skill other than the vocabulary size in the target language. The interviews were conducted for a total of 90 minutes at the end of the eighth week on the following seven subcategories by the researcher. These are “the time spent for the game, problems encountered, new word/grammatical structures numbers in the game diaries, in-game exercises, and language level of the game content, evaluation of the game in terms of technical features including difficulty, attractiveness, visual design and soundtrack. They were also asked whether they thought using digital games in their teaching in the future.

Analysis of Data
In order to test the quantitative data for the relevant research questions, the data were analyzed using the software package SPSS 21.0 through two-way ANOVA, multiple comparison tests (Scheffe), t-test Mann-Whitney U test and descriptive statistics for related samples were used. The qualitative data obtained through interviews and game diaries was analyzed using content analysis (McKay, 2006), and the findings were reported through descriptive/qualitative analysis.

Implementation Process
The implementation of games were integrated into Education Technology and Materials Design course in 2014-2015 Spring semester and applied for eight weeks. This course was preferred since the content of the lesson was appropriate to integrate the digital games. The whole content of the lesson (YÖK, 1998: 27; 2007:158) was carried out successfully as it aims to analyse, use and develop the digital material designs (text, audio, video, presentation etc.) and digital games as course content. Digital games were applied out of class hours and the evaluation of the process (experiences, difficulties that they encounter during the games, etc.) was done in the last 15 minutes of the class hours and through Learning Management System (LMS). Furthermore, a social network webpage (Auftrag, 2015) was created in order for the participants to share their experiences like achieving the game goals, consulting others when they fail.

RESULTS
Before the analysis, the data were checked for outliers and missing data. No outliers were observed in the data. Missing data in the set were replaced by the mean score (3) before subsequent analysis. The data illustrated normal distribution except for the mean values of pre-test and post-test scores of gender. Since the data were not normally distributed in the case of gender effect on success, Mann-Whitney U test was conducted. The internal consistency of the 32-item vocabulary learning strategies scale calculated by using Cronbach’s alpha coefficient. The values obtained were .853.

In order to identify the beliefs of the pre-service teachers about DGBLL, they were asked if they found the digital games (both COTS and SG) useful for learning a foreign language. Most of them (86.7%; n=52) responded “Yes” and 13.3% (n=8) stated they were not sure about it. In open-ended questions section, they were asked which linguistic skills they believed digital games would help to improve. Table 2 shows the participants’ beliefs about the effects of digital games on developing linguistic skills.
Table: 2
Participants Beliefs on Contribution of the Digital Games Developing the Linguistic Skills

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vocabulary</td>
<td>20</td>
<td>33.3</td>
</tr>
<tr>
<td>Reading</td>
<td>18</td>
<td>30.0</td>
</tr>
<tr>
<td>Listening</td>
<td>17</td>
<td>28.3</td>
</tr>
<tr>
<td>Speaking, Fluency, Pronunciation</td>
<td>3</td>
<td>21.7</td>
</tr>
<tr>
<td>Grammar</td>
<td>7</td>
<td>11.7</td>
</tr>
<tr>
<td>Writing</td>
<td>3</td>
<td>5.0</td>
</tr>
<tr>
<td>Other (idioms, etc.)</td>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td>Information about target culture</td>
<td>2</td>
<td>3.3</td>
</tr>
</tbody>
</table>

The second research question of this study examined using the vocabulary achievement test whether the game "A Mysterious Mission" contributed to the development of pre-service teachers' professional terminology. For this purpose, a paired-samples t-test was conducted to evaluate whether there was a statistically significant difference between the mean values of pre-test and post-test scores for vocabulary.

Table: 3
Post- and Pre-test Results for Vocabulary Achievement

<table>
<thead>
<tr>
<th>Measurement</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>df</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-Test</td>
<td>60</td>
<td>40.60</td>
<td>7.43</td>
<td>59</td>
<td>18.41</td>
<td>.000</td>
</tr>
<tr>
<td>Pre-Test</td>
<td>60</td>
<td>35.19</td>
<td>6.15</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The results indicated that the mean value of post-tests scores (M=40.60; SD=7.43) was significantly greater than the mean value of pre-test scores for vocabulary (M=35.19; SD=6.15; t(59)=18.41, p<0.01).

In order to test the third research question, one way analysis of variance (ANOVA) was conducted using vocabulary learning strategies scale to evaluate the effect of the compensation strategy use on the pre-test scores of participants since the Levene Test has indicated that the variances of scores across the different frequency groups are homogeneous (L=1.20, p=0.31).

Table: 4
Comparison among Pre-test Scores of Groups Depending on the Use of Compensation Strategies

<table>
<thead>
<tr>
<th>Variance</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>91.94</td>
<td>2</td>
<td>45.97</td>
<td>1.22</td>
<td>.30</td>
</tr>
<tr>
<td>Within Groups</td>
<td>2141.95</td>
<td>57</td>
<td>37.58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2233.90</td>
<td>59</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Test results of ANOVA indicated that there was no significant difference among the mean scores using the vocabulary achievement test of pre-test results of participants depending on the use of compensation strategies in different frequencies (F(2-57)=1.22, p>0.05). One way analysis of variance was conducted to evaluate the effect of the compensation strategy use on the post-test scores of participants since the Levene Test has indicated that the variances of scores across the different frequency groups are homogeneous (L=0.80, p=0.45).
Table: 5

Comparison among Post-test Scores of Groups Depending on the Use of Compensation Strategies

<table>
<thead>
<tr>
<th>Variance</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>88.17</td>
<td>2</td>
<td>44.08</td>
<td>.79</td>
<td>.46</td>
</tr>
<tr>
<td>Within Groups</td>
<td>3168.26</td>
<td>57</td>
<td>55.58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>3256.43</td>
<td>59</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Test results of ANOVA indicated that there was no significant difference among the mean scores of post-test results of participants depending on the use of the compensation strategies (F(2-57)=0.79, p>0.05).

For the fourth research question of this study, one way analysis of variance was conducted to evaluate compare the participants' age and their pre- and post-test scores.

Table: 6

ANOVA Table for Pre-Test Results for Measurement of Age Groups

<table>
<thead>
<tr>
<th>Variance</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>p</th>
<th>Significant Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>384.29</td>
<td>2</td>
<td>192.15</td>
<td>5.92</td>
<td>.005</td>
<td>(19-21)-(22-24)</td>
</tr>
<tr>
<td>Within Groups</td>
<td>1849.60</td>
<td>57</td>
<td>32.45</td>
<td></td>
<td></td>
<td>(19-21)-(25+)</td>
</tr>
<tr>
<td>Total</td>
<td>2233.90</td>
<td>59</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Test results of ANOVA indicated that there was significant difference among the mean scores of pre-test results of participants from three age groups (F(2-57)=5.92, p<0.05). To see the mean differences among age groups Scheffe Test was conducted and the test results revealed that mean score of 28 participants from 19-21 age group (M(19-21)=32.49) is statistically lower than the mean scores of 26 participants from 22-24 age group (M(22-24)=37.48) and the mean score of 6 participants from 25+ age group (M(25+)=37.90), (p=0.009).

One way analysis of variance was conducted to evaluate compare the age of participants and their post-test scores.

Table: 7

ANOVA Table for Post-Test Results for Measurement of Age Groups

<table>
<thead>
<tr>
<th>Variance</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>p</th>
<th>Significant Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>603.55</td>
<td>2</td>
<td>301.77</td>
<td>6.48</td>
<td>.003</td>
<td>(19-21)-(22-24)</td>
</tr>
<tr>
<td>Within Groups</td>
<td>2652.88</td>
<td>57</td>
<td>46.54</td>
<td></td>
<td></td>
<td>(19-21)-(25+)</td>
</tr>
<tr>
<td>Total</td>
<td>3256.43</td>
<td>59</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Test results of ANOVA indicated that there was significant difference among the mean scores of post-test results of participants from three age groups (F(2-57)=6.48, p<0.05). To see the mean differences among age groups in pre-test Scheffe Test was conducted and the results revealed that mean score of participants from 19-21 age group (M(19-21)=37.23) is statistically lower than the mean scores of participants from 22-24 age group (M(22-24)=43.36) and the mean score of participants from 25+ age group (M(25+)=44.41), (p=0.007).
The effects of the participants' gender on the mean average of their success were examined. Since there is a great difference between the populations of groups and the data sets were not distributed normally, instead of an independent-samples t-test, a Mann-Whitney U test was conducted to evaluate whether there was statistically significant difference between the mean values of pre-test and post-test scores of genders. The results of the test indicated that the difference between pre-test scores ($U=112.5$, $z=1.68$, $p>0.05$) and post-test scores ($U=116$, $z=1.60$, $p>0.05$) of female and male participants was not statistically significant.

The study also investigated whether the participants' being a gamer or a non-gamer (that is, whether they play digital games or not; and how much time they spent playing games every week) had an effect on the success of the process. An independent-samples t-test was conducted to evaluate whether there is significant difference between the mean values of pre-test and post-test scores of 46 participants who play digital games ($M_{PreTest}=34.91$ and $M_{PostTest}=40.35$) and 14 participants who do not play digital games ($M_{PreTest}=36.13$ and $M_{PostTest}=41.33$). The results indicated that the difference between pre-test scores ($t(58)=-0.43$, $p>0.05$) and post-test scores ($t(58)=-0.37$, $p>0.05$) of the participants is not statistically significant. One way analysis of variance was conducted to evaluate the effect of the time spent for playing digital games on the pre-test and post-test scores of participants. Test results of ANOVA indicated that there was no significant difference among the mean scores of pre-test ($F(3-56)=0.37$, $p>0.05$) and post-test results ($F(3-56)=0.54$, $p>0.05$) in terms of time the participants spent playing the games.

The language that the participants preferred while playing the game was examined in terms of its effects on their success in the game. An independent-samples t-test was conducted to evaluate whether there was statistically significant difference between the mean values of pre-test scores of 28 participants who preferred game instructions in German ($M_{PreTest}=36.30$ and $M_{PostTest}=42.35$) and 32 participants who preferred English ($M_{PreTest}=36.13$ and $M_{PostTest}=39.08$). The results indicated that there was no significant difference between pre-test scores ($t(58)=1.43$, $p>0.05$) and post-test scores ($t(58)=1.73$, $p>0.05$) of the language priming groups.

The fifth and the sixth research questions of the study asked whether the in-game and non-game variables such as multimedia features and motivation were involved in learning process and whether the serious games contributed to the participants' teacher qualifications in the context of DGBLL. The answers to these questions were obtained in the data gathered through game diary and in-class interviews.

Although 'A Mysterious Mission' game can be played with tablet computers and smart phones, only two of the participants in their diaries stated that they played the game with the tablet computers and the rest of the students played it with their personal mobile phones but all of the students took notes via using a PC/laptop. It was concluded from the diaries that game was played between 4-23 hours. Students noted 5-30 words to the 'newly learned vocabulary' part but they didn't write anything to the 'newly learned structure' part. Only one of the students noted 30 words and one student noted 5 words. The others noted between 12-23 words. Although a considerable number of participants (72 %; $n=43$) stated that during the games they used the online dictionary frequently via a laptop or PC as suggested, 28 % of them ($n=17$) stated that they sometimes used online dictionaries for some parts of the games. Nothing was stated about the difficulties to be resolved during the game. The participants noted down about 2 to 5 newly learned elements comparing Irish and German cultures, (as German people prefer directly speaking strategy instead of indirect strategies, and their salutation style, punctuality being important for German, whilst it is less important for other cultures, rules about the parks (dos and don'ts)) cultural elements from world knowledge, business world, Hollywood (e.g. The Devil Wears Prada), Walt Disney (e.g. Bugs Bunny) and Western films (e.g. The Good, the Bad and the Ugly) were also noted. For the encouraging/amusing parts of the game, participants marked the properties from 1 to 4. (e.g. game's graphics, clothing game, main character, jokes). Furthermore 6 of the participants stated the 3D graphics of the game were very realistic.
Majority of the participants (n=47) indicated that two parts of the game (4th and 11th) are particularly more boring as the texts and dialogs were longer than the other parts. That is the reason for the participants why these two parts are more exhaustive and boring than the other parts. For the part of the difficulties they encountered, 12 of the participants stated technical difficulties, 17 of them stated game challenge, 21 of them stated handling language tasks. 10 out of 12 participants who declared that they had technical problems while downloading or playing the game noted down that they consulted their more experienced friends. The other two students who played the game via their tablets because their mobile phones were not compatible with the game’s minimum requirements stated that they had no problems. For the question whether they use these kinds of serious games as a course material in their future classes, 86.7 % of the participants responded “Yes” (n=52), and only 13.3 % of them responded as ‘Not Sure’ (n=8).

The process was evaluated through semi-structured in-class interviews, the researchers’ observation and the data from the participants’ diaries. They shared their experiences and views in seven subcategories at the end of the eighth week.

The qualitative data gathered through in-class interviews were analyzed using textual and discourse analysis, which require a close and systematic reading of the responses given by the participants in order to reach a theory (Corbin & Strauss, 1990; Strauss & Corbin, 1998). The findings obtained through the interview were noted on the interview sheet and labeled using emergent coding method after the content analysis. Since it was not possible to predict the time students might spend to play the game, the 2-23-hour time period was identified through labeling the data with emergent coding method at the end of the content analysis. In the interview, two different categories emerged in terms of the time students spent while playing the game: playing without reading the content and the instructions of the serious game in detail, and playing the game after reading the instructions and fulfilling all the requirements of the course. One participant stated:

“I finished playing the game in four hours without reading the instructions. The second time I read the instructions and played the game noting down the information the course required. I played the game about one and a half hours every week and it took 12 hours in eight weeks.”

In the interview, the participants indicated that it took them 12 to 23 hours to play the game when they fulfilled the instructions and the tasks required for the course.

They were asked why they noted down less words into their diaries although the game contained much more unknown words. The responses given by the participants for this question were divided into three categories using emergent coding method:
1) the appropriateness of the language level of the game,
2) the difficulty of noting unknown words,
3) believing that it was not necessary.

Two categories emerged regarding the language level of the game: language level of the game was low, and language level of the game was appropriate, however, the professional terminology in the texts made it difficult to understand. It was identified that the participants who noted down less words in the diaries because of the low level of the game were the students born and grown up in Germany before they came to Turkey. One participant indicated that the language level was appropriate for the target audience but the professional terminology in the texts made the game’s content harder to understand.

One participant expressed the difficulty of noting down the unknown words as follows:

“Actually, I came across many unknown words. However, I kept playing the game because it was difficult to find them in the dictionary and to write in the diaries at the same time the sample German sentences where the words were used. Since I found noting down in-game exercises and their definitions boring and tiring, I did not write them either. I did not
write anything in the section for the new structures learned because there was not any new structure left since our courses in high schools and preparatory class.”

One participant expressed why he found it unnecessary to note down the new words, structures and in-game exercises as follows:

“The purpose of the game was to learn the new words, so I just looked up in the dictionary to learn their meanings and solved the exercises on the screen. I thought it was not necessary to note them down in the diary.”

The responses given by the participants for the question related with the difficulty level of the game mechanics were coded using emergent coding method and compiled under two categories: 1) the game was easy 2) the game was difficult at a specific point. One participant indicated this in the following words:

“I did not have serious problems with playing the game. I had a problem with downloading the game, but solved it with the help of a friend. When I pressed the replay button for the parts I did not understand, I had to go back to the beginning and listen to the whole section again because the game could not save the stage I worked on. This was quite boring.”

During the game project, the participants were provided theoretical knowledge about DGBLL and they were informed that one of the noteworthy features of the games for students is multimedia in the field (soundtrack and visual design). Conversely, none of the participants noted down anything about the sounds of the game. When asked about the audio-visual characteristics of the game, one participant expressed the following words:

“I enjoyed the introductory sounds but played the rest of the game in the mute mode because the soundtrack was distracting and boring.”

The participants were asked if they wanted to use digital games in their classrooms in the future. Most of them (86.7 %) responded as “Yes” and 13.3 % responded that they were not sure. The participants were also asked to justify their responses during the interview. Two categories emerged after the responses were coded using emergent coding method: 1) positive and 2) unsure. In the “positive” category, they indicated that digital games were more appealing than traditional course materials, and encouraged ubiquitous and autonomous learning. In the “unsure” category, they mentioned about technical problems and expressed that they were not sure whether such games would be interesting for students in the future. They also stated they have not decided to become a teacher yet. One participant with a positive approach expressed this as follows:

“Digital games are more enjoyable than the course book and films. I can play them anytime wherever I want, at home or at a café. Unlike the courses, I can determine the length and format of learning.”

One participant who was not sure about using digital games in the future stated his ideas in the following words:

“The games do not work properly in all phones and tablets. You need to have access to internet while uploading and playing. Additionally, my phone is old and the game worked slowly. Every student needs to have a good phone or tablet. It is also difficult to predict whether our student in the future would like such games or not.”

Another participant who was not sure indicated:

“I am not sure whether I would work as a teacher after my graduation. That is why I have no idea on using digital games.”

The social network site (Auftrag, 2015) created in order to share the experiences with the game was not used by the participants. The in-class interviews revealed that the
participants did not have time to share their experiences through the web site, and they believed asking for help from friends was more efficient and faster.

**DISCUSSION**

The study aimed to identify the contributions of the game to the pre-service teachers’ vocabulary size and language competence and to contribute to the teachers’ qualifications in terms of digital game-based language learning. The results of the study revealed that there was a significant difference between pre and post-tests in terms of their vocabulary size. It is concluded that the game ‘A Mysterious Mission’ contributed to the participants’ success. This result was expected and consistent with the previous successful studies in the field of DGBLL (Kocaman & Kizilkaya Cumaoglu, 2014b; Peirce & Vade, 2010, Müller, 2012; Johnson, 2010). The findings are in accordance with the theoretical implications and suggestions which argue for the contribution of digital games to the pre-service teachers’ vocabulary size and other language skills (Bernert-Rehaber & Schlemminger, 2013; Levy & O’Brien, 2006; Roy & Schlemminger, 2014; Neville et al., 2009).

The present study obtained various results regarding the effects of pre-service teachers’ demographic features on their learning success. Many studies show that the youth is regarded digital natives and digital literacy and game literacy (being a gamer or non-gamer, playing games, playing frequency and length of playing time) superiorities of them are significant factors in learning through digital games (Peirce & Vade, 2010; Jantke & Hume, 2015). However, the results of the present study revealed that age had positive effects on both words that were known before the activities and the success of the new words learned during the game after the eight-week period. Pre-service teachers older than 25 were more successful than the two age groups 22-24 and 19-21. Other studies with young learners (9-14 ages) emphasize that there is a negative correlation between age and DGBLL success. In this study, the youngest participant was 19 years old, it is not logical to relate this group of participants with the young learners’ studies previously conducted. In this study, the game was rather comprehensive (70-page scenario) and its content included business world, job application, presentation, and cultural elements and Western film elements unfamiliar to young learners. The game had less adventure and action features compared to entertaining fun COTS games. All these characteristics can be justified with the fact that the game addressed adult learners who are more responsible and felt greater responsibility than younger people. As the game was more appealing to adults than the young learners, it was possible to state that there is a relation between pre-service teachers’ age and the success (pre- and post-test) as opposed to the results on the youth. Meanwhile, the present study is different from other studies which showed the effect of the game literacy on success, because being a gamer or a non-gamer (playing games, playing frequency and length of playing time) in this study had no effect on vocabulary learning. Thus, this result was consistent with the fact that only 39.13 % of the participants (n=18) played action-based COTS games with long scripts.

As it was stated in De Grove et al. (2011)’s studies, there was no gender differences in success in the present study. The present study also revealed that pre-service teachers’ preferences of language instruction in English or German had no effect on their success. Since a large part of the game text (text, dialogue, in game exercises etc.) are included in the content of the game and target vocabulary are embedded into the game story, it was an expected result that language preference did not affect their success. Kocaman & Kizilkaya Cumaoglu (2014b) concluded that use of compensatory strategies has positive effect on success in their study with the young learners. In the present study, use of compensatory strategy (frequency in consulting on digital games in language learning, video, CALL-Ware etc.) had no effect on success. The level of the participants’ digital literacy was high as they didn’t have so many technical problems whether they played the game or not. All these issues considered until now are consistent with the fact that the game -A Mysterious Mission- is designed for adult learners of German.
Blamiere (2012), Chandler (2013), Gerber & Price (2013) and Yilmaz Ince & Demirbilek (2013) concluded that teachers/adult learners’ digital literacy problem is an impeding factor in establishing the use of DGBLL, and they suggested having teachers experience games and establishing courses to introduce game based learning so that use of games becomes more prevalent and productive. Diaries and face to face in class interview revealed that the participants found the game beneficial both as a teacher and a learner. Majority of the students (86.7 %) stated that they wanted to use the games for their future classes with their learner groups. Dealing with the games in teacher education programs both theoretically and practically, experiencing games and activities on their own are important for spreading the implementation of the DGBLL. Pre-service teachers who receive the training may assist their colleagues in the future.

Backlund & Hendrix (2013) stated that there is no longitudinal study in the field showing the contributions of the games into language learning progress. The findings gathered from the present study are the first step of the longitudinal study and planned to sustain through integrating reading, comprehending the game texts, grammar, material adaptation and design courses and creating new activities. (e.g. reading, transcription, or game making as suggested by Bermingham et al., 2013, etc.). This is important in terms of the suggestion Gerber & Price (2013) and Karadag (2015) proposed; they indicate that it is actually not very crucial for teachers to have an in-depth understanding of video games, or knowledge of the multiple video game genres in order to design lessons of video games to develop literacy activities. They state that teachers can effectively create learning opportunities by using video games as both the core unit and supplemental piece in lessons if they can draw upon their experiences with digital literacy, literature, and language learning theories.

The present study establishes evidence that digital serious games should not be associated only with young learners and suggests considering serious games for adult language learners as well and integrating them into teacher training curriculum for enhancing DGBLL pedagogy through practical game applications with pre-service teachers. The integration of DGBLL into foreign language education curriculum is definitely recommended. It is important to conduct further studies examining the contribution of games for various languages and language skills in order to improve the use of DGBLL.

Ministry of National Education, and directors at schools and educational institutions in cities are recommended to provide in-service professional development workshops and games for language classrooms in order to spread their use among all teachers, not just for few teachers with IT abilities at primary, secondary and high schools.

Authors’ Note: An early version of this study has been orally presented as a paper at ICEFIC 2015 Conference

BIODATA and CONTACT ADDRESSES of the AUTHORS

Dr. Yunus ALYAZ is an Associate Professor of Foreign Language Education in Uludag University, Turkey. He received his masters and doctorate degrees on Computer Assisted Language Learning (CALL). His interests are Linguistics, CALL and Digital Game-Based Language Learning. With German/Austrian Academic Exchange Services and Culture Institutes scholarships he joined CALL projects in Ruhr, Klagenfurt and Vienna Universities. Within the last five years, he has focused his studies on multilingual digital serious games design and development projects besides theoretical and applied digital game based language learning.

Assoc. Prof. Dr. Yunus ALYAZ
Department of Foreign Language Education
Faculty of Education, Uludag University, Bursa, TURKEY 16059
Phone: 0(224) 294 22 76
E-Mail: alyaz@uludag.edu.tr

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Dr. Zubeyde Sinem GENC is Associate Professor at the Department of English Language Teaching, Faculty of Education, Uludag University, Turkey, where she teaches graduate and undergraduate courses for in-service and pre-service EFL teachers. She has articles in national and international journals and book chapters in various books by publishers including Cambridge University Press, John Benjamins, Peter Lang and TESOL. She also taught English for academic purposes at American Language Institute at Indiana University of Pennsylvania and graduate courses in MA TESOL Program at Southern Illinois University in the U.S. Her professional interests include language teacher education, theory and practice in language teaching methodology, use of technology in foreign language teaching and second language acquisition.

Assoc. Prof. Dr. Zubeyde Sinem GENC
Department of Foreign Language Education
Faculty of Education, Uludag University, Bursa, Turkey
Phone: 0(224) 294 22 67
E-Mail: zsgenc@uludag.edu.tr

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EVALUATING LEARNERS’ ABILITY TO USE TECHNOLOGY IN DISTANCE EDUCATION: THE CASE OF EXTERNAL DEGREE PROGRAMME OF THE UNIVERSITY OF NAIROBI

Ouma OMITO
Department of Curriculum Instruction and Media
Rongo University, Kenya

ABSTRACT

The study was aimed at investigating the students' ability to use technology for distance education with specific reference to the University of Nairobi’s External Degree Program. To achieve this, one specific objective was formulated: To find out the student teacher's readiness to accept and utilize technology for learning purposes in relation to their work experience. The study design used was cross-sectional survey with a well-constructed questionnaire. The study population was 500 External Degree Students of the University of Nairobi who were final year students in the Bachelor of Education (Arts) by distance mode. The study sample of 217 was reached at by the use of a sample table provided by Krejcie and Morgan, (1970). Simple random sampling technique was used to identify the 217 respondents. A total of 110 questionnaires were filled and returned by respondents who were mainly primary school teachers in Kenya. A non-probability sampling technique (purposive) was used to select the cohort under study, that is, the final semester students in the External Degree Program of the University of Nairobi. The results from the pilot study were used to prove content validity as instrument reliability was determined from the internal consistency of responses from the questionnaires after the pilot study. The findings from the study revealed that majority of teachers 19 (50%) who had a work experience between 6 to 11 years were able to gather information from the internet for learning purposes. It was also learnt that as the number of years of work experience increased (21 years and above), the ability to gather information from the internet decreased drastically. When respondents were asked of their ability to troubleshoot computers, all categories of work experience showed low ability. All percentages were less than 50% with the work experience brackets of 21 and above years which recorded 22.2%, emerged as the highest percentage. Finally, when respondents were asked about their feelings towards using computers for their additional research and education, the work experience brackets of 21 and above years overwhelmingly, 6 (67.7%) , enjoyed working with computers. It was, therefore, concluded that any institution aiming at introducing e-learning in their institution should assess students’ technology literacy levels and prepare them in advance before the launch of e-learning.

Keywords: e-Learning, Wedusoft, distance learning, distance education, e-learning uptake, information literacy.

INTRODUCTION

Education is seen as the indispensable agent to bring about the change between what we are and what we want to be. In this context the role of distance education, as part of the mainstream education, is not an option but an unavoidable imperative for many students all over the world. Distance education (DE) provides access to higher education and especially to the growing student population of traditional and non-traditional students, (Reddy and Manjulika, 2002), who may be subject to constraints such as time, distance or a physical disability etc and, therefore, are not able to attend traditional courses on campus. The higher learning institutions needs to take into account the high demands and the
central role that education play in our society, that is, internationally, regionally and nationally.

Distance education is a technology driven education. It is the separation of the teacher and the learner in time and space. However, in synchronous distance learning, the element of time does not arise. Technology bridges the gap of time since learning takes place in real time (Keegan, 1996). In both synchronous and asynchronous learning environment, technology is central in distance education. One area that should therefore not be ignored in distance education is the student’s ability to engage with technology for learning purposes. Distance education allows for the modelling of the effective use of technology in learning, an important skill for faculty involved in education (International Society for Technology in Education, 2002; National Council for Accreditation of Teacher Education, 2006). This is supported by the convergence of powerful computers with telecommunication technologies over the past three decades that has precipitated the fundamental shift in human history (Reddy and Manjulika, 2002).

Universities have begun to promote distance learning processes and make use of Information and Communication Technologies (ICTs) so as to offer their learners away to develop new competencies as well as to take advantage of flexibility of time and space. The use of distance learning tools is expanding in the field of education and this has led to more and more institutions offering distance learning curriculums through various distance learning practices and models such as e-learning platforms, school based programs and open educational resources (Armando, 2014). It is believed that there is an unstoppable paradigm shift in the design, development and delivery of education in higher institutions of learning. In addition, distance education has drastically increased the opportunities for the underserved populations. This is witnessed by the fairly recent proliferation and success of on-line universities, and its happenings in spite of criticism of e-learning and on-line degree programs among the popular press (Milligan and Buckenmeyer, 2008). In addition, e-learning is a major trend, that is, the most rapidly growing segment of distance education.

University of Nairobi is no exception. It is the oldest university in Kenya and among the very many universities in the world that offers distance education. There is an evidence that this university is involved in the recruitment and training of school teachers by distance learning mode as shown in the table below.

<table>
<thead>
<tr>
<th>Academic Year</th>
<th>Month</th>
<th>Student Enrolment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>April Intake</td>
<td>600</td>
</tr>
<tr>
<td></td>
<td>December Intake</td>
<td>737</td>
</tr>
<tr>
<td>2002</td>
<td>April Intake</td>
<td>994</td>
</tr>
<tr>
<td>2003</td>
<td>December Intake</td>
<td>1025</td>
</tr>
<tr>
<td>2004</td>
<td>April Intake</td>
<td>1550</td>
</tr>
<tr>
<td></td>
<td>December Intake</td>
<td>1420</td>
</tr>
<tr>
<td>2005</td>
<td>August Intake</td>
<td>682</td>
</tr>
<tr>
<td>2006</td>
<td>April Intake</td>
<td>353</td>
</tr>
</tbody>
</table>


To further show the university’s commitment to e-learning, the University of Nairobi owned an e-learning platform (Wedusoft) and engaged in training students and lecturers on its use as shown in the table below.
Bachelor of Education (Arts) by distance studies which forms the scope of this research was tailored to cater for the many Kenyan students with minimum university entry requirements but who could not get the limited and competitive chances in the Kenyan public universities. Teaching and learning in this program was done in two phases; face to face done on-campus which catered for only 33.3 % (15 hours) and self-study done off-campus that catered for 67.7 % (30 hours) of the required course contact hours. Print media designed inform of course modules was the main source of content. Online delivery requires training and sensitization of both staff and students to engage in mutual exchange but the scenario at the University of Nairobi was that many students of the External Degree Programme had not been trained to use the e-learning platform and the very few who used computers either did so to type their term papers or accessing general learning materials in the internet.

**STATEMENT OF THE PROBLEM**

The presence of distance learning students and the online training of students as shown in both table 1 and 2 under background to the study validated the University of Nairobi’s commitment to offering e-learning to students and more particularly to school teachers who were in this case distance learners. Driven by the above concern, this study attempted to answer the following research question in order to maximize the utilization of the benefits of University of Nairobi’s e-learning platform: Are the Bachelor of Education (Arts) students of the University of Nairobi who are taking their studies by distance learning mode adequately prepared to adopt, sustain and use technology for their learning purposes?

The main objective of this study was to find out the student teacher’s readiness to accept and utilize technology for learning purposes in relation to their work experience.

**LITERATURE REVIEW**

Information literacy in this research refers to the ability to seek information using a variety of effective computer search strategies (Anastasi and Cochrane, 2006). In a research conducted at University College Dublin comparing final year biochemistry students’ and first year biology students, it was found that 27% of the first year biology students and 56.5% of final year biochemistry students were under-educated in the information seeking technology and processes (Callinan, 2005). In another similar study in the United Kingdom, it was found that higher education students made insufficient use of electronic learning systems in overall (Rowley, Banwell, Gannon-Leary, Urquhart and Armstrong, 2002). The same study also observed that non-traditional students in higher education generally had lower levels of information literacy and required extensive tutorial assistance by e-learning staff in the initial stages of their study program. This might have also been a similar case with Bachelor of Education (Arts) students of the University of Nairobi.
Literature also revealed that self-efficacy, personality and study approaches have significant impact on information searching behavior by students (Anastasi and Cochrane, 2006). Kurbanoglu (2003) conducted a study on information literacy levels among the students enrolled in an Information Management Course throughout their study program. It was found that the program of study did not provide students with enough opportunity to practice newly acquired information seeking skills in order to develop a sense of self-efficacy with both, the process and the e-learning facility itself.

Many African academicians and students still lacked capacity as far as e-learning skills were concerned. Since that was the case, e-learning platforms and many other products were not fully utilized by faculty members in many African institutions. As a result of that inadequacy, a significant fraction of academicians had a negative attitude towards e-learning as a mode of delivery for higher education. They did not believe that quality education could be delivered through information technology (Juma, 2001). One reason for such a negative attitude was technophobia. Technophobia sees technology as the solution to all human problems (Britain and Liber, 1999).

"The technophobes are most likely those who did not grow using computer...their personal aversion and anxiety about computers may be due to many reasons. They may like what they are used to doing and do not wish to change. They may feel experienced.... They may not want their awkward efforts to learn the new technology...subjected to public scrutiny. They may feel that it is too late in their lives to learn something completely new and different....they may be afraid of breaking a complicated and expensive piece of equipment (Soong, 2002)."

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>Dependent variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Literacy</td>
<td>Uptake of e-learning</td>
</tr>
<tr>
<td>• Knowledge of online educational resources</td>
<td>• Typing class assignments</td>
</tr>
<tr>
<td>• Prerequisite computer skills</td>
<td>• Online research</td>
</tr>
<tr>
<td>• Expression of confidence when using computers</td>
<td>• Possessing and using of a computer</td>
</tr>
<tr>
<td>• Prior computer training</td>
<td>• Use of emails etc.</td>
</tr>
<tr>
<td></td>
<td>• Visiting cyber cafes</td>
</tr>
</tbody>
</table>

Source: Research data

Figure 1: Conceptual Framework
METHODOLOGY

Research Design
The design used in this study was a case study. Cross sectional survey was used. According to Tolmie, Muijs, and McAteer (2011 p.36), cross-sectional survey design is carried out at one point in time by individuals within selected group or cross-sections of the target population. Survey is also said to be an attempt to collect data from members of a population in order to determine the current status of that population with respect to one or more variables (Mugenda and Mugenda, 2003). The survey design is suitable because it is characterized by a systematic collection of data from members of a given population. Survey design was also appropriate because for this study because it described and reported the preparedness level of students under study with a higher degree of accuracy. This is because survey design is a systematic empirical enquiry in which the researcher does not have control over the independent variables because their manifestations have already occurred or simply they are inherently manipulate able. Oketch (2013) in her unpublished masters project at the University of Nairobi also observed that cross-sectional survey can successfully be used in social sciences to gather the required data for the research since it allows researchers to look at numerous variables such as age, education level, gender etc at once, takes place at a single point in time (Tolmie, Muijs and McAteer, 2011) and often used to look at the prevalence of something in a given population. Cross sectional survey in the context of this study can measure e-learning uptake in terms of institutional needs of educational services as they relate to program ( Creswell, 2012 p.378). As such, inferences about relationship among variables were made without direct intervention from variation of independent and dependent variables. The final part of the Bachelor of Education (Arts) of the University of Nairobi was therefore seen as a cross section and a representative of the External Degree Program of the University of Nairobi.

Target Population
Borg and Gall (1998), defined target population as all the number of real or hypothetical set of people, events of objects to which a researcher generalizes the results of the research study. According to Luck and Rubin (1993) as cited by Anyona (2009), two categories of respondents are necessary in research, and these are the informed specialists and the consumers or users. Based on such facts, the consumers of distance learning program for this particular research were the final year external degree students taking Bachelor of Education (Arts) by distance learning at the College of Education and External Studies of the University of Nairobi.

Sample Size and Sampling Procedure
This section describes the procedure used in sampling and gives the sample size for the final group of Bachelor of Education (Arts) students from the External Degree Program of the University of Nairobi. To determine the sample size, both probability and non-probability sampling techniques were used. Non probability sampling was used to pick part 6 from the rest of the parts (1, 2, 3, 4 and 5) making up the External Degree Program of the University of Nairobi. For an appropriate sample size of distance learners, a table provided by Krejcie and Morgan (1970) was used. The table gives the required the sample size for various population sizes. The total number of students for this (part 6) cohort was 500. This was inclusive of drop out cases. According to the table provided by Krejcie and Morgan (1970), the sample size for this study was 217 students. Since the population was not homogeneous, the researcher used simple random sampling. This involved random selection of the respondents provided they were members of the group under study (Weirsma, 1969).
### RESEARCH INSTRUMENTS

Since the research design is survey, the researcher used a questionnaire. A questionnaire is a data gathering instrument used when factual information is desired (Best and Khan, 2003). It was important for this study because the researcher administering the instrument had an opportunity to establish rapport, explain the purpose under study, and as well explain the meanings of items that were not clear. The researcher used a closed questionnaire for this research. The researcher administered questionnaires to 217 distance learning students. The questions asked were centered more on their feelings of students on their comfort with the use of technology especially computers for learning.

#### Instrument Validity

According to Weirsmma (1969), validity refers to the extent to which the instrument reflects the behaviour under study. It involves a systematic investigation of the instrument’s items to determine whether or not they make up a representative sample of behavioral dimensions or traits to be measured. Content validity is a measure of degree to which data collected using a particular instrument represents a specific domain of indicators or content of a specific concept (Mugenda and Mugenda, 1999). The content validity was picked for use in this study as it was based on the results and comments of the pilot study.

#### Instrument Reliability

Reliability of the instrument is the degree of consistency that the instrument demonstrates (Best, 1998:276). Weirsma (1966) says reliability means consistency of the measuring instrument. Rose and Stanley (1954), refer to reliability as the degree to which an instrument agrees with itself. An instrument is reliable when it can measure the variables accurately and consistently and obtain the same results under the same conditions over a period of time. According to Njagi (2013) in his PhD theses, a test must be valid in order for it to be reliable. For this research, a pilot study was conducted on some External B.Ed (Arts) students from other cohorts which were not under the study with the aim of indicating reliability on the questionnaire. The internal consistency of data was determined from scores obtained from single test that the researcher administered to indicate whether the questionnaires were reliable tools for this research.

#### Data Collection Procedures

The administration of research data collection instrument was done by the researcher both at the pilot and main study. The main research instrument used for data collection was a questionnaire administered to students during their residential sessions. Upon the approval of the research instruments, the researcher obtained a research permit from the Ministry of Education, Science and Technology. The collected data were grouped and coded for data analysis.

#### Data Analysis Techniques

The researcher used a number of statistical methods to analyze the collected data. These included quantitative techniques. The data was analyzed by each question asked. The researcher used frequencies, tables, percentages, mean score and total scores.
Ethical Considerations
A research permit was obtained from the Ministry of Science and Technology. A copy of this permit was presented to the Dean, School of Continuing and Distance Education, University of Nairobi. All respondents were assured of confidentiality and security. Ethical issues were considered in all components of this research. Efforts were made to ensure there was no academic theft in this research. All sourced data and information were properly cited and referenced.

DATA ANALYSIS AND INTERPRETATION OF FINDINGS

Research Question 1: Can You Use the Internet to Gather Data?

Table: 4
Distribution of B.Ed (arts) students by work experience on their ability to use the internet to gather data

<table>
<thead>
<tr>
<th>Work experience</th>
<th>Sample size</th>
<th>Response</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below one year</td>
<td>0</td>
<td>Yes</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>1-5</td>
<td>6</td>
<td>Yes</td>
<td>2</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>4</td>
<td>66.7</td>
</tr>
<tr>
<td>6-11</td>
<td>38</td>
<td>Yes</td>
<td>19</td>
<td>50.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>19</td>
<td>50.0</td>
</tr>
<tr>
<td>11-20</td>
<td>57</td>
<td>Yes</td>
<td>10</td>
<td>17.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>47</td>
<td>82.5</td>
</tr>
<tr>
<td>21+</td>
<td>9</td>
<td>Yes</td>
<td>2</td>
<td>22.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>7</td>
<td>77.8</td>
</tr>
<tr>
<td>Total</td>
<td>110</td>
<td></td>
<td>110</td>
<td></td>
</tr>
</tbody>
</table>

From the above table, no student was reported to have a work experience of less than one year. 6 students were reported to have worked for a period between 1 and 6 years. 2 (33.3%) students could use the internet to gather data. 4 (66.7%) students could not use the internet to gather data. 38 students had their work experience periods ranging from 6 to 10 years. Out of this, 19 (50.0%) students could use the internet to gather data. Another 19 (50.0%) students could also not use the internet to gather data. 57 students were within the work experience brackets of 11 and 20 years. It was observed that 10 (17.5%) students could use the internet to gather data. 47 (82.5%) students could not use the internet to gather data. 9 students were found to have worked for over 21 years. 2 (22.2%) students from this category could use the internet to gather data. 7 (77.8%) students could not gather the data using the internet.
Research Question 2: Can You Troubleshoot Internet Problems?

Table: 5
B.Ed (Arts) students’ distribution by work experience on their ability to troubleshoot internet problems

<table>
<thead>
<tr>
<th>Work experience</th>
<th>Sample size</th>
<th>Response</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below one year</td>
<td>0</td>
<td>Yes</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>1-5</td>
<td>6</td>
<td>Yes</td>
<td>1</td>
<td>16.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>5</td>
<td>83.3</td>
</tr>
<tr>
<td>6-11</td>
<td>38</td>
<td>Yes</td>
<td>7</td>
<td>18.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>31</td>
<td>81.6</td>
</tr>
<tr>
<td>11-20</td>
<td>57</td>
<td>Yes</td>
<td>2</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>55</td>
<td>96.5</td>
</tr>
<tr>
<td>21+</td>
<td>9</td>
<td>Yes</td>
<td>2</td>
<td>22.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>7</td>
<td>77.8</td>
</tr>
<tr>
<td>Total</td>
<td>110</td>
<td></td>
<td>110</td>
<td></td>
</tr>
</tbody>
</table>

From the above table, no student had a work experience below one year. 6 students had a work experience period between 1 and 5 years. Only 1 (16.7%) student could troubleshoot the internet problems. 5 (83.3%) students could not troubleshoot internet problems.

38 students were reported to have a work experience period between 6 and 10 years. 7 (18.4%) students could troubleshoot internet problems. 31 (81.6%) students could not troubleshoot internet problems.

57 students had worked for a period between 11 and 20 years. 2 (3.5%) students could troubleshoot internet problems. 55 (96.5%) students could not troubleshoot internet problems. 9 students had worked for over 21 years. 2 (22.2%) students could troubleshoot the internet problems. 7 (77.8%) students could not troubleshoot internet problem.
Research Question 3: Do You Find Working with Computers Easy?

Table: 6
B.Ed (Arts) students’ responses by work experience on their ability to work with computers easily

<table>
<thead>
<tr>
<th>Work experience</th>
<th>Sample size</th>
<th>Response</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below one year</td>
<td>0</td>
<td>Yes</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>1-5</td>
<td>6</td>
<td>Yes</td>
<td>2</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>4</td>
<td>66.7</td>
</tr>
<tr>
<td>6-11</td>
<td>38</td>
<td>Yes</td>
<td>24</td>
<td>63.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>14</td>
<td>36.2</td>
</tr>
<tr>
<td>11-20</td>
<td>57</td>
<td>Yes</td>
<td>18</td>
<td>31.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>39</td>
<td>68.4</td>
</tr>
<tr>
<td>21+</td>
<td>9</td>
<td>Yes</td>
<td>6</td>
<td>66.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>3</td>
<td>33.3</td>
</tr>
<tr>
<td>Total</td>
<td>110</td>
<td></td>
<td>110</td>
<td></td>
</tr>
</tbody>
</table>

In the above table, no student had worked for a period less than one year. 6 students had worked for a period between 1 and 5 years. 2 (33.3%) found working with computers easy. 4 (66.7%) found working with computers difficult. 38 students had a work experience period between 6 and 10 years. 24 (63.2%) students found working with computers easy. 14 (36.8%) students found working with computers difficult.

57 students had worked for a period between 11 and 20 years. 18 (31.6%) students found it easy to work with computers. 39 (68.4%) could not find it easy to work with computers. 9 students had worked for over 21 years. 6 (66.7%) students could work with computers easily. 3 (33.3%) students found working with computers to be difficult.

CONCLUSION

On the ability to gather information from the internet based on research question 1, majority of students lacked the skills to gather data from the internet hence no relationship was found between work experience and the students’ ability to gather data from internet. It was also concluded that across the work experience, it was observed that majority of the students from all categories of work experience brackets could not troubleshoot internet problems. Hence, no relationship existed between work experience and ability to troubleshoot internet problems. Lastly, the research findings revealed that the majority of students with the working experience of over 21 years had a higher percentage (66.7%) of ability to work with computers easily. This in essence meant that technology adoption was a new phenomenon in Kenya and was more embraced by the younger generation compared to older generation. Among the three areas of technology readiness, troubleshooting remained to be a major barrier for students who were working with computers. In short, before the adoption of any distance learning program in any institution of learning, a consideration of technological readiness of the students should be taken into account.

Author’s Note: This is a part of improved Master Project.
Ouma OMITO is a PhD student of Educational Communication and Technology at Rongo University College in Kenya. He is currently writing a PhD thesis entitled ‘Readiness for the uptake of laptop computers in selected public primary schools in Homa Bay County, Kenya. He holds a distinction master degree in Distance Education from the University of Nairobi which he did on scholarship from the University of Nairobi. Currently he is serving as a school teacher and part-time lecturer of education at Rongo University College.

Mr. Ouma OMITO
P.O. Box 646-40300, Homa Bay, Kenya.
GSM: +254722106659.
e-Mail: oumaomito@yahoo.com

REFERENCES


A PROPOSED FRAMEWORK BETWEEN INTERNAL, EXTERNAL AND PEDAGOGY DIMENSIONS IN ADOPTION OF INTERACTIVE MULTIMEDIA E-LEARNING

Fathia LAHWAL
College of Computing
De Montfort University, Leicester, United Kingdom

Ajlan S. AL-AJLAN
College of Business & Economics
Qassim University, Buraidah, Saudi Arabia

Mohamad AMAIN
College of Computing
De Montfort University, Leicester, United Kingdom

ABSTRACT

This study focuses on interactive multimedia e-learning aims to improve our understanding about the dynamics of e-learning. The objective is to critical evaluate and better understand the interrelationships in the proposed framework between internal, external and the pedagogy dimensions in adoption of interactive multimedia and e-learning. It develops a tool to measure creative user adoption of interactive multimedia and e-learning services by using Partial Least Squares algorithm as the method of estimation and the major analytical tool in this study. Finding of a small scale data sampling of students in United Kingdom indicate that the proposed measurement framework is an acceptable fit with the data. Overall, the findings supply a precise tool for measuring creative user adoption of interactive multimedia and e-learning services, providing further insights for researchers and may provide to guide research and practice in interactive multimedia and e-learning by using communication media.

Keywords: External adoption, internal adoption, pedagogy, multimedia and e-learning.

INTRODUCTION

The need for integrated pedagogical to enhance Interactive Multimedia E-learning Environment (IMEE) has recently emerged as a priority area in supporting creative user. The fusion of various types of media in interactive e-learning environment, particularly for programming tasks, has generated intense interest, both in UK higher education and international (Heilesen & Josephsen, 2008). Its potential has recently been demonstrated in the context of enhancing technical skills for creative user in virtual world, by the combination of a variety of interactive multimedia application. However, institutions need to understand which factors may influence and attract creative users to adopt Interactive Multimedia E-learning (IME) for learning programming language, so that can support creative users in acquiring technical skills. Pedagogical has been seen as a key factor in successful and one is adopted in the design. In order to understand how educations and institutions can maintain good or successful a priority with creative user and attract them to use IME to learn programming language, diffusion innovation theory (Rogers, 1995) and the 3P model of learning (Biggs, and Moore, 1993) can be used as a basic for this study.

The main aims of this paper are: (1) to better understand the interrelationship among the internal dimension variables, external dimension variables and pedagogical side variables of students on their perceptions regarding the process of IMEE and furthermore on the effectiveness of IME be adapted by creative user, (2) to find out how pedagogical factors can be
mediator or moderator the effect of the Internal dimension factors and external dimension factors in the perception of IMEE and furthermore on the effectiveness of IME to be adapted by creative user, (3) to discover which of external dimension factors can best mediate the effects of the student perception (Internal dimension) regarding the process of IME and furthermore on the effectiveness of e-learning to be adapted by creative user, (4) to discover which of pedagogical factors can best mediate the effects of the student perception (Internal dimension) regarding the process of interactive multimedia e-learning and furthermore on the effectiveness of e-learning to be adapted by creative user, (5) to discover which of external dimension factors can best mediate the effects of the student perception (Internal dimension) regarding the process of interactive multimedia e-learning and furthermore on the effectiveness of e-learning to be adapted by creative user and (6) to understand more the dynamics of IME and find out how these factors can be different across different systemic level contexts.

Our interest is to explore the design of robust instrument from a blend of theories of technology models and trust for measuring creative user adoption of e-learning services. Thus, the rest of this paper is organized as follows: First section focuses on the related theories of adoption, primarily via a literature review examining technology acceptance models, Pedagogy in e-learning and online environment studies. This is then followed by an introduction to the measurement model intended for the purposes of this study. Then the explanation and justification of the research method is presented. Finally, we conclude the study’s overall findings followed by a discussion and future work for both practitioners and researchers respectively.

THEORETICAL FOUNDATION

This section aims to obtain the key internal, external and pedagogical determinants in order to create a strong tool. This research proceeds primary with the most commonly established theoretical models in the literature of IT acceptance and pedagogical framework followed by interactive multimedia and e-learning related studies.

The theoretical comes up to technology acceptance consist of the Diffusion of Innovation Theory (DOI), Technology Acceptance Model (TAM), and the Theory of Causal Layered Analysis (CLA). The research builds on these to classify the related determinants of the adoption phenomenon and lead the research to the design of a well build up tool.

Adoption of Interactive Multimedia and E-Learning

Rogers’ modelled a useful framework for studying the adoption process. Many studies of diffusion found that the way targeted adopters perceive the attributes of an innovation is critical and that these perceptions account for 49–87% of the variance in whether or not they adopt. Five significant concepts in the perceived attributes of innovations are (Rogers, 1995):

- **Relative advantage:** represents the additional benefit offered by the innovation in comparison with the existing offer on the market. The degree of relative advantage is often expressed as economic profitability, social prestige, and other benefits.
- **Compatibility:** the degree to which an innovation is perceived as consistent with the existing values, past experiences and needs of potential adopters.
- **Complexity:** the degree to which an innovation is perceived as relatively difficult to understand and use. The more simplistic and less complex the innovations is, the easier it is for someone to adopt.
- **Observability:** the degree to which the results of an innovation are visible to the society at large, or in a social/professional group. If the observed effects are perceived to be small or non-existent, then the likelihood of adoption is reduced.
- **Trialability:** The capacity of potential clients to interact with the innovation. This may include trying out parts of a program or having the opportunity to watch others using a new program.
The 3p Model: Learning Experiences, Process and Effectiveness Model

The 3P model of learning been developed by Biggs and Moore (1993). The 3P’s stand for presage, process and product. The pre-existing student variables and contextual and situational issues are the main components of presage section. Student’s perceptions regarding their learning environment are assessed under the process part. These perceptions influence students’ preferences of learning strategies and how these approaches are implemented. The performance outcomes of the students in the product section (Biggs, Moore, 1993). Examples of representative variables are illustrated in Table 1, that can be used in learning models within each part.

<table>
<thead>
<tr>
<th>Presage</th>
<th>Student variables, intellectual capability (IC) and abilities, prior knowledge, subject area, teaching methods, personality, culture, home background, time constraints, course structure.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process</td>
<td>Student motivation and behavior, Student learning strategies.</td>
</tr>
<tr>
<td>Product</td>
<td>Exam results, self-concept, grade point average, satisfaction</td>
</tr>
</tbody>
</table>

Current research uses a modified version of Biggs and Moore (1993) model to evaluate these relationships among internal dimension factors, external dimension factors and pedagogical of students on their perception about the process of interactive multimedia e-learning and furthermore on the effectiveness of interactive multimedia e-learning environment that affect creative user’ decision of the adoption.

Interactive Multimedia and E-Learning Studies and Related Research

Studies of latest research have investigated the prospective features that impacts student adoption of e-learning. Biggs and Moore (1993) study adopted Rogers’s diffusion of innovation theory (DOI), to find out the essential features that impacts the individuals adoption of e-learning between adult workers in Jordan. The results demonstrated that flexibility, relative advantage, complexity, compatibility, culture, structure, top management support, professional advancement, social contact, external expectations, and social stimulation were greatly correlated to individual’s adoption of e-learning initiative. The suggestion is that the features of relative advantage required to be given more highlighting in the adoption of e-learning between individuals (Al-Zoubi, et.al, 2011).

Duan et.al, (2010) study aims to examine an innovation adoption perspective, Chinese students’ intention of taking up e-learning degrees. Research hypotheses were established based on Rogers’s theory. Five innovation adoption attributes suggested by Rogers were modified in the context of e-learning and were used in the survey questionnaire design and data analysis. The study confirmed that only perceived compatibility has significant positive influences on the students’ intention of taking up e-learning degrees, which is in line with a number of other innovation adoption studies concerning the significance of compatibility.

Hsiu-Li et.al, (2008) conducted an empirical research to explore the relevant factors of adoption in the context of e-learning services among students of Taiwan. They administered a survey questionnaire included a combination of items derived from earlier studies and newly developed items to one hundred and thirty seven young respondents aged from 20 to 30 years old. The findings showed that perceptions of relative advantage and compatibility are significant relationships with their adoption intention. The results are generally consistent with prior research about other technology adoption. In this study, previous e-learning experiences, compatibility and result demonstrability have a significant, direct effect on user’s intention of continued use. However, for users without previous experience of using e-learning, compatibility, image and relative advantage have a significant, direct effect on user’s intention of adoption.

Liaw (2008) study investigates learners’ satisfaction, behavioral intentions, and the effectiveness of the Blackboard e-learning system among students in university central
Taiwan. The study integrates multidisciplinary perspectives that included motivation; social cognitive theory (SCT), theory of planned behavior (TPB), and technology acceptance model (TAM). The findings showed that learners’ characteristics will influence learners’ perceived satisfaction, and perceived usefulness of a product.

By utilizing the theory of technology acceptance model, flow theory and the theory of media richness, Liu et.al, (2009) develop an integrated theoretical model to investigate users’ acceptance of streaming media for e-learning by who are both learners and system users. The study proposes three typical groups of presentation types of e-learning that impact users’ perceptions: text with auditory, video with supplementary audio, and audio–video by way of a display of corresponding text. The investigation carried out a random sampling to allocate student to three groups. Subjects in all groups were offered access to a module of self-study e-learning system. Between the three groups test only the presentation form of the streaming media for e-learning was varied. After finishing the complete sessions, the subjects who done all four weeks sections of the course were invited to fill in the survey again. It yielded 88 usable responses, giving an overall net response rate of 73%. The results of this study showed that all constructs have a reasonable reliability and validity. These results have practical suggestions for those concerned in adding streaming media into e-learning.

Finally, (Roca, et.al, 2006; Sanchez & Hueros, 2010) study considered decomposed technology acceptance model in the context of an e-learning services. Based on theoretical background such as TPB, TAM, EDT and users’ satisfaction they propose a research framework which identifies several attributes as likely predictors of e-learning continuance intention. The results from this study suggest that ease of use, playfulness and usefulness are considered important issues in IT usage.

In the earlier discussed study of Duan et.al, (2010), it is significant to note that the targeted sample was young students enrolled as a full time undergraduate in a chins university, which confines the results from being generalized to either whole or other population, such as mature students and part time. Liaw (2008) stress the significance of considering perceived satisfaction, behavioral intention, and effectiveness of e-learning factors for a better understanding of the phenomenon. (Liaw, 2008; Roca, et.al, 2006) rightly incorporate in their studies these behavioral intention factors. However, effectiveness of e-learning factors were not included in Roca, et.al, (2006) studies. In contrast, Liaw (2008) represent that the effects of e-learning can be influenced by multimedia instruction, interactive learning activities, and e-learning system in his study in one entity; however, dividing trust into two dimensions, i.e. trust in Internet and government should provide a better explanation for the relevant factors of adoption.

An Integrated Measurement Framework
This research is based on a combinations of pedagogical strategies Ryberg (2007) with Heilesen and Jensen’ frame that consists of internal and external dimensions (Heilesen, Josephsen, 2008). These two dimensions were initially modified by Heilesen, & Josephsen, (2008) by combing diffusion theory Rogers (1995) with a little modified version of Causal Layered Analysis (CLA) (Inayatullah, 2003). Current study centers around the combination of pedagogical strategies Ryberg (2007), with the external dimension that can be measured and quantified, and an internal dimension, the perception, that is relative to individual (Heilesen, Josephsen, 2008). We believe that these three dimensions influence student perceptions regarding the process of learning environment and furthermore on the effectiveness IMEE which is shown in the IME Adoption Model as in Fig. 1. To investigate factors that have influenced creative user’s adoption decision, we focus on three major dimensions as the central construct; namely: 1) Internal dimension, 2) External dimension and 3) Pedagogical side.
Internal dimension: For the internal dimension, current study adapted Biggs’ three constructs, student variables, prior knowledge, intellectual capability (IC) and ability, to match internal dimension on current research framework. We call our modified constructs (1) prior educational and knowledge (2) skills and experiences, and (3) characteristic of the student and ability.

We believe that these three constructs influence student perception regarding the process of learning environment and furthermore on the effectives of IMEE which is shown in detailed internal dimensions model Fig. 2 that can be adapted by creative user. Therefore, to further clarify such relationship, the first hypothesis is developed as:

H1: There are multiple features for each of the three constructs as in Fig. 2. For example, for prior educational and knowledge, there are features such as academic specialization; student attitude, and prior of the value of interactive multimedia e-learning. For skills and experiences of the student, facets include experiences.

External dimension: This study centers around the five factors of Heilesen’ external dimension: (1) technology supported learning (2) physical (3) economic implication (4) culture setting (5), and social. We believe that these five factors influence student perception regarding the process of learning environment and furthermore on the effectives of IMEE which is shown in detailed internal dimensions model to be adapted by creative user as Fig. 1. So, to further clarify such relationship, the first hypothesis is developed as:
H2: External Dimension will significantly influence on the perception of the learning environment, furthermore, in the effectiveness of the IMEE to be adapted by creative user.

Pedagogy Strategies: it is based on Ryberg’ perspective of learning processes (Ryberg, 2007). Ryberg (2007) developed the model that was argued those three central dimensions of PBL/POPP that could be extracted. Our pedagogy side centres on Problem Based Learning approach as a wide concept to cover a broad range of more student centred learning approaches that feature processes of enquiry, and with a focus on critical knowledge production and distribution, experientially based pedagogy favoring learning as knowledge construction through collaboration in groups and through problem-orientation rather than the acquisition of a given body of knowledge (Ryberg, 2007).

We believe that these four constructs influence student perception regarding the process of IMEE and furthermore on the effectiveness of IMEE which is shown in detailed pedagogy strategy of IME adoption model. Thus, the following hypothesis is posted:

H3: Pedagogical dimension with internal and external dimensions will significantly influence on the perception of the learning environment, furthermore, in the effectiveness of the IMEE.

H4: Pedagogical dimension will significantly moderator the internal and external dimensions on the perception of the learning environment, furthermore, in the effectiveness of the IMEE.

H5: Pedagogical dimension will significantly mediator the internal and external dimensions on the perception of the learning environment, furthermore, in the effectiveness of the IMEE to be adapted by creative user.

RESEARCH METHOD

The Construction of Research Tool
A questionnaire, the IME Questionnaire (IMEQ), was developed by the researchers for use in this research to gather data on creative user adoption of IMEE for empirical analysis. It contained closed-ended Likert five-point scale items 1 (Completely disagree) to 5 (Completely agree), open-ended question items and demographic items. The chosen constructs were operationalized using validated items from previous studies. These items were adapted for e-learning services. Therefore, the IMEQ contained the following four main parts: (1) Internal Dimension, (2) Pedagogical, (3) External Dimension (4) Demographic Information.

The internal dimension examines the personal attitude values experience, and ability and interest that corresponding to compatibility perceived attributes of innovations was adopted from Everett (Duan, et.al, 2010; Haverila, 2010; Haverila, & Barkhi, 2009), who used the instrument developed by Biggs and Moore (1993).

In pedagogy dimension the items that represent content of the instructional design were adopted from Debevc, & Bele, (2008), who used the instrument developed by SUMI (Software Usability Measurement Inventory) evaluation. The SUMI is a reliable method for assessing the quality of use of software products. It is supported by an extensive reference database embedded in an effective analysis and report generation tool; it has been developed, validated and standardized on an international basis.

External dimension items to measure the systemic level factors comprises social, culture, economic, historical, physical and technological. The systemic level roughly matches the external dimension of Roger’s attributes were adapted from Moore, Benbasat, (1991) is general enough to be used with modification for the type of innovation being studied.
Rogers (1995) acknowledged the work done by Moore, Benbasat, (1991) and agreed that the items can be applied to any particular innovation.

**Pre-Test and Pilot Study**

First step: it was decided to organize a session of seven undergraduate students asking them to complete a self-administered questionnaire. Subsequently, participants were asked for comment and give any feedback on the instrument concerning any unclear wording or vagueness. Besides, the pilot testing aimed to guesstimate the time required to complete the questionnaire. Because some minor modifications were made with pilot testing, but in the main questions and instructions were found to be satisfactory. The middling time of completing the questionnaire was from twenty to twenty five minutes, which was considered a reasonable time.

Second step: a literature review was performed to launch an appropriate sample size for the pilot test. According to Denscombe (2010) suggests that for small-scale data collection the sample should contain thirty to two hundred responses. However and Oates (2005) states that researchers should have a sample that involves at least thirty responses for small-scale projects. Besides, he argues that a sample fewer than this may effect in the analysis becoming unreliable.

Based on these suggestions of prior studies, the current research succeeded in having thirty three usable observations from students at DMU. The aim of this stage was to check the reliability of its instrument and prove its clearness and the meaningfulness of its items. The accepted cut-off value for reliability should be equal or greater than 0.50 or above 0.70. Results showed all the constructs exceeded the threshold value of 0.70, except friend influence and self-efficacy, which scored 0.66 and 0.64 respectively, which is still considered an adequate level of reliability. Consequently, it can be confirmed that the instrument is reliable and ready for the main study.

**THE CONFIRMATORY STUDY**

**Data Collection**

There are four parts in the questionnaire; part A, respondents were ask to rate their perception, about IME usage, that is relative to individual using five point Likert scale. The statements are derived from the 3P model created by Biggs and Moore (1993) and include other items as well from Moore and Benbasat (1991). There are three categories of questions: Presage (15 measure), Process (5 measures) and Product (3 measures). Meanwhile in part B, respondents were ask to rate their opinion about pedagogical strategies. In part C, respondents were ask to rate their perception about systemic level of IMEE using Likert scale ranging from 1-point (strongly disagree) and 5-point (strongly agree). Finally, the research surveyed other important issues such as participant demographics in part D was used to collect demographic information such as gender, age, mode of study, highest level of education, and academic specialization. The data collection was performed using special Internet-based software called “Survey” owned and operated by Kokteyl, Inc (http://www.surveey.com/survey/Communication.aspx). This software is frequently used in various kinds of research and for data gathering activities. The questionnaire is first created with the “Form Editor” software and then an E-Mail describing the nature of the study with an Internet link to the actual questionnaire was sent to the respondents as well as given some questionnaire to volunteer students.
Model Estimation
The Partial Least Squares algorithm was used as the method of estimation and the major analytical tool in this study. As the model involves hierarchical higher order constructs, viz. communication and mediation, the two-steps approach (Agarwal & Karahanna, 2000; Henseler, et.al, 2007) to modelling higher order latent variables in the context of PLS modeling was favored over the more common hierarchical components approach (also dubbed repeated indicators approach inasmuch as the latter was shown to yield biased and less consistent estimates (especially in the case of small samples) with respect to the former (Wilson, Henseler, 2007).

Principal Components Analysis
The PCA of mediation indicators was carried out with the software SPSS 18. The Kaiser criterion pointed to a three-component solution, rotated obliquely with the Promax algorithm.

Table: 2
Pattern matrix of the Principal Components Analysis of the Mediation construct items

<table>
<thead>
<tr>
<th>Pattern Matrix</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Component</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>IN_1</td>
<td>.821</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IN_2</td>
<td>1.011</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IN_3</td>
<td>.968</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IN_4</td>
<td>.495</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IN_5</td>
<td></td>
<td>.789</td>
<td></td>
</tr>
<tr>
<td>IN_6</td>
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<td></td>
</tr>
<tr>
<td>IN_7</td>
<td></td>
<td>.622</td>
<td></td>
</tr>
<tr>
<td>IN_8</td>
<td></td>
<td>.851</td>
<td></td>
</tr>
<tr>
<td>IN_9</td>
<td></td>
<td>.649</td>
<td></td>
</tr>
<tr>
<td>IN_10</td>
<td></td>
<td></td>
<td>.987</td>
</tr>
</tbody>
</table>

Extraction Method: Principal Component Analysis. Rotation Method: Promax with Kaiser Normalization, a. Rotation converged in 4 iterations

As evidenced in the pattern matrix reported in Table 2, the first component is correlated with the first four items while the third one is formed by the sole IN_10 variable. In the three-componential space, the communality of IN_9 is quite low thereby betraying insufficient quality of representation. Moreover, the loading of IN_4 onto the first component is on the verge of practical significance with respect to sample size. However, the items were not removed because the more cogent PLS estimation verdict is pending.

PLS Estimation of Mediation Model 1
First step: The estimated model was a model wherein only first-order constructs were specified. Thus, instead of being regressed on the second-order constructs, namely communication and mediation, the dependent constructs were regressed on the first-order dimensions thereof. The estimation was carried out using the Partial Least Squares (PLS) Algorithm with the centroid weighting scheme inasmuch as it proved to be best suited for the detection of small effects purportedly involved in the two rival research models to be estimated, especially moderation effects and, to a lesser extent, indirect effects. The measurement mode was specified as reflective (mode A) within all blocks, as the indicators consist of attitudinal data. The package plspm of the R software environment was used for the purposes of the first-step estimation because of the data management facilities, while the SmartPLS software was used during the second step on account of its moderation effects utilities.
Table: 3
Psychometric properties of the original latent variables in the first-stage estimation

<table>
<thead>
<tr>
<th></th>
<th>C.alpha</th>
<th>DG.rho</th>
<th>eig.2nd</th>
<th>AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SI</td>
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<td>0.670</td>
<td>1.009</td>
<td>0.532</td>
</tr>
<tr>
<td>TI</td>
<td>0.230</td>
<td>0.599</td>
<td>0.882</td>
<td>0.612</td>
</tr>
<tr>
<td>CI</td>
<td>0.300</td>
<td>0.617</td>
<td>0.999</td>
<td>0.462</td>
</tr>
<tr>
<td>VI</td>
<td>0.204</td>
<td>0.715</td>
<td>0.887</td>
<td>0.516</td>
</tr>
<tr>
<td>TR</td>
<td>0.441</td>
<td>0.725</td>
<td>0.937</td>
<td>0.469</td>
</tr>
<tr>
<td>RA</td>
<td>0.705</td>
<td>0.772</td>
<td>2.273</td>
<td>0.345</td>
</tr>
<tr>
<td>PRI</td>
<td>0.510</td>
<td>0.756</td>
<td>0.993</td>
<td>0.405</td>
</tr>
<tr>
<td>PRE</td>
<td>0.000</td>
<td>0.399</td>
<td>0.689</td>
<td>0.548</td>
</tr>
<tr>
<td>IC</td>
<td>0.686</td>
<td>0.793</td>
<td>1.069</td>
<td>0.439</td>
</tr>
<tr>
<td>LT</td>
<td>0.487</td>
<td>0.796</td>
<td>0.678</td>
<td>0.661</td>
</tr>
<tr>
<td>POLE</td>
<td>0.799</td>
<td>0.855</td>
<td>1.116</td>
<td>0.464</td>
</tr>
<tr>
<td>ADOPTE*</td>
<td>0.705</td>
<td>0.772</td>
<td>2.273</td>
<td>0.345</td>
</tr>
<tr>
<td>GOF</td>
<td>1.000</td>
<td>1.000</td>
<td>0.000</td>
<td>1.000</td>
</tr>
</tbody>
</table>

*The psychometric properties could not be assessed because the measurement model parameters were fixed for identification purposes.

Table 3 displays the psychometric properties of the original latent variables in the first-stage estimation. The first-step estimation results show that some constructs cannot boast acceptable psychometric properties. More specifically, the blocks SI, TI, CI, VI, TR, RA, PRI, PRE, IC, LT and POLE are shown to be deficient in terms of reliability (as measured by coefficient Cronbach alpha (Must be greater than 0.7.) and coefficient rho of Dillon-Goldstein(Must be greater than 0.6), validity (assessed by the Average Variance Extracted, herein AVE (Must be greater than 0.5)) and/or unidimensionality (appraised through the second Eigen value (Must be smaller than 1 and possibly much smaller that the first one) of the spectral analysis).

In order to gauge the extent to which the inverse items are the source of the above mentioned psychometric defects, Table 4 exhibits the loadings of the original items, as well as their standard errors and 95% confidence intervals obtained through resembling (bootstrap 1000 replications).

Table: 4
Estimates, standard errors and t-statistics of total effects

<table>
<thead>
<tr>
<th></th>
<th>Original</th>
<th>Mean.Boot</th>
<th>Std.Error</th>
<th>perc.025</th>
<th>perc.975</th>
</tr>
</thead>
<tbody>
<tr>
<td>SI_3</td>
<td>-0.233</td>
<td>-0.210</td>
<td>0.223</td>
<td>-0.583</td>
<td>0.243</td>
</tr>
<tr>
<td>TI_3</td>
<td>-0.469</td>
<td>-0.454</td>
<td>0.162</td>
<td>-0.716</td>
<td>-0.090</td>
</tr>
<tr>
<td>CI_3</td>
<td>-0.437</td>
<td>-0.270</td>
<td>0.466</td>
<td>-0.819</td>
<td>0.912</td>
</tr>
<tr>
<td>RD_4</td>
<td>0.571</td>
<td>0.574</td>
<td>0.087</td>
<td>0.398</td>
<td>0.733</td>
</tr>
<tr>
<td>VI_1</td>
<td>0.215</td>
<td>0.222</td>
<td>0.400</td>
<td>-0.596</td>
<td>0.888</td>
</tr>
<tr>
<td>VI_2</td>
<td>0.995</td>
<td>0.889</td>
<td>0.237</td>
<td>-0.104</td>
<td>1.000</td>
</tr>
<tr>
<td>TR_3</td>
<td>0.124</td>
<td>0.163</td>
<td>0.429</td>
<td>-0.706</td>
<td>0.899</td>
</tr>
<tr>
<td>RA_1</td>
<td>0.153</td>
<td>0.122</td>
<td>0.255</td>
<td>-0.421</td>
<td>0.577</td>
</tr>
<tr>
<td>RA_2</td>
<td>0.085</td>
<td>0.057</td>
<td>0.248</td>
<td>-0.444</td>
<td>0.507</td>
</tr>
<tr>
<td>RA_3</td>
<td>0.353</td>
<td>0.322</td>
<td>0.210</td>
<td>-0.144</td>
<td>0.653</td>
</tr>
<tr>
<td>RA_8</td>
<td>0.577</td>
<td>0.558</td>
<td>0.121</td>
<td>0.281</td>
<td>0.764</td>
</tr>
<tr>
<td>PRI_1</td>
<td>-0.041</td>
<td>0.101</td>
<td>0.433</td>
<td>-0.620</td>
<td>0.907</td>
</tr>
<tr>
<td>PRI_2</td>
<td>0.444</td>
<td>0.438</td>
<td>0.292</td>
<td>-0.202</td>
<td>0.863</td>
</tr>
<tr>
<td>PRI_3</td>
<td>0.986</td>
<td>0.746</td>
<td>0.426</td>
<td>-0.662</td>
<td>0.996</td>
</tr>
<tr>
<td>PRE_1</td>
<td>0.764</td>
<td>0.451</td>
<td>0.569</td>
<td>-0.750</td>
<td>0.890</td>
</tr>
<tr>
<td>PRE_2</td>
<td>0.832</td>
<td>0.473</td>
<td>0.619</td>
<td>-0.800</td>
<td>0.920</td>
</tr>
<tr>
<td>PRE_3</td>
<td>0.687</td>
<td>0.377</td>
<td>0.525</td>
<td>-0.706</td>
<td>0.811</td>
</tr>
<tr>
<td>PRE_4</td>
<td>-0.904</td>
<td>-0.371</td>
<td>0.733</td>
<td>-0.926</td>
<td>0.968</td>
</tr>
<tr>
<td>PRE_5</td>
<td>-0.284</td>
<td>-0.091</td>
<td>0.453</td>
<td>-0.703</td>
<td>0.807</td>
</tr>
<tr>
<td>IC_1</td>
<td>0.763</td>
<td>0.626</td>
<td>0.325</td>
<td>-0.390</td>
<td>0.944</td>
</tr>
<tr>
<td>IC_2</td>
<td>0.838</td>
<td>0.674</td>
<td>0.276</td>
<td>-0.201</td>
<td>0.903</td>
</tr>
<tr>
<td>IC_3</td>
<td>0.764</td>
<td>0.619</td>
<td>0.298</td>
<td>-0.307</td>
<td>0.901</td>
</tr>
<tr>
<td>IC_4</td>
<td>0.686</td>
<td>0.557</td>
<td>0.229</td>
<td>-0.082</td>
<td>0.815</td>
</tr>
<tr>
<td>IC_5</td>
<td>0.500</td>
<td>0.418</td>
<td>0.291</td>
<td>-0.358</td>
<td>0.796</td>
</tr>
<tr>
<td>IC_6</td>
<td>0.007</td>
<td>-0.001</td>
<td>0.260</td>
<td>-0.353</td>
<td>0.497</td>
</tr>
<tr>
<td>POLE_1</td>
<td>0.549</td>
<td>0.538</td>
<td>0.103</td>
<td>0.308</td>
<td>0.713</td>
</tr>
<tr>
<td>POLE_2</td>
<td>0.446</td>
<td>0.436</td>
<td>0.124</td>
<td>0.173</td>
<td>0.658</td>
</tr>
</tbody>
</table>
Table 4 confirms that the inverse items are fraught with problems. Not only are not they, for most cases, statistically significant (the confidence interval does contain zero), but they also have the wrong sign (even after reverse coding) or propagate a negative sign to other items pertaining to the same scale. In the rare cases where such problems are not evinced, the inverse items are part of a block that is not unidimensional and/or have loadings that are not large enough to achieve validity. Thus, it seemed inevitable that the inverse items should be removed. Hence, the pool of weeded items is comprised of: SI_3, TI_3, CI_3, RD_4, VI_2, TR_3, RA_1, RA_2, RA_3, RA_8, PRI_1, PRE_4 PRE_5, IC_6, IC_5, POLE_7, POLE_1, and POLE_2.

Table 5
Correlations between latent variables

<table>
<thead>
<tr>
<th>AT</th>
<th>VA</th>
<th>EX</th>
<th>AB</th>
<th>ID</th>
<th>SI</th>
<th>TI</th>
<th>CI</th>
<th>AUT</th>
<th>AF</th>
<th>IN1</th>
<th>IN2</th>
<th>IN3</th>
<th>ETU</th>
<th>RD</th>
<th>VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT</td>
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<td>0.5216</td>
<td>0.2781</td>
<td>0.3252</td>
<td>0.3326</td>
<td>0.2683</td>
<td>0.2280</td>
<td>-0.1567</td>
<td>0.2589</td>
<td>0.2760</td>
<td>0.1274</td>
<td>0.4232</td>
<td>0.3143</td>
<td>0.1241</td>
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<td>VA</td>
<td>1.0000</td>
<td>0.5083</td>
<td>0.4160</td>
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<td>0.3434</td>
<td>0.3575</td>
<td>0.1676</td>
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</tr>
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<td>0.3680</td>
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<td>0.3164</td>
<td>0.2569</td>
<td>0.1941</td>
<td>0.1914</td>
<td>0.3357</td>
<td>0.3575</td>
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<td>0.3996</td>
<td>0.5596</td>
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</tr>
<tr>
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<td>0.2664</td>
<td>0.3167</td>
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<td>-0.0125</td>
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<tr>
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<tr>
<td>AF</td>
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<td>0.1932</td>
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<td>0.4026</td>
<td>0.0369</td>
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<td>IN2</td>
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<tr>
<td>IN3</td>
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</table>

As for discriminate validity, Table 5 reports the correlations between latent variables. It can be verified that for each blocks all correlations are smaller than the square root of the AVE.

According to the Fornell and Larcker criterion, discriminate validity is accredited. Furthermore, it is noteworthy that intercorrelations between first-order dimensions of communication and mediations are not high enough to warrant a reflective mode for the second-order constructs in the second step. That is why the formative mode (Mode B) will be specified for mediation and communication in the second step.

Second step: The partial mediation model M1 was estimated using PLS. The scores of the first-order dimensions of the Communication and Mediation constructs, calculated from the first step, were used as the indicators thereof. The reflective measurement mode (mode A) was specified for all blocks except Communication and Mediation for the reason stated above. The path coefficients, representing the hypothesized direct effects, are reported in Table 6, together with their standard errors and associated t-statistics obtained through resembling (bootstrap 1000 replications). Bidirectional significance tests were used for the sake of testing statistical significance. Coefficients significant at the 5% level are marked with double asterisks while coefficients significant at the 10% level are marked with an
asterisk. Furthermore, direct effects that are either statistically significant or on the verge of statistical significance are highlighted in bold.

It appears from Table 6 that amongst the hypothesized effects on POLE, only the effects of COM, MF and VI are statistically significant (at the 5% conventional level). Although they did not achieve formal statistical significance, the effects of PRI and MED are roughly significant at the 10% level. Therefore, MED and PRI can be considered salient predictors of POLE, since augmenting the bootstrap replications is likely to reduce the standard errors of their effects, thereby conducting to their achieving statistical significance. All salient effects are positive and moderate in magnitude (ranging between 0.15 and 0.30), except for MF whose effect is negative. In turn, POLE exerts a significant moderate positive impact on LO, together with COM, LT and VA. Finally, LO AF and ID positively and significantly affect ADOPTE, whereas TR influences it negatively.

With respect to the partial mediation theory underlying Model 1, it is noteworthy that POLE affects LO, which in turn affects ADOPTE, whereas POLE does not affect ADOPTE directly. This allows us to conjecture that LO may mediate completely mediate the effect of POLE on ADOPTE and that POLE may not only mediate the effects on LO but also the impacts on ADOPTE. Such conjectures needs further evidence to be sought in the subsequent analysis.

In order to check the plausibility the hypothesis of the meditational role of POLE underpinning Model M1, Table 6 reports estimates, standard errors and t-statistics of total effects. Total effects that are significant at the 5% level are marked with double asterisks while those significant at the 10% level are marked with an asterisk. Furthermore, total effects that are either statistically significant or on the verge of statistical significance are highlighted in bold.

<table>
<thead>
<tr>
<th>Direct Effect</th>
<th>Original Sample</th>
<th>Sample Mean</th>
<th>Standard Error</th>
<th>T-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF -&gt; ADOPTE</td>
<td>0.286958**</td>
<td>0.297984</td>
<td>0.097675</td>
<td>2.937899</td>
</tr>
<tr>
<td>COM -&gt; LO</td>
<td>0.180605*</td>
<td>0.173858</td>
<td>0.098518</td>
<td>1.833221</td>
</tr>
<tr>
<td>COM -&gt; POLE</td>
<td>0.252091**</td>
<td>0.260096</td>
<td>0.114559</td>
<td>2.200531</td>
</tr>
<tr>
<td>ID -&gt; ADOPTE</td>
<td>0.298647**</td>
<td>0.296808</td>
<td>0.107743</td>
<td>2.771847</td>
</tr>
<tr>
<td>LO -&gt; ADOPTE</td>
<td>0.312112**</td>
<td>0.313976</td>
<td>0.121595</td>
<td>2.566824</td>
</tr>
<tr>
<td>LT -&gt; LO</td>
<td>0.137541*</td>
<td>0.137153</td>
<td>0.070873</td>
<td>1.940665</td>
</tr>
<tr>
<td>MED -&gt; POLE</td>
<td>0.141123</td>
<td>0.135271</td>
<td>0.091587</td>
<td>1.540871</td>
</tr>
<tr>
<td>MF -&gt; POLE</td>
<td>-0.208727**</td>
<td>-0.194153</td>
<td>0.089334</td>
<td>2.336467</td>
</tr>
<tr>
<td>POLE -&gt; LO</td>
<td>0.245396**</td>
<td>0.242285</td>
<td>0.089546</td>
<td>2.740440</td>
</tr>
<tr>
<td>PRI -&gt; POLE</td>
<td>0.143595</td>
<td>0.132979</td>
<td>0.092597</td>
<td>1.550762</td>
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<tr>
<td>TR -&gt; ADOPTE</td>
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<td>-0.162253</td>
<td>0.103677</td>
<td>-1.676265</td>
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<tr>
<td>VA -&gt; LO</td>
<td>0.245495**</td>
<td>0.245400</td>
<td>0.102546</td>
<td>2.393997</td>
</tr>
<tr>
<td>VI -&gt; POLE</td>
<td>0.169023**</td>
<td>0.154694</td>
<td>0.082590</td>
<td>2.046531</td>
</tr>
</tbody>
</table>

Table 7 reports estimates, standard errors and t-statistics of total effects. Total effects that are significant at the 5% level are marked with double asterisks while those significant at the 10% level are marked with an asterisk. Furthermore, total effects that are either statistically significant or on the verge of statistical significance are highlighted in bold. To assess the partial mediation, we ought to focus on the total effects involving the mediation of POLE. In this respect, Table 7 shows that the total effects of COM, LT, VA and VOL on LO are either significant or on the verge of significance. Besides, these total effects are different from the associated direct effects. Consequently, POLE can be said to mediate the impacts of COM, LT, VA and VOL on LO. In the case of VOL mediation is complete since VOL does not influence LO directly. Likewise, while POLE does not influence ADOPTE directly, its total effect thereon is significant at the 10% level, which vouches for the complete mediation role of LO in the relationship between POLE and ADOPTE, since POLE influences LO which influences ADOPTE. As a consequence of POLE influencing ADOPTE indirectly, not only does POLE mediate the effects between external, internal and pedagogical factors on
LO, but it also mediates their impacts on ADOPTE. Thus, it should come as no surprise that
the total effects of AF, ID, TR and VA on ADOPTE are significant and different from the
associated direct effects. Hence the mediation role of POLE in these relationships,
mediation being complete in the latter case.

Table: 7
Estimates, standard errors and t-statistics of total effects

<table>
<thead>
<tr>
<th>Total Effect</th>
<th>Original Sample</th>
<th>Sample Mean</th>
<th>Standard Error</th>
<th>T-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF -&gt; ADOPTE</td>
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</tr>
<tr>
<td>COM -&gt; POLE</td>
<td>0.252091**</td>
<td>0.260096</td>
<td>0.114559</td>
<td>2.200531</td>
</tr>
<tr>
<td>ID -&gt; ADOPTE</td>
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<td>0.289545</td>
<td>0.112151</td>
<td>2.564561</td>
</tr>
<tr>
<td>LO -&gt; ADOPTE</td>
<td>0.312112**</td>
<td>0.313976</td>
<td>0.121595</td>
<td>2.566824</td>
</tr>
<tr>
<td>LT -&gt; LO</td>
<td>0.133483**</td>
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<td>1.896430</td>
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<tr>
<td>MF -&gt; POLE</td>
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<td>0.089334</td>
<td>2.336467</td>
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<tr>
<td>POLE -&gt; ADOPTE</td>
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<td>0.166473</td>
<td>0.089606</td>
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</tr>
<tr>
<td>POLE -&gt; LO</td>
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<td>0.089546</td>
<td>2.740440</td>
</tr>
<tr>
<td>TR -&gt; ADOPTE</td>
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<td>-0.170102</td>
<td>0.108583</td>
<td>1.610956</td>
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<tr>
<td>VA -&gt; ADOPTE</td>
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<td>0.167116</td>
<td>0.120316</td>
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<td>VI -&gt; POLE</td>
<td>0.169023**</td>
<td>0.154694</td>
<td>0.082590</td>
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<tr>
<td>VOL -&gt; LO</td>
<td>0.123107</td>
<td>0.137117</td>
<td>0.078024</td>
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</table>

PLS Estimation of Moderation Model 2

First step: the first step estimation of model 2 proceeded analogously with model 1 and
yielded similar conclusions in terms of reliability, unidimensionality, convergent validity
and discriminant validity. As a consequence, there is little use reproducing the results of
the first step herein.

The only difference between the twain models lies in the specification. In fact, moderating
effects were estimated based on the product indicator approach proposed by Chin, et.al,
(1996) [22]. According to this approach, the moderating effect of a latent variable Z on the
impact of an independent latent variable X on a latent dependent variable Y consists of the
effect on Y of a latent interaction variable equivalent to a created latent variable made up
of the product of X and Z. Using the standardized indicators of the predictor variable (i.e.,
X) and the moderator variable (i.e., Z), product indicators are then developed by creating
all possible products from the two sets of indicators. These product indicators are used to
reflect the latent interaction variable. Hence, specification of latent interaction variables
consisting of products of POLE and all external, internal and pedagogical factors, and the
operationalization thereof with all possible products of the indicators of POLE and the
indicators of these factors.

Second step: Table 8 reports estimates of paths coefficients specified in model 2 along with
their standard errors and associated t-statistics obtained through resampling (bootstrap
with only 500 replications do to limitations of available computing power). Path coefficients
include both linear and nonlinear effects. Linear effects are the main effects of predictors,
whereas nonlinear effects are interaction effects. Bidirectional significance tests were used
for the sake of testing statistical significance. Coefficients significant at the 5% level are
marked with double asterisks while coefficients significant at the 10% level are marked
with an asterisk. Furthermore, path coefficients that are either statistically significant or
on the verge of statistical significance are highlighted in yellow. It behooved us to consider
coefficients that are on the verge of statistical significance, because we reckon that an
increase in the number of bootstrap replications would have dwindled their standard errors,
thereby rendering them statistically significant.
Table 8 shows that the variables which influence LO directly and linearly are COM and VA. Likewise the variables which influence ADOPTE directly and linearly are AF, ID, TR and LO, with the effect of TR being negative. On the other hand, it turned out that AB, ID, RD and SN exert a nonlinear effect on LO, in the sense that their impact thereon is moderated by POLE.

RESULTS

As model 1 and model 2 are irreconcilable and imply different managerial recommendations, it is of great import to know which one is more plausible. For want of a formal statistical test allowing to reject one model in favor of the other, as is the case of the likelihood ratio test in the context covariance-based structural equation models, model comparison can be done heuristically, hinging upon goodness of fit indexes meant to reflect the extent to which a model is in accord with the gathered data. The goodness of fit indexes considered herein are the coefficient of determination (R2), the cross-validated communality index and the cross-validated redundancy index.

The coefficient of determination (R2 or R square) denotes the proportion of the variance of a dependent variable explained by the independent variables. The cross-validated communality index measures the quality of the measurement model for each block. The cross-validated redundancy index measures the quality of the structural model for each endogenous block, taking into account the measurement model Stone–Geisser’s (Q2). Following Wold (1982, 1982, p. 301) the cross-validation test of Stone and Geisser fits soft modeling like hand in glove. In calculating cross-validated communalities and redundancies, the blindfolding procedure was employed with an omission distance equal to 8, in line with the recommendations of Herman Wold.

Table 9 reports r squares in the two rival models. It reveals that while the two models explain quite the same amount of variance of ADOPTE (which should come as no surprise
since this dependent variables is regressed on the same predictors in both models), model 2 explains a fairly greater proportion of the variance of LO than its counterpart. Hence the superiority model 2 in terms of explanatory power.

Table: 10
Cross-validated redundancies in the two rival models

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<tr>
<th>Cross-validated redundancy</th>
<th>Model 1</th>
<th>Model 2</th>
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<td>LO</td>
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<td>0.469804</td>
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<tr>
<td>POLE</td>
<td>0.120539</td>
<td>n.a.*</td>
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</table>

Not applicable because POLE is not a dependent variable in Model 2

Table 10 reports cross-validated redundancies in the two rival models. Not are the redundancies greater for both LO and ADOPTE in model 2 than their counterparts in model 1, but the redundancy of ADOPTE in model 1 is also negative, which betrays serious problems in terms of goodness of fit.

Table: 11
Cross-validated communalities in the two rival models

<table>
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<tr>
<th>Cross-validated communality</th>
<th>Model 1</th>
<th>Model 2</th>
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<td>AB</td>
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<td>PD</td>
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</tbody>
</table>

Table 11 reports cross-validated communalities in the two rival models. It reveals that the cross communalities for all latent variables are greater, sometimes by far, in model 2 than their counterparts in model 1. Thus, it appears that model 2 outperforms model 1 in terms of all goodness-of-fit criteria. Model 2 can therefore be said to provide a better fit to the data than model 1. As a result, it can be concluded that in the relationship between external, internal and pedagogical factors and LO, POLE is a moderator rather than a mediator.

CONCLUSION AND FUTURE WORK

While we used a combination of extended frameworks in this research, the interesting results were found about the research framework that combines the modified innovation diffusion theory (IDT) in conjunction with modified version of the Biggs and Moore model both in the earlier study in addition to this research.

The current research activity been extend the study of e-learning by concentrating on learning where mixed modes were taken into account. In addition a mixture of types of technological software solutions for interactive multimedia and e-learning were investigated (e.g. Wikis, Blogs, Skype). In other words, does the use of interactive multimedia and e-learning tools moderate the presage and learning outcome relationship?

As indicate the students in this research were undergraduate and graduate students experiencing their perspective of interactive multimedia and e-learning environment.
Hence it would be interesting to examine and test the role of moderating interactive multimedia and e-learning in the extended framework when the undergraduate and graduate students have more experience with interactive multimedia and e-learning.

**BIODATA and CONTACT ADDRESSES of the AUTHORS**

**Fathia LAHWAL** is PhD Student in STRL De Montfort University, United Kingdom, at College of Computing. Her department is Software Technology Research Laboratory. Her research areas are multimedia and e-learning services.

Fathia LAHWAL  
Software Technology Research Laboratory (STRL)  
De Montfort University, Leicester, United Kingdom  
Phone: +447453510579  
e-Mail: fathia272002@yahoo.co.uk

**Ajlan S. AL-AJLAN** is Assistant Professor of management information system. His position is Vice-Dean of Academic Affairs at the College of Computer, Qassim University, Saudi Arabia. He finished his Ph.D. De Montfort University, United Kingdom. His teaching areas are management information systems, e-learning systems (Moodle), distance learning, introduction to technology, information technology, decision support system and intelligent system. His research areas are e-learning, distance learning, strategy of e-learning, digital watermarking, multimedia application, watermarking technology, web services.

Ajlan S. AL-AJLAN  
College of Business & Economics,  
Qassim University,  
Buraidah, Saudi Arabia,  
Phone: +966550856741  
e-Mail: ajlan2010@gmail.com

**Mohamad AMAIN** is PhD Student in STRL De Montfort University, United Kingdom, at College of Computing. His department is Software Technology Research Laboratory. His research areas are information technology, project management, risk management, human resources, human development, economy planning, research methodologies, action research, e-learning and media.

Mohamad AMAIN  
Software Technology Research Laboratory (STRL)  
De Montfort University, Leicester, United Kingdom  
Phone: +447969972956  
e-Mail: mohamed372005@yahoo.co.uk
REFERENCES


THE ICT LEVEL OF CONFIDENCE OF COURSE SPECIALISTS IN DISTANCE EDUCATION: THE POLYTECHNIC UNIVERSITY OF THE PHILIPPINES EXPERIENCE

Dr. Caroline T. SUMANDE  
College of Education  
Polytechnic University of the Philippines, Philippines

Dr. Carmencita L. CASTOLO  
Institute of Open and Distance Education  
Polytechnic University of the Philippines, Philippines

Benilda Eleanor V. COMENDADOR  
Institute of Open and Distance Education  
Polytechnic University of the Philippines, Philippines

ABSTRACT

The study addressed two questions: what is the ICT level of confidence of the course specialists handling Open University classes, and to what extent do course specialists integrated ICT applications such as word processing, electronic spread sheet, presentation software, YouTube and etc. in their OUS classes? The instruments were administered to 130 OUS course specialists with 80 or 61.54% retrieval rate from those who attended the LMS training from April to May 15, 2015. The responses to the questionnaires were summarized using frequency and percentages. Results show that a high percentage of course specialists are fully confident in using computer applications such as; word documents, PDF documents, email, multi-media presentations, e-learning tools for submission of requirements, assessment of students performance, and other systems integrated in handling OUS classes through the DE system blended method of teaching, but the alarming reality revealed that a number of course specialists used the applications but need further practice/training while some are “not aware of the application” which can be deterrent in achieving the goal of the university to offer pure online strategy in the next few years. In Distance Education, technology is considered as an integral part of the learning process, thus, this study concludes that creating a long-term vision for the future of DE system in the country can be best achieved if DE providers or universities prepare the faculty members or the course specialists in teaching via online given proper training programs where technology is best utilized and makes a gratifying experience for both the students and course specialists.

Keywords: ICT level of confidence, course specialists, distance education, e-learning utilization, learning management system.

INTRODUCTION

Teaching and learning in the 21st Century require both teachers and students to capitalize upon the relative advantage of using ICT to enhance curriculum, pedagogy, and assessment approaches. There has been profound change on approaches to education globally; new learning models have emerged in which technology has become an essential part on the delivery of education (White, 2010). ICT initiatives and integration to teachers’ teaching has shown great impact among students, specifically the distance type students. In the Philippines, however, there were a number of educational
institutions which are patronizing an ideology that the researchers believed to be highly capitalizing on the ICT infrastructure for successful implementation of the program.

**History of Distance Education in the Philippines**

The rapid growth of distance education system has brought so many changes in the way education look at the philosophy of learning. From the simple traditional classroom set up to boundless types of educational ideology highly affiliated to information communication technology offers a new way of teaching and learning experience for both students and teachers.

This has resulted to Philippine Educational System to adapt and to put increasing pressure to its higher education institutions (HEIs) to adjust their mode of delivery systems in an effort to meet these changes. Distance Education (DE) has emerged as a legitimate alternative system to traditional educational strategies in a number of Higher Education Institution (HEIs) in the Philippines. With its alternative educational delivery system, DE provides a unique blend of practical and career related experiences with formal and academic learning. Addressing the needs of the DE mode of delivering education is important, yet is becoming an increasing challenge for institutions implementing Open and Distance Learning (ODL) due to various factors such as: the increasing number of students admitted in ODL, reduction of staff and resources as a result of budget cuts among State Universities and Colleges (SUCs), the hits and misses in the adoption of various ODL strategies which all contribute to the diminishing success of DE students in obtaining their degrees and in persisting in their studies.

It was also underscored that online education as an educational process that is delivered from a distance utilizing the tools and techniques of information technology (IT) is officially acknowledged as Open Learning (OL), Distance Education (DE), or Electronic-aided Learning (e-Learning). The point of convergence between the teacher and the student is no longer the physical structure of the traditional classroom; but the length and breadth of information highways traversed worldwide via the facilities of the internet, web nets, lineal and cellular bridges, broadcast media, among others.

The entry of Information Technologies (IT) encompassing computer hardware and software applications in the country in the mid-1980s led to the introduction of innovations in Philippine education. Tertiary and technical educational institutions began offering IT-aided degree courses through the broad range of curriculum, and specific degree courses in the fields of computer science and technology.

In the late 90s, this development has spawned yet another innovation in the areas of OL/DE, e-Learning or Online Education. In response to these changes in the educational landscape, the Commission on Higher Education (CHED), which is the highest governing body of tertiary and graduate education in the Philippines, encouraged institutions to explore OL/DE and e-Learning. The CHED is committed to the promotion of “quality higher education,” in line with its mandate as set forth by Republic Act No. 7722 known as the Higher Education Act of 1994.

CHED Memorandum Order #35, series of 2000 (CMO 35, s. 2000) was then issued. It provided, among others, the updated Policies and Guidelines on Open Learning and Distance Education. This ruling also set the standards for qualifying Center of Excellence, Center of Development, and recognized Higher Education Institutions (HEIs) with Level III Accreditation as institutions fit to offer Open Learning and Distance Education (OL/DE) programs. CMO #30 s. 2004 further defined OL/DE as “alternative systems of education emphasizing the opening of opportunities by overcoming barriers that result from geographical isolation, personal or work commitments or conventional courses structures which have often prevented people from realizing their educational goals”, “Open Learning is a philosophy of learning that is learner-centered and flexible, enabling learners to learn at the time, place, and pace which satisfies their circumstances and requirements, while DE is a mode of educational delivery whereby teacher and learner are
separated by time and space, and instruction is delivered through specially designed materials and methods supported by organizational and administrative structures and arrangements.”

It is the CHED which provides the policy framework for operating OL/DE delivery of courses. Basically bound by the following guiding principles; 1) learning centeredness must focus on student needs and goals; 2) sound instructional design which can be compared well with face to face programs; 3) there must be transparency, that is, all information related to the program have to be made available; 4) there must be public responsibility and accountability for program impact and outcomes; and 5) there must be continuous monitoring, evaluation and upgrading of program content and delivery.

During the First Conference on e-Learning organized by CHED in August, 2002, online education was described as “a process wherein tie, distance, and geographic space are collapsed on the computer (internet)” -undefined by any physical barrier. The student acquires knowledge and skills by means of computerized learning modules that are accessed right within the confines of the home or the network station. The educator or teacher assumes a virtual, not visual presence. Teacher-student or peer-to-peer communication occurs within a designated venue at pre-arranged intervals only when the class assembles for face to face (F2F) sessions. Conventional teaching methods give way to modular approaches in course design. As a result, the student is allowed to progress at his own time and in his own place.

It was also in the said Conference on e-Learning where the Committee of Reviewers for the delivery of Open and Distance education that the formal definition of e-learning to guide all the HEIs was presented. This definition can be found in its Policy Framework for e-Learning in the Philippines as “a generic term for all technologically supported learning using an array of teaching and learning tools that utilizes electronic media such as phone bridging, audio and videotape, video teleconferencing, satellite broadcast, and the more commonly recognized forms of web-based training or computer-aided instruction commonly referred to as online courses.”

CHED proceeds with the promotion of e-learning and distance programs with extreme caution for two reasons. The first reason has something to do with access. The Commission realized all too clearly that the availability of computers and the internet to students and teachers alike “as an instructional medium is a fairly recent phenomenon and had low penetration in the households of students” in tertiary levels. The second reason is only faculty and student preparedness prompting the CHED to presently confine the offering of online courses to HEIs and COEs.

As years go by, scientific developments and social changes have continuously sprouted. The use of technology has visibly shown greater impact on society in general and in education in particular. As a consequence, the emphasis of paradigm shift in education is highly dependent on the technology capital of an institution to offer Distance Education. According to Harasim in 2000 as mentioned by Bozkurt, et al., (2015) the invention of the web technologies made online education increasingly accessible, open, flexible which allowed new pedagogical models to emerge and reasoned the revolution in digital knowledge age that enabled greater and faster human communication and collaboration that led to fundamentally new forms of economic activity that produced the knowledge economy and required basic changes in education. This may bring increase for a more educational opportunities and inventions of new learning models and pedagogies.

Course Specialists Preparation to Handle DE Courses through ICT Integration

The birth of distance education finds its way to totally engage academic sectors in technology integration practices in the country from its established roots as a form of instruction 150 years ago (Holmberg, 1986). Marcial (2012) stated that the level of prioritization in teaching and learning with technology integration takes high precedence, but moderately implemented
among HEIs. This has something to do with the premise that it has been put in place in Higher Education strategic planning, but has yet to be realized due to lack of resources and facilities. This is further supported by Rodrigo (2003) with his statement that the Philippines is one of the many developing nations that have turned to information and communication technology (ICT) as a tool to improve teaching and learning. Unfortunately, implementation suffers from several shortcomings; the absence of information on how ICT is actually used; a lack of coordination between public and private sector efforts; and insufficient teacher's preparation and further concludes “if teachers venture to use ICT without adequate training, they are likely to do so erroneously.”

The term ICT is more than just computers. Many IT enthusiasts have provided the definitions following the different views and perspectives; Berce, et al (2008) "as a mixture of hardware (equipment), software (operating system, applications, etc.) and communication facilities (Local Area Networks, wide area and backbone networks, communication protocols, etc.); Wang and Woo (2007) defined ICT as a tool; that ICT can be hardware (such as computers, digital cameras), software (such as excel, discussion forums) or both. More importantly, ICT as defined in the educational context mainly refers to various resources and tools that help in enhancing student learning and, so too, realizing the learning objectives (Altun et al, 2011).

Therefore, DEIs necessitates redesigning the educational experience for the distance learners through the use of technology. Technology is a ubiquitous part of children's lives. It is transparent. Most homes have connected computers or Internet-enabled devices. As prices of technology drop, computers and digital devices may replace television as we know it. Pioneering educational technology advocate Jan Hawkins wrote an essay for Edutopia in 1997, "The World at Your Fingertips: Education Technology Opens Doors," about how technology brings the tools of empowerment into the hands and minds of those who use them, Hawkins couldn’t have known her words would be even more relevant today. This is particularly true in the distance education implementation.

From face-to-face approach, through PUP’s Pamantasang Bayan in the late 80’s with its unique idea of bringing education to the doorstep of the target clients by sending faculty members in different OU centers, utilizing blended method of combining online and offline sessions. This has revolutionized the way classroom activities should be done; online sessions started only with the creation of yahoo groups and sending of assignments via online through email addresses, virtual classrooms utilization.

Now that PUP OUS has already designed a new way to accommodate even those who are living in far places to undergo quality education through the integration of the Moodle System–Mabini Portal, PUP’s version of the Learning Management System (LMS), its purpose of integration in teaching and learning should be fully realized. But only a meager percentage of around 20% utilization was reported recently with the Master of Science in Information Technology and Post Baccalaureate Diploma in Information Technology course specialists exclusively utilizing the system. Jamieson-Proctor (2010) enumerated ICT at various dimensions and stages of integration as inherent methodological difficulties; obstacles to integration such as teacher ICT confidence, expertise and beliefs about the potential for ICT to make a difference to student learning; teacher professional development; school technological infrastructure and support; and the need for ICT leadership. Likewise, the ability of the course specialists or facilitators to handle distant subjects, classes or students and the DE system were also taken into consideration.

Thus, this study particularly investigated the extent of Learning Management System (LMS) utilization of PUP OU course specialists; underscoring on the extent of eLearning Utilization for Instructions and awareness on the application/use/functions of different e-learning materials, as well as, the identification of training ICT programs through the identification of obstacles and providing baseline information to ensure the 100% utilization and to effectively meet the goal of PUP OU in the successful implementation of the Distance Education.
RESEARCH METHODS AND TECHNIQUES

The study is an exploratory one that used a questionnaire. Therefore, it was not rigorous with respect to sampling. The sample of course specialists for the study was derived from different OUS Centers from Manila, Quezon City, Lopez, Maragondon, Sablayan, Sta. Rosa, Sto. Tomas, Taguig, and Unisan. All 130 CS were present during the LMS training from April to May, 2015 with retrieval rate of 61.54% or 80 course specialists where majority of the respondents were from Manila campus who have less than 5 years of teaching experience in the Master in Educational Management Program.

The opinion index used as questionnaire was divided into three (3) parts. The first part pertained to the profile of the respondents. The second part was an opinion index to measure the extent of e-Learning Utilization for Instruction in PUP Open University; subdivided into five (5) areas such as the use of electronic document files, use of multimedia presentations, use of e-learning tools for submission of requirements, use of 3-learning tools for assessments, and Learning Management System (LMS) tool features course specialists integrate to OU online classes. The third part elicited the needs of the course specialists to further enhance their ICTC competencies/proficiency in handling online classes. Frequency, percentages, and weighted mean were utilized to statistically analyze the results of the study. Weighted Mean range was analyzed using the Likert scale (Table 1).

<table>
<thead>
<tr>
<th>Range</th>
<th>Numerical Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.20 – 5.00</td>
<td>5</td>
</tr>
<tr>
<td>3.40 – 4.19</td>
<td>4</td>
</tr>
<tr>
<td>2.60 – 3.39</td>
<td>3</td>
</tr>
<tr>
<td>1.80 – 2.59</td>
<td>2</td>
</tr>
<tr>
<td>1.00 – 1.79</td>
<td>1</td>
</tr>
</tbody>
</table>

RESEARCH FINDINGS

With the problem posted, the researchers derived with the following findings:

Profile

<table>
<thead>
<tr>
<th>Centers</th>
<th># of Participants in the Moodle Rehash Conducted</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manila Center</td>
<td>61</td>
<td>76.25%</td>
</tr>
<tr>
<td>Quezon City</td>
<td>9</td>
<td>11.25%</td>
</tr>
<tr>
<td>Other Centers (Lopez, Maragondon, Sablayan, Sta. Rosa, Sto. Tomas, Taguig and Unisan, Quezon)</td>
<td>10</td>
<td>12%</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>100%</td>
</tr>
</tbody>
</table>
There were 80 or 61.54% course specialists participated in the survey from the 130 total attendees of May and April 2015 activities. Majority of the respondents (76.25%) were affiliated in the Manila campus; followed by 11.25% from Quezon City Campus, and 12% were distributed from other centers far from the main campus such as Lopez, Maragondon, Sablayan, Sta. Rosa, Sto. Tomas, Taguig, and Unisan Quezon.

The Polytechnic University of the Philippines as one of the leading institutions in terms of providing quality Distance Education in the country has already spread DE practices all over the archipelago.

### Table: 3
**Number of years teaching in PUP Open University**

<table>
<thead>
<tr>
<th>Centers</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 to 25 years</td>
<td>12</td>
<td>15%</td>
</tr>
<tr>
<td>6 to 15 years</td>
<td>29</td>
<td>36.25%</td>
</tr>
<tr>
<td>less than 5 years</td>
<td>21</td>
<td>26.25%</td>
</tr>
<tr>
<td>No Response</td>
<td>18</td>
<td>22.5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>80</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

In terms of the number of years in teaching in PUP Open University, 36.25% or majority of the course specialists have 6 to 15 years teaching experience. This was followed by those who have already have less than 5 years of teaching with only around 26.25%, while those who have been teaching in PUP OU from 16 to 25 years which included majority of retirees and special lecturers in the university with 15% of the total number of respondents. There were also around 22.5% who never indicated their answer to this item.

The History Distance education can be traced back in mid-19th century of Europe and the United States. It can also recall that the pioneers of distance education used the best technology of their day, the postal system, to open educational opportunities to people who wanted to learn but were not able to attend conventional schools. People who most benefited from such correspondence education included those with physical disabilities, women who were not allowed to enroll in educational institutions open only to men, people who had jobs during normal school hours, and those who lived in remote regions where schools did not exist (California Distance Learning Project).

This is particularly the same with what PUP OU has already been established for in the Philippines. As it was already been serving out-of-school youths in late 90s and now flourishing more to serve graduate students in its 26 years of existence.

### Table: 4
**Program assigned to teach in the Open University**

<table>
<thead>
<tr>
<th>OU Programs</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master in Educational Management</td>
<td>24</td>
<td>30.00%</td>
</tr>
<tr>
<td>Master in Public Administration</td>
<td>5</td>
<td>6.25%</td>
</tr>
<tr>
<td>Master in Communication</td>
<td>1</td>
<td>1.25%</td>
</tr>
<tr>
<td>Master in Construction Management</td>
<td>1</td>
<td>1.25%</td>
</tr>
<tr>
<td>Master of Science in Information Technology</td>
<td>1</td>
<td>1.25%</td>
</tr>
<tr>
<td>Bachelor in Broadcast Communication</td>
<td>25</td>
<td>31.25%</td>
</tr>
<tr>
<td>Bachelor in Entrepreneurial Management</td>
<td>23</td>
<td>28.75%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>80</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

A number of course specialists teach in Master in Educational Management graduate program which corresponds to 30.00% from among other graduate programs indicated herein. This is due to the fact the biggest pool of course specialists teach in MEM
program. In addition, the undergraduate programs in Broadcast Communication and Entrepreneurial Management Programs constituted around 31.71% and 29.27% of the respondents respectively.

The PUPOU has already been providing education to both of the graduate and undergraduate programs in the Philippines. Likewise, majority of its clients came from the education sector or catered to teachers who are said to be very busy with their work and may not able to pursue education under the traditional method.

<table>
<thead>
<tr>
<th>Items</th>
<th>Frequency and Percentage</th>
<th>Weighted Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write in digital documents for your Lessons (Word Documents)</td>
<td>75.25% (61)</td>
<td>4.66</td>
</tr>
<tr>
<td></td>
<td>13.75% (11)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.00% (8)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Write in digital documents for your Lessons (PDF Documents)</td>
<td>61.25% (49)</td>
<td>4.34</td>
</tr>
<tr>
<td></td>
<td>11.25% (9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>27.5% (22)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Write in digital documents for your Lessons (Presentation Files)</td>
<td>51.25% (41)</td>
<td>4.28</td>
</tr>
<tr>
<td></td>
<td>35% (28)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10% (8)</td>
<td>1.25%</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>(1)</td>
</tr>
<tr>
<td>Send files to your students for lectures or additional references</td>
<td>60% (48)</td>
<td>4.38</td>
</tr>
<tr>
<td></td>
<td>26.25% (21)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10% (8)</td>
<td>1.25%</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>(1)</td>
</tr>
<tr>
<td>Send announcement through E-mail or group posts</td>
<td>65% (52)</td>
<td>4.56</td>
</tr>
<tr>
<td></td>
<td>26.25% (21)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8.75% (7)</td>
<td>0</td>
</tr>
<tr>
<td>Use file sharing sites for distributing large files? (i.e Google Drive, Facebook, Yahoo Group, etc)</td>
<td>45% (36)</td>
<td>4.16</td>
</tr>
<tr>
<td></td>
<td>30% (24)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>21.25% (17)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.75% (3)</td>
<td>0</td>
</tr>
<tr>
<td>Grand Total</td>
<td>59.63%</td>
<td>19.38%</td>
</tr>
<tr>
<td></td>
<td>14.58%</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>1.25%</td>
<td>4.40</td>
</tr>
</tbody>
</table>

The said opinion index were used to evaluate the respondents' skills in terms of the use of electronic document files, use of multimedia presentations, use of e-learning tools for submission of requirements, use of the learning tools for assessments, and Learning Management System (LMS) tool features that the course specialists integrate to OU Online Classes.

From among the items shown in the table, “write in digital documents for lessons, particularly word documents” got the highest mean score of 4.66 which the course specialists can confidently use and can explain the use to others. While the lowest mean score respondents are just regularly user of was provided to item “use file sharing sites for distributing large files? (i.e Google Drive, Facebook, Yahoo Group, etc) with 4.16 mean score.

Of the number of Course specialists who attended the training said that they are fully competent in writing digital documents for lessons in file formats such as word documents (75.25%); while 13.75% answered that they are regular and confident user of this program, and a minimal 10% or 8 responded that they have used/done the mentioned programs occasionally but need further practice/training to be confident.
Meanwhile, Course Specialists find the use of electronic document files as highly indispensable with 61.25% of the respondents claiming to be fully competent in writing digital documents for lessons using pdf documents and could confidently explain it to others. This implies that a large portion of the course specialists in the Open University can maximize the use of pdf documents in teaching.

On the other hand, in sending the files to students for lectures or additional references, yielded to 45% of the respondents who are fully competent at it, while a 30% are regular and confident user of this application, and 30% have used or done it occasionally but need further practice/training to be confident.

While, in making use of electronic document files to aid course specialists in lectures and presentations, only an average of 45% said that they are fully competent with sending announcements through e-mail or group-sent files to students for lectures or additional references, and use file sharing sites for distributing large files (i.e. Google Drive, Facebook, Yahoo group, etc.).

<table>
<thead>
<tr>
<th>Table: 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confidence in the Use of Multi-media Presentations</td>
</tr>
<tr>
<td><strong>Items</strong></td>
</tr>
<tr>
<td><strong>Frequency and Percentage</strong></td>
</tr>
<tr>
<td><strong>Weighted Mean</strong></td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td><strong>Compose and use digital slides such as powerpoint</strong></td>
</tr>
<tr>
<td>65% (52)</td>
</tr>
<tr>
<td>21.25% (17)</td>
</tr>
<tr>
<td>10.00% (8)</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>3.75% (3)</td>
</tr>
<tr>
<td>4.40</td>
</tr>
<tr>
<td><strong>Use video presentations or tutorials as additional materials and distribute to your students</strong></td>
</tr>
<tr>
<td>43.75% (35)</td>
</tr>
<tr>
<td>32.75% (26)</td>
</tr>
<tr>
<td>20% (16)</td>
</tr>
<tr>
<td>3.75% (3)</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>3.73</td>
</tr>
<tr>
<td><strong>Suggest video links such as in YouTube and the like to be viewed by your students</strong></td>
</tr>
<tr>
<td>38.75% (31)</td>
</tr>
<tr>
<td>25% (20)</td>
</tr>
<tr>
<td>28.75% (23)</td>
</tr>
<tr>
<td>7.5% (6)</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>3.95</td>
</tr>
<tr>
<td><strong>Use digital infographics (Pictures with labelled information) for illustrations in your lessons</strong></td>
</tr>
<tr>
<td>36.25% (29)</td>
</tr>
<tr>
<td>21.25% (17)</td>
</tr>
<tr>
<td>21.25% (17)</td>
</tr>
<tr>
<td>6.25% (5)</td>
</tr>
<tr>
<td>3.75% (3)</td>
</tr>
<tr>
<td>3.46</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
</tr>
<tr>
<td>45.94%</td>
</tr>
<tr>
<td>25.06%</td>
</tr>
<tr>
<td>20%</td>
</tr>
<tr>
<td>5.83%</td>
</tr>
<tr>
<td>7.5%</td>
</tr>
<tr>
<td>3.89</td>
</tr>
</tbody>
</table>

On the average, 45.94% respondents are fully competent in the use of Multi-Media presentations and can share to others compositions and digital slides utilizing different modes as revealed in the following: Powerpoint with 65%, video presentations with 43.75%, YouTube with 38.25%, and digital infographics with 36.25%. However, there were around 28.75% who have used YouTube and similar sites occasionally but need further training on this application.

Likewise, an average of 55% of the respondents can be concluded that either regular user (25.06%); used it occasionally but need further training (20%); and those who are aware of the program but not using or utilizing it as part of their teaching techniques; plus with a meager percentage of 7.5% who are either not aware or using the program.

The highest mean score of 4.40 was provided to item “compose and use digital slides such as powerpoint” while the lowest mean score was assigned to “use of digital infographics (pictures with labelled information) for illustrations in the lessons” with 3.46. The grand mean computed of 3.89 implies that though majority of the course specialists are a regular and confident user of these applications; further practice and training are still of consideration when confidence level has to be reached.
This only showed that the need of training in relation to the use of multimedia presentations is highly needed among the course specialists, as ACEC 2010 Award Winning Paper “ACT to improve ICT Use for Learning: Synthesize Teacher Confidence in Using ICT in two Queensland schooling systems,” that accordingly, ICT is integral to learning as ICT is expanding exponentially worldwide, it alone does not guarantee teacher’s ICT use for teaching and learning by which this particular paper is putting emphasis on.

<table>
<thead>
<tr>
<th>Items</th>
<th>Frequency and Percentage</th>
<th>Weighted Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Require students to use computer text, editing tools in submitting work documents</td>
<td>37.5% (30)</td>
<td>3.91</td>
</tr>
<tr>
<td>Require students to submit assignments through the use of internet</td>
<td>46.25% (37)</td>
<td>4.08</td>
</tr>
<tr>
<td>Ask students to submit their work burn in a CD or a DVD</td>
<td>36.25% (29)</td>
<td>4.63</td>
</tr>
<tr>
<td>Use social networking sites such as fb to announce requirements’ submission and the likes</td>
<td>50% (40)</td>
<td>4.28</td>
</tr>
<tr>
<td>Grand Total</td>
<td>42.5%</td>
<td>4.23</td>
</tr>
</tbody>
</table>

On the average, a total of 42.5% or 4.23 mean score of the course specialists feel confident using for the submission of the student requirements. About 46.25% of the respondents require students to submit assignments through the internet; 50% of them use social networking sites such as FB to announce requirements submission and deadline; 37.5% of their total number require students to use computer text editing tools in submitting documents; and 35.80 of the course specialists ask students to submit their work burned in a CD or DVD. An average of 10% has used/done such means occasionally but need further practice/training to be confident.

Among the following items, the use of social networking sites such as fb to announce requirements’ submission and the likes has the highest number of respondents who feels confident or fully competent using at for the submission of the students’ requirements (50% or 40); while a certain 36.25% or 29 as the lowest number of respondents who answered competent at using at is through the submission through CD or a DVD, but it can also be noted that the highest mean score of 4.63 registered in this item which mean that on the average this application is more of likely used by the respondents than the other applications enumerated.

The lowest mean score was provided on the item “require students to use compuer text, editing tools in submitting work documents” with 3.91; followed by 4.08 for item “require students to submit assignments through the use of internet”; and, item “use social networking sites such as fb to announce requirements’ submission and the likes” with 4.28 which means that the course specialists are regular and confident users of these applications.
Table: 8
Use of e-Learning Tools for Assessment

<table>
<thead>
<tr>
<th>Items</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Send quizzes or activities online</td>
<td>46</td>
<td>57.5%</td>
</tr>
<tr>
<td>Use sites with autoquiz checking</td>
<td>15</td>
<td>18.75%</td>
</tr>
<tr>
<td>Use MS Excel or other spreadsheet program in recording</td>
<td>38</td>
<td>47.5%</td>
</tr>
<tr>
<td>and computing scores of quizzes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use MS Excel webpages to create interactive quizzes</td>
<td>30</td>
<td>37.5%</td>
</tr>
</tbody>
</table>

Of the items provided on the use of e-Learning Tools or Assessment, 57.5% (46) send quizzes or activities online; followed by those who use MS Excel or other spreadsheet program in recording and computing scores of quizzes with 47.5% (38); a few who can use MS Excel webpages to create interactive quizzes with 37.5 (30) and a handful of 15 or 18.75% declared to use sites with autoquiz checking.

It only indicates that to maximize the use of this program, a training can be proposed on the use of e-Learning Tools for assessment for OU course specialists. One of the programs that can barely use in the implementation of online classes is the proper use of e-learning tools for assessment, simply because of not enough knowledge on how to use the program whereas majority of the course specialists are having problem in the submission of the final rating or the gradesheets. The proper use of this learning tools will help to simplify the problem and eventually may not be able to meet in the future years in PUP Open University.

Table: 9
Learning Management System (LMS) Tool Features being Integrated in OU Cyber Classe

<table>
<thead>
<tr>
<th>Items</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create e-groups or classes</td>
<td>31</td>
<td>38.75%</td>
</tr>
<tr>
<td>Post announcements and other course information</td>
<td>30</td>
<td>37.5%</td>
</tr>
<tr>
<td>Show calendar of events</td>
<td>20</td>
<td>25%</td>
</tr>
<tr>
<td>Create online submission of assignment through eMabini Portal</td>
<td>16</td>
<td>20%</td>
</tr>
<tr>
<td>Create webpages for lecture notes and handouts</td>
<td>10</td>
<td>12.5%</td>
</tr>
<tr>
<td>Upload files to publish and support material for lessons</td>
<td>20</td>
<td>25%</td>
</tr>
<tr>
<td>Create and administer quizzes</td>
<td>9</td>
<td>11.25%</td>
</tr>
<tr>
<td>Provide automated checking of quizzes</td>
<td>11</td>
<td>13.75%</td>
</tr>
<tr>
<td>Provide automated quiz results</td>
<td>12</td>
<td>15%</td>
</tr>
<tr>
<td>Post relevant website links for topic areas</td>
<td>23</td>
<td>28.75%</td>
</tr>
<tr>
<td>Create forums for online class discussion</td>
<td>20</td>
<td>25%</td>
</tr>
<tr>
<td>Allow blogging</td>
<td>14</td>
<td>17.5%</td>
</tr>
<tr>
<td>Allow chat messages to all students</td>
<td>14</td>
<td>17.5%</td>
</tr>
<tr>
<td>Post final grades through eMabini portal</td>
<td>14</td>
<td>17.5%</td>
</tr>
<tr>
<td>Host wikis' online resources</td>
<td>9</td>
<td>11.25%</td>
</tr>
</tbody>
</table>

An average of 21.58% of the course specialists is involved with the application of LMS as a tool integrated to OU Cyber Classes. A few from the respondents where barely use the various features of LMS thus integrating them in OU online classes reflective of their answers: create e-groups or classes with 38.75%; post announcements and other course information with 37.5%; show calendar of events with 25%; create online submission of assignment through eMabini portal having 20%; create web pages for lecture notes and handouts having 12.5%; upload files to publish and support material for lessons with 25.00%; post relevant website links for topic areas, and create forums for online class discussion with 28.75%. While items under the following features reflect these results:
create and administer quizzes (11.25%), allow blogging and post final grades through eMabini portal got 17.50%; and Hosting wikis (online resources) with 11.25% and 20% below for the following features "provide automated checking of quizzes (13.75%); allow chat messages to all students (17.5%); and provide automated quiz results with 15. This indicates that only course specialists need to be trained in these activities as it allows too many activities that could be done by both of course specialists and the students if properly educated in these areas.

Table: 10
Course Specialists Needs for the Enhancement of ICTC Competencies/ Proficiency in Handling OU Classes

<table>
<thead>
<tr>
<th>Items</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning Management System i.e. Moodle</td>
<td>75</td>
<td>93.75%</td>
</tr>
<tr>
<td>Basic and advance use of courseware (powerpoint, word processing software, and electronic spreadsheet software)</td>
<td>48</td>
<td>60%</td>
</tr>
</tbody>
</table>

Investigating on specialized trainings, it is noted that advanced training on the use of open source Learning Management System (LMS) i.e. Moodle with noticeably percentage of (93.75%) of the respondents need further to enhance their ICTC competencies/proficiencies in handling OU online classes, while an average of 60% of the courses specialists answered that they need training on basic and advance use of the following: Course ware i.e. PowerPoint for teaching, Open source Learning Management Systems (LMS) i.e. Moodle, Word Processing Software, Electronic Spreadsheet Software.

Synthesis of Course Specialists Responses
A close study on the quality of responses rendered by course specialists to the questions, statements, and ideas posted to them in the survey instrument yielded a pulse characterizing their knowledge, competencies, and proficiencies to fully maximize the use of LMS in the PUP Open University System.

Majority of the respondents were from Manila campus with less than 5 years of teaching experience in Open University teaching under the Master in Educational Management Program.

Generally, Course Specialists find the use of electronic document files as highly indispensable as they are fully competent in writing digital documents for lessons using word documents, PDF, electronic document files to aid course them in lecture and presentations, sending announcement through e-mail or group-sent files to students for lectures or additional references, and using file sharing sites for distributing large files (i.e. Google Drive, Facebook, Yahoo group, etc.,

As for the use of e-learning tools for submission of requirements, respondents are fully competent with the application requiring students to use computer text, editing tools in submitting work documents, likewise, requiring students to submit assignments through the use of internet.

As to the use of multimedia presentations, a number of respondents said that they are fully competent on composing and using digital slides such as PowerPoint and the like, also creating video presentations or tutorials as additional materials and distribute them to students, suggesting video links such as in YouTube and others, and utilizing digital infographics for illustrations.
Course specialists rely on various internet means where they are competent with when it comes to the submission of the requirements. Many of them require students to submit assignments through the internet. To illustrate, they employ social networking such as FB to announce requirements submission and deadlines, computer text editing tools in submitting work documents and burned documents/files in a CD or DVD.

Course specialists include the application of LMS as a tool that integrates OU online classes. Respondents were fully competent with the following features that they already integrated in OU online classes: create e-groups or classes, post announcements and other course information, show calendar of events, create online submission of assignment through eMabini portal, create web pages for lecture notes and handouts, upload files to publish and support material for lessons, and post relevant website links for topic areas and create forums for online class discussion. While items like “create and administer quizzes, allow blogging, and post final grades through eMabini portal,” and Hosting wikis (online resources), while provide automated checking of quizzes, allow chat messages to all students, and provide automated quiz results were also included as features of ICT where the respondents are said to be competent with. Moreover, the respondents mentioned that they need training on the use of open source Learning Management System (LMS) i.e. Moodle, while other course specialists need to have basic training on use of Course ware for teaching i.e. PowerPoint, Word Processing Software, Electronic Spreadsheet Software, and advanced training on how to use Electronic Spreadsheet software.

RECOMMENDATIONS

Distance Education can be effective if the system creates a truly independent environment with self-motivated, participative, and interactive course specialists who have a clear understanding of the nature of e-learning or the Open Learning theory backed-up with supportive organizational leaders who believe and patronize the theory underlying the system. The authors raised certain ethical issues that could affect the successful implementation of the system; such as the course specialists’ capability to maintain a strong virtual presence, democratization approach of extending service access to as many persons as possible, standard norms to address cheating and other abuses, and the need to intensify human interaction through LMS as facilitated by the course specialists.

It is likewise suggested that the PUP Open University System must first put in place an overriding Enterprise Architecture, or simply an Information Technology strategic plan utilizing critical variables – Organizational support, ICT network, course specialists continuous training, and other provisions that would benefit the distance teacher in general and the distance learner in particular.

With this in place, it is strongly proposed that PUP OUS development plan be put into action. This system implementation plan consists of three keys and integrated components – the School Management System, the Distance Learning system and the Learning Management System together with its course specialists.

It is also suggested that the Learning Management System raise the general computer literacy among the OUS Course Specialists by conducting training on the different applications such as MS, PPT, YouTube and etc. or the conduct of a series of “ICT Boot Camps” which entail grouping the same level-of-ICT confidence course specialists to a workable level needed for the successful implementation of LMS endeavor in the University.
Organize an overall core group for LMS Course Development Coordination and Consulting team that will help create the strategy and guidelines for distance learning in the form of Guidelines which shall be followed by OUS Course Specialists.

Mentor the next level cluster of LMS team composed of the LMS Chief and subject experts in developing online programs and content. The Researchers believed that course specialists who felt more confident to use ICT with their students for teaching and learning have the greater possibility of having students to use ICT more than the students of less confident teachers.

Authors’ Note: The result of this study was presented in e-CASE & e-Tech 2015-Fall at Kyoto, Japan, September 9, 2015.

BIODATA and CONTACT ADDRESSES of the AUTHORS

Dr. Caroline T. SUMANDE is an educator and research enthusiast. She is concurrently working as the Department Chairperson in the College of Education/Department of Library and Information Science and Chief of the Open University System Center for Accreditation, Research and Extension Unit and the Editor-in-Chief of Journal in Open and Distance Education in the same University. She earned her Bachelor in Business Teacher Education (Cum Laude), Master in Educational Management, and Doctor in Educational Management degrees from Polytechnic University of the Philippines.

Dr. Caroline T. SUMANDE
151 4th St. Saint Catherine BF Road
Quezon City, Philippines
Phone: (2) 63 9227696924
e-Mail: ctsumande@gmail.com

Dr. Carmencita L. CASTOLO is the Dean of the Graduate School and concurrently the Director of the Institute of Open and Distance Education of the Polytechnic University of the Philippines. She finished her Bachelor in Business Education at the Polytechnic University of the Philippines where she graduated Cum Laude in 1980. Seeking for career advancement, she took Master in Business Education and Doctor in Educational Management also at her Alma Mater. Dr. Castolo is also an author of many articles, researches and modules in the field of open and distance education. She holds the rank of University Professor in the University. She is teaching in the Master in Educational Management program and a course specialist in the open and distance learning in the same university.

Dr. Carmencita L. CASTOLO
Bonita Homes, Marikina City, Philippines
Phone: (2) 63 9278781322
e-Mail: colcastolo@gmail.com
Benilda Eleanor V. COMENDADOR was a grantee of the Japanese Grant Aid for Human Resource Development Scholarship (JDS) from April 2008 to September 2010. She obtained Master of Science in Global Information Telecommunication Studies (MSGITS), major in project research at Waseda University, Tokyo Japan in 2010. She was commended for her exemplary performance in completing the said degree from JDS. She finished her Master of Science in Information Technology at Ateneo Information Technology Institute, Philippines in 2002. Presently, she is the Chief of the Open University System Learning Management System (OUS-LMS) and the Program Chair of the Master of Science in Information Technology (MSIT) of the Graduate School and Open University System of the Polytechnic University of the Philippines (PUP).

Benilda Eleanor V. COMENDADOR
Blk 1, Lot 27 Benson Ville Subd.
Dulong Bayan 2, San Mateo, Rizal
Phone: (2) 63 9178992313
e-Mail: bennycomendador@yahoo.com

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PEDAGOGICAL INTERCULTURAL PRACTICE OF TEACHERS IN VIRTUAL ENVIRONMENTS

Dr. Carmen Ricardo BARRETO
Education Department
Universidad del Norte, Barranquilla, Atl, Colombia

Dr. Jorge Mizzuno HAYDAR
Education Department
Universidad del Norte, Barranquilla, Atl, Colombia

ABSTRACT

This study presents some of the results of the project "Training and Development of Intercultural Competency of Teachers in Virtual Environments", carried out in ten Colombian Caribbean higher education institutions (HEI) offering virtual programs. It was performed in three steps: 1-diagnosis, 2-training, and 3-analysis of the pedagogical practice. The article shows third-stage results of six cases corresponding to teachers who had participated in the two previous stages selected. The study used a qualitative approach based on a cooperative action research design. The stage here reported aimed at analyzing and assessing virtual teachers' practice in virtual learning environments. Data were collected from each case's Virtual Learning Environment, and they were analyzed by using documentary analysis of the teacher's pedagogical practice. This analysis was performed by the participant teachers, the researcher, and an external expert. Results show a changing process of intercultural conception both in the design and in the implementation and evaluation. In order to overcome some weaknesses observed, it is necessary to train the teachers not only in the intercultural education but also in topics such as curricular design and educational technology.

Keywords: Virtual Learning environment, intercultural competencies, intercultural pedagogical practice, virtual education, distance education.

INTRODUCTION

This paper shows the results of the final stage of the research project "Training and Development of Intercultural Competency of Teachers in Virtual Environments", whose objective aimed at designing, implement and evaluate a pedagogical proposal to develop intercultural competency in virtual learning environment. The research was carried out in three steps: diagnosis of the intercultural competency in virtual teachers from the Colombian Caribbean region; design and implementation of the proposal to train and develop the intercultural competency of virtual teachers in virtual learning environments; and analysis and assessment of virtual teachers' practice in virtual learning environments. This paper deals with the results of the 3rd step. In the first section, the theoretical framework will be established; then, the methodological aspect of the research will be discussed; the next section will deal with results and discussion; and finally, a conclusion.
DISTANCE AND VIRTUAL EDUCATION

Virtual and distance education would be conceptually considered in a sociocultural approach, which uses information and communication technologies for creating teaching and learning virtual environments characterized by the interaction, dialog, and motivational aspects for students’ learning (a new role assumed by teachers and students), and the design of interactive and motivating materials for student’s independent work (Badia, Barbera & Momino, 2001; Garcia, J., Badia, Garcia, C., & Meneses, 2013; Monerero & Badia, 2013). The network current model of the latest generation of distance education (Garcia, Ruiz & Dominguez, 2007; Badia, et al., 2001; Cardona-Roman & Sanchez-Torres, 2011; Garcia, J., et al., 2013), gives the student the initiative in the learning process, the possibility of working cooperatively, the access to databases, as well as to multimedia resources, simulations and, sophisticated forms of knowledge representations.

Teaching Guidelines for the Design of Virtual Environments

Pedagogical guidelines are based on the contributions of a constructivist and socio-cognitive approach (Carretero, 2009; Marin & Salinas, 2014; Vygotsky, 1988), with some elements of the artistic and socio-communicative theory (Medina, 2015), responding in this way to the new methodological proposals for distance education in virtual learning environments. These proposals take into account the following aspects:

The context of teaching and learning that has been defined taking into account the contributions of Badia et al. (2001); Bozalek, Gachago, Alexander, Watters, Wood, Ivala, & Herrington (2013); Brown and Campione (1997); Dominguez (2006); Fonseca & Redondo (2015); Garcia, J., et al. (2013); Monerero & Badia, 2013; Mueller (2014); Woo, Herrington, Agostinho and Reeves (2007), characterized by

- recognition of students’ cultural aspects assumed as opportunities for the teaching and learning process;
- establishing professor-students’ cooperation environment, focusing on self-learning and personal responsibility acquisition;
- generating an empathic climate in the classroom recognizing the students’ previous knowledge;
- specifying the objectives, competencies and content students should reach and dominate, planning a sequence and rhythm recommended to achieve them;
- student-center methodological conception, offering the tools to build learning, stimulating collaborative learning among students of diverse cultures, in a learning atmosphere mediated by ICT;
- taking into account principles for creating intercultural learning communities and for transforming co-learning processes by recognizing and assessing individual and group differences, and applying authentic and transparent evaluation processes, coherent with the curriculum vision;
- the development of authentic learning tasks that make reference to the representation of real learning situations on the subject.

Learning Conception

As in the virtual environment the learning process is mediated by technologies, these become the mediator elements to bring cultural differences into the classroom, promoters of interactive and communicative dialectical processes, distant in space and time (Lopez & Solano, 2010). Learning is assumed from the socio-cognitive, constructivist, socio-communicative and artistic approaches. Knowledge acquisition is based on the understanding to establish meaningful relationships between the new information and what is already available (Carretero, 2009). Social interaction is essential to foster the learning processes (Vygotsky, 1988), and the motivation to learn, without which no training activity can be done. Learning must be meaningful to students, so that new knowledge can be incorporated into the student’s knowledge structures and acquire meaning from the relationship with existing knowledge (Duart & Sangrá, 2001).
This process participants are teachers, students and culture, because the aim is “to reach a greater knowledge of themselves and of their own culture because this is essential for being able to relate to other cultures effectively” (Arnaiz, De Haro & Escarabajal, 2010, p. 41). The virtual context is understood as the way "that uses technology to reach out the acquisition of culture through internal and external mechanisms for the appropriation of meanings" (Badia et. al., 2001, p. 78). Students learn at their own pace, interacting with the teacher and peers and progress in an autonomous way (Fonseca & Redondo, 2015). That is, the process focuses on the student, being the teacher mediator and companion in the process, and his/her mission should be to ensure the highest quality of the teaching-learning process, and take the tutorial action in processes of distance learning. The role of the teacher in intercultural environments can be summed up as an intercultural coach taking into account three basic elements of intercultural competence: self-awareness, knowledge, and abilities or skills.

Interaction
Interaction is a key aspect in training students process in virtual constructivist contexts, assuming the sociocultural approach whereby one learns in interaction with the other (Vygotsky, 1988). So, the intercultural aspect is vital since it determines the interactions of teaching-learning process actors, mediated through technology. According to Badia et al. (2001), virtual context interaction includes three key aspects: characterization of the interaction, psycho-pedagogical criteria and interaction, and educational functions. The first aspect deals with the frequency of social interaction, which is affected by some factors such as: professor’s control over the learning activity; teacher’s ability to maintain the interaction and the warmth and amount of aid provided; students’ prior experience to perform the activity; and meaning and significance of the activities.

The psycho-pedagogical criteria are based on the teacher-apprentice, apprentice-other apprentices and apprentice-content interaction (Moore & Kearsley, 2011). In the former, the teacher should be sure their students can understand, answer to the different activities proposed and receive the necessary guidance to perform them. S/he should also foster the intercultural competencies in the virtual environment. This type of interaction is made through e-mail, forums, feedback, or communication in general, being individual or in group in the virtual learning environments (Berg-sørensen, Holtug, & Rasmussen, 2010; Rasmussen, Coleman & Ferguson, 2007; ). In apprentice-apprentice interaction, there must be a high degree of interactivity among the classmates either individually, in small groups or with the whole class, according to the constructivism principle of knowledge collective construction or shared knowledge. This can be done if there is a positive interdependence relationship among students; a real exchange of knowledge and beliefs is fostered; and the development of tasks is focused in cooperative work (Badia et al., 2001).

In these cases, efforts should be made to promote the effective intercultural communication, involving the teaching-learning actors to avoid stereotyping, and to manage of intercultural communicative competence (Vilà, 2008). In the learner-content interaction, it must be borne in mind that the educational materials are presented in various formats (textual, visual or hypermedia) and that the content is developed in a clear, orderly and structured manner. The other aspect of the interaction in virtual contexts, the educational functions, includes interactions related to the activity management and organization. This serves to promote a high level of teacher-students’ communication and collaboration to clarify information about the activities, and help students regulated their learning process through high levels of negotiation with the professor.

Virtual Learning Environment (VLE)
This refers to the virtual space where the teaching-learning process is developed. It is designed in Learning Management System (LMS) (Muñoz & Gonzalez, 2009). LMS is an informatics and telematics tool organized according to some learning goals that can be achieved exclusively within it, and with some educational psychology and organizational
intervention principles (Adell, Bellver & Bellver, 2008; Kidd & Song, 2008). Additionally, VLE use social networks tools to create learning communities in more flexible and friendly environments. Using such tools helps the teacher to use the more appropriate instructional strategies that support the construction of knowledge.

Educational Materials
They should: be learning facilitators and sensitive to the cultural plurality; motivate students; and comply with the learning objectives and allow learning to learn. (Fonseca & Redondo, 2015; Gil, 2009)

Learning Activities and Tasks
The design of authentic tasks online is suggested in virtual and intercultural contexts (Woo et al., 2007; Bozalek et al., 2013; Mueller, 2014) to encourage reflection and continuous revision, and the selection of resources available online/offline, with incremental degrees of difficulty. Tasks should include simulations with data analysis, communicative and intercultural reflection, field notes, intercultural exhibitions, contrast between individual and collaborative situations of cultures, collaborative work to facilitate exchanges and relationship among culturally diverse students, and development of joint projects that also prevent the formation of ghettos and separate groups (Medina, Dominguez & Lopez, 2010; Murua-Cartón, Etxeberria-Balerdi, Garmendia-Larrañaga & Arrieta Arangueren, 2012).

Learning Assessment and Monitoring
Learning assessment include diagnostic, formative and summative evaluation, as well as, the assessment metacognitive strategy involves student’s reflection about his/her own learning, and multicultural and intercultural component. In this process, ICT provides new opportunities, for example, self-assessment and peer assessment, team and collaborative assessment tasks, on-line dialog and discussion, simulation and role-playing, problem-solving, online assessment and albums and portfolios. (Conejo & Castillo, 2014; Dominguez, 2006; Marín & Salinas, 2014). In virtual environments, monitoring occupies a central role, particularly in regard to the participation of the students in the different virtual spaces, to the development of the learning activities and to the assessment of aspects related to the competencies defined.

PURPOSE OF THE STUDY

This article aims at showing the findings of the research’s third stage, whose objective was to analyze teachers’ mediation in order to develop intercultural competence in virtual learning environments, by using the pedagogical proposal guidelines. Intercultural competence has been scarcely studied in Colombia. Literature review shows few Colombian systematic studies about this topic. Thus, it is very difficult to access to information related to teachers’ training in order to deal with an intercultural education in on-site and virtual environments, as Castro (2009, p. 273) claims, “in Colombia there are some works on intercultural competence, however, it lacks a lot to advance in this process”. Besides, there is no Colombian intercultural education policy coherent with constitutional principles of ethnic and cultural diversity (Bolaños, Tattay & Pancho, 2008), which establishes the academic and pedagogical practice articulation as the stronger element (Guido & Bonilla, 2010).

The above stated makes it necessary researches on this topic in order to know intercultural competence development level of virtual teachers of Colombian caribbean region, and to develop pedagogical proposals addressed to the development of intercultural education in Colombia (Alarcon & Castro, 2012, p. 71). As a result, the research problem is stated as follows: How is virtual teachers’ mediation carried out in order to develop intercultural
competence in virtual learning environments? And how does they apply pedagogical guidelines and orientations to design virtual intercultural learning environments?

**METHOD**

The study here reported was performed in ten Colombian Caribbean higher education institutions (HEI) offering virtual programs, being its object of study these institutions’ online teachers in virtual and distance programs. The project was developed in three stages, and in each one, according to the objectives, different methodological approaches were used. In the first stage (professor’s intercultural competencies diagnosis), the approach was quantitative in nature; in the second and third phases, which attempted to describe the process of formation and transformation of the practice, the approach was qualitative. In this article, we present the results of the phase 3 in which the proposed training program in participant teachers’ educational practice was implemented and evaluated. Thus, this stage was a participatory evaluative research, consistent with the cooperative action-research, involving online tutors of the HIEs selected.

**Participants**

Colombia is divided into 32 departments, and the students participating in the research were from different departments, as follows. 72% from Departament of Atlantico; 6% from Bolivar; 9% from Magdalena; 3% from Cesar; 2% from Tolima; 3% from Antioquia, 1% from Norte de Santander; 1% from Santander, and 1% from Venezuela. Although, there are not systematic experiences of intercultural education in the Colombian Caribbean region, it cannot be ignored the diversity and presence of aborigen, afro-descendant and Romany communities in the country. In the departments of the Colombian Caribbean region (Atlantico, Bolivar, Cesar, Cordoba, Guajira, Magdalena and San Andres), there is a significant percentage of this population regarding to the total Colombian population (DANE, 2005).

Beside this cultural population, there is another phenomenon presented in the main cities of the region: the forced displacement and volunteer migrations due to different causes, mainly the political situation of the country. Table 1 shows the statistic of forced displacements in terms of receptor places.

<table>
<thead>
<tr>
<th>Department</th>
<th>People received</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlantico</td>
<td>28238</td>
</tr>
<tr>
<td>Bolivar</td>
<td>51587</td>
</tr>
<tr>
<td>Cesar</td>
<td>32407</td>
</tr>
<tr>
<td>Córdoba</td>
<td>33679</td>
</tr>
<tr>
<td>Guajira</td>
<td>17250</td>
</tr>
<tr>
<td>Magdalena</td>
<td>40688</td>
</tr>
<tr>
<td>San Andrés</td>
<td>25</td>
</tr>
<tr>
<td>Sucre</td>
<td>36178</td>
</tr>
</tbody>
</table>

This situation implies an urgent need of educative institutions to make changes favoring an intercultural dialog, which includes each culture and makes the necessary opening to develop two cultural processes: to position the own culture and to recognize that of others (Alban, 2005; Murua-Carton, Etxeberria-Balerdi, Garmentia-Larragaña & Arrieta-Aranguren, 2012). Though in Colombia, ethnic minorities are included in public policies, these are far from being understood in the normativity and, especially, in the practice in the pedagogical environment (Guido & Bonilla, 2010).
Data Collection and Analysis
In this phase, 6 cases-types of the different HIEs were selected. Each case corresponded
to the virtual subject taught by the participant teacher, being the analysis unit the teachers’
pedagogic practice. A content analysis technique was applied to the subjects chosen
(Medina, 2015) made both by the teachers, the researcher and an external expert.

The Scale
To collect data, the “Guideline for self-analysis and reflection on intercultural practice in
virtual learning environment” was designed and applied. It was built from the “Pedagogical
guidelines/orientations for designing intercultural virtual learning environments” (Ricardo,
2013), and submitted to expert evaluation for reliability and validity. Table 2 shows and
extract of the instrument.

| Table: 2 |
| Guideline for self-analysis and reflection on intercultural practice in |
| virtual learning environment |
| Criteria | Is this criterium reflected in your Virtual practice-How do you do it? | Evidences |
| Virtual teaching and learning context Learning Conception | Yes/No. Describe | Write fragments of the course as evidence of the criterium |
| | Yes/No. Describe | Write fragments of the course as evidence of the criterium |
| Interaction | Yes/No. Describe | Write fragments of the course as evidence of the criterium |
| Comments: |

Teacher participants completed the guideline by a documentary analysis of their practice
in the VLE. At the same time, the researcher had access to the teachers’virtual classroom.
The researcher and an external peer analysed the documents completed by the teachers
and counter checked the given information with the contents, activities and
students/teachers participation in the virtual classroom. In such a way, data were
triangulated in order to obtain greater reliability of results.

FINDINGS AND DISCUSSION

Regarding the Teaching-Learning Context, in general terms, teachers used a simple
language to present and describe the activities in which an appropriation of the
intercultural discourse is observed (Excerpts come from the virtual courses of the Case
Study and the Guideline for self-analysis and reflection on intercultural practice in virtual
learning environment). This demonstrates teachers recognize each student’s cultural
aspects and have this in mind as opportunities of the teaching-learning process (Badia et
al., 2001). The use of strategies for the development of critical and reflective thinking is
encouraged (Excerpt 1). The course methodological approach is student-center. The
individual and group differences are recognized and valued, creating an empathic
environment. Teachers provided a framework for cooperation facilitating cooperative and
communicative work, focused on self-learning and acquisition of personal responsibility.
Their also consider the principles of intercultural learning communities, which include the
quality and pacing of the questions in groups, the deep and structured content, and the
authentic and transparent processes of evaluation. (Brown & Campione, 1997; Bozalek et
al., 2013; Dominguez, 2006). (Excerpt 2)
Excerpt 1. Case 1

Activity 2. Socio-cultural determinants of health promotion

To develop this activity, we suggest to do the following:

1. Participate in the forum Socio-cultural determinants of health promotion, in the following topics: health promotion definitions, identify cultural elements in them. You may highlight their intercultural considerations and those protecting inequities. It is valid to send related videos or conceptual maps. To develop the activity, you may consider class discussions. Remember we study definitions classified as goal oriented, aim-oriented, and activity-oriented.

2. Send to the forum reflecting about socio-cultural determinants of health promotion. Historical context, jokes which make evident stereotypes related to inequitable health attention, especially in promotion and prevention. Make a critical comment of two peers' interventions. Be respectful with them when making the joke criticism. In the joke, it can be observed patterns of discrimination, stereotypes, equity and racism.

Excerpt 2. Case 3

Activity Forum: My Experiences

"Hi. Tolerance value has been one of the most commented topics in this forum. We are people who think in different ways, and discussions have been respectful. I like the interaction we have had because each one has expressed his/her point of view, and I like that because I can see my classmates’ personal concept" (Student 3)

"Teacher and dear classmates. I really think among us there has been a series of very interesting comments, which strengthens us in many aspects. The good thing is the respect existing among us. Each one of us is free of expressing his/her opinion and it is respected. I hope we continue in this way, strengthening ourselves more and more. Go ahead friendssssss." (Student 3)

In the conception of learning category, it was found that teachers of all the cases used generating questions and support material, which serve the group to construct new knowledge collaboratively. In this process, social interaction (discussion, agreements, feelings, emotions, knowledge) (Extract 3) plays an important role to foster learning. The aim is to ensure that the student makes relations between the acquired knowledge and the socio-cultural and historical context in which s/he lives. That is, the courses’ methodological approach is based on the constructivist and socio-cognitive theories, because knowledge is acquired by establishing meaningful relationships between the new information and the one has already been (significant learning), where the motivation plays an important role (Medina, 2015). (Extract 3).

Excerpt 3. Case 4

Sources of Information

Objective: Deepen on different types of information sources starting from the interchange of opinions with a critical attitude

Activities:
- Review last week document "Searching and assessing information"
- Participate in the discussion forum "My position before information sources"

Objective: This activity has two aims: firstly, to promote the critical sense in handling Internet sources, and secondly, to promote the collaborative construction of knowledge.

Activities:
- Read the document "Searching and assessing information"
Select one of the groups aiming at participating in the collaborative construction of a mental map in which the different types of information sources are shown.

Regarding interaction, teachers and students maintain ongoing dialogs through interaction means and the institutional platform and social networking resources, proposed for the module, under an empathic atmosphere. Students receive a timely feedback. During the interaction, students’ personal stories, needs, knowledge and programming are respected. Although interaction is promoted, in one case it was not achieved, and in other it was made difficult because the group was large. It is worth noting that in one case, it was able to identify the teacher’s role of supervisor, facilitator and source of information (Fonseca & Redondo, 2015). (Excerpt 4)

Excerpt 4. Case 2

OK Mauricio, you are improving; however, it is necessary for you to argue your comments by quoting authors or bibliographic sources which refers to the topic. In the same way, I invite you to quote your classmates’ comments. Best regards.

In general terms, interaction in the cases studied shows evidence of some of the most relevant factors mentioned in the literature (Badia et al., 2001; Berg-sørensen et al., 2010; Rasmussen et al., 2007). The professor guides the development of the activities; the teacher is able to maintain the interaction, as well as the warmth and amount of aid provided; another factor is the time of interaction and type of synchronicity (Excerpt 4). Content is presented in different formats (textual, visual and hypermedia) and from various sources (web, print media, videos, photos) (Badia et al., 2001). In two cases, the students may select the material to use. (Excerpt 1)

In the Virtual Learning Environment, the modules are designed on an LMS, allowing ease of access to content, as well as flexibility and interactivity of all the activities and topics. Social networks tools are used to enrich and complement the experiences and the LMS (Adell et al., 2008; Muñoz & Gonzalez, 2009; Kidd & Song, 2008).

With regard to educational material, it is possible to affirm that in most of the cases, course materials are relevant and consistent with assessment objectives, methodologies and experiences. They show facts and problem situations, which can be applied in other contexts. Some activities are developed with material students look for and select, using quality criteria provided by the teacher (Excerpt 3 and 4). Materials are not discriminatory and it can be said they are sensitive to diversity (Gil, 2009) because the student can select and compare information from different countries. Three of the cases reflect some aspects that characterize the design of intercultural digital educational materials (Duart & Sangrá, 2001; Medina et al., 2010; Gil, 2009).

Learning Activities and Tasks are consistent with the course objectives and can be performed both individually and in group. The activities can be considered as genuine ones; besides, they are converted into intercultural and communicative reflection. Although, the multicultural perspective is part of the course, sometimes it is not actually worked. Learning activities are due to various teaching techniques, including activities for demonstration, exploratory, applied, creative and collaborative purposes (Excerpt 1 and 3), thus complying with the suggestions about the design of tasks that facilitate or encourage the development of intercultural competence (Medina et al., 2010; Murua-Carton et al., 2012). Activities have a detailed guide including explicit, clear, concise and comprehensive information about materials and inputs to use, objectives to reach and type of evaluation, and task are genuine because they have relevance in the real world; can be reviewed from different perspectives, using a variety of resources, among others. (Bozalek et al., 2013; Woo, et al., 2007). To perform the activities, some factors are considered: the
understanding achieved the experiences, emotions and feelings, and the possibility to apply them to current contexts.

In the Evaluation and Follow-up category, it was found that teachers consider the evaluation as a process which provides self-assessment, coevaluation and heteroevaluation moments (Excerpt 2 and 4), by using rubrics and guidelines (Vandervelde, 2015) (Table 3) that enable students to value both their own performance and that of their peers. This process assigned to student roles of responsibility and co-protagonism in the first two modalities and participatory in the third (Conejo & Castillo, 2014; Dominguez, 2006). It is also noted that teachers make a permanent follow-up and monitoring of all activities, providing support, resolving doubts, inviting students to participate by giving opinions and discussing their views, through dialog (Excerpt 4). Evaluation in virtual environments is not focused on control but on learning, as well as it is more consensual and participatory (Salinas et al., 2008). This can be evidences in the cases studied, making possible to affirm these teachers are aware of the importances of evaluation in virtual environments, and that the process cannot be as the same as the one in face-to-face environments.

<table>
<thead>
<tr>
<th>Rubrics</th>
<th>Excellent</th>
<th>Good</th>
<th>Regular</th>
<th>Bad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of selected Information in Blog (30%)</td>
<td>Postings present a focused and cohesive viewpoint that is substantiated by effective supporting examples or links.</td>
<td>Postings present a specific viewpoint that is substantiated by supporting examples and links. Postings are generally.</td>
<td>Postings present a specific viewpoint but lack supporting examples or links to websites or documents.</td>
<td>Postings present no specific viewpoint and no supporting examples or links to websites or documents.</td>
</tr>
<tr>
<td>Construction a creativity Blog (30%)</td>
<td>Postings are creatively and fluently written to stimulate dialogue and commentary.</td>
<td>Postings are generally well written with some attempts made to stimulate dialogue and commentary.</td>
<td>Postings are brief and unimaginative, and reflect minimal effort to connect with the audience.</td>
<td>Postings are do not stimulate dialogue and commentary and do not connect with the audience.</td>
</tr>
<tr>
<td>Quality of findings and opinions of Activity Posted in Twitter (30%)</td>
<td>Tweets are creatively and succinctly written to stimulate dialogue and commentary.</td>
<td>Most tweets are written to stimulate dialogue and commentary.</td>
<td>A few tweets are written to stimulate dialogue and commentary.</td>
<td>Tweets are poorly written and do not stimulate dialogue and commentary.</td>
</tr>
</tbody>
</table>

**CONCLUSION AND SUGGESTIONS**

After analyzing the results, it can be concluded that the more important observed strengths are:

- The student-center pedagogical approach is the protagonist of the learning process, in which the professor becomes a permanent coach of the apprentice, thus promoting students’ self-learning.
- The methodologies used, which are consistent with the proposal of pedagogical guidelines for the design of virtual intercultural environments.
- The design of authentic tasks, mainly characterized by a respect for the social and contextual realities.
The interaction quality between actors in the process, as evidenced in most cases, and characterized by a high degree of empathy and affectivity.

The positive attitude of teachers in intercultural work, demonstrating awareness of the importance of considering different cultures presence in the classroom to innovate their educational practice.

The use of formative assessment in the development of the courses because the evaluation is seen as a student-center process.

Educational materials in line with the majority of the features some authors propose.

In relation to the weaknesses, it is concluded that:

- There is little flexibility in the choice of the tasks shown in all cases, which avoid promoting student’s autonomy and responsibility, one of the features of intercultural learning in virtual environments.
- Lack of knowledge about curriculum design, especially in what has to do with the consistency between the objectives, content, methodology and evaluation.
- In order to overcome these weaknesses, it is necessary to train the teachers not only in the intercultural education but also in topics such as curricular design and educational technology.

These research findings may serve as a guide to those teachers interested in improving their pedagogical practice in virtual learning environments, favoring and taking into account their students’ cultural diversity. These results also serve to managers and actors of virtual education as a model for designing learning environments, which enhance the development of teachers and students’ intercultural competence through the defined pedagogical orientations. Additionally, they open a space for future researches about intercultural pedagogical practices using ICT in education.

**BIODATA and CONTACT ADDRESSES of the AUTHORS**

Dr. Carmen Ricardo BARRETO, a graduate student in Computer Sciences at Universidad Del Norte in 1992, studied Distance Education Master Degree from January 2002 to December 2004 at UNED. She has pursued a Ph.D degree in Didactical Model, Technology and Interculturality since 2009 to July 2013 at UNED in Madrid (Spain). She has worked at Universidad Del Norte since 1992, and she has different charges as a Development Engineer, Chief of User Section at Informatics Center Department. She has been Chief of New technology into Education since 2001 until 2012. Currently, Dr. Ricardo is an Assistant Professor and Head of Education Department since 2006. His research interests are Distance Education, Strategic Planning to integrate ICT in Education, Intercultural Education and TIC, B-learning and other. Dr. Ricardo teaches “E-learning”, “Intercultural Education”, “Planning and organization of ICT”, “Educational Mediation with ICT”, “Project Educational Planning” courses in undergraduate, graduate and postgraduate levels in Universidad del Norte. She was in many projects related to information and communication technology and teacher education. She has presented in national and international conferences and published scholarly articles.

Assist. Prof. Dr. Carmen Ricardo BARRETO
Education Department
Universidad del Norte, Km 5 Vía Puerto Colombia,
Barranquilla, Atl, Colombia
Phone: +5753509491
e-Mail: cricardo@uninorte.edu.co
Dr. Jorge Mizzuno HAYDAR is an Emeritus Professor of Universidad del Norte. Master in Education. He has worked at Universidad del Norte since 1982, and he has diferente charges as Head of the Language Department and profesor of languages and research in education. Currently, he is Coordinator of the Education Master Program in Language and Pedagogical Practices. His research interests include discourse analysis, especially of educational texts; relation between discourse, learning and citizenship; teacher development; intercultural education and TIC. Among his publications are the books *El texto escolar y el aprendizaje. Enredos y desenredos* (Textbooks and learning: Entanglement and disentanglement) and *Urdimbre del texto escolar: ¿Por qué resultan difíciles algunos textos?* (The tappery of the textbook: Why are some textbooks difficult?). He has also published chapters in dited books and papers in different academic journals. He is also interested in applying Systemic Functional Linguistics to the description of Spanish.

Dr. Jorge Mizzuno HAYDAR
Education Department
Universidad del Norte, Km 5 Vía Puerto Colombia, Barranquilla, Atl, Colombia
Phone: +5753509799
Email: jmizzuno@uninorte.edu.co

REFERENCES


IMPROVING CURRICULUM THROUGH
BLENDED LEARNING PEDAGOGY

Dr. Ojat DAROJAT
Faculty of Education
Terbuka University, Jakarta, Indonesia

ABSTRACT

This paper is a study of blended learning pedagogy in open and distance learning (ODL), involving two universities in Southeast Asia, STOU Thailand and UT Indonesia. The purpose of this study is to understand the issues related to the implementation of blended-learning pedagogy. Qualitative case study was employed to optimize my understanding of the blended learning phenomena gathered through semi-structured interview and documentary analysis. Whilst they operated in different educational settings, these two universities shared similarities. They have developed blended learning pedagogy to promote students’ learning classified into three dimensions: printed learning materials, F2F sessions, and online learning. Printed materials, however, may be identified as a major one and online learning have been regarded as strategic policies for further development. They have been equipped with their VLE; the use of VLE helped these universities to provide two-way traffic communications. This study identifies some strategic best practices in developing blended learning pedagogies in ODL universities in Southeast Asia. This study also provides practical recommendation that internet-based instruction is now becoming a strategic choice for ODL in developing countries to widening access and to meet challenges for better future.

Keywords: Open and distance learning, blended learning, curriculum improvement, pedagogy.

INTRODUCTION

Higher education systems worldwide, particularly distance teaching universities (DTUs), are currently influenced by a number of common trends, frequently interconnected, that demand for ongoing change and adaption. The organisational changes and the stress on formulation and implementation of managing their academic support services and all learning support programs have been regarded as strategic issues in distance higher education systems for improving their quality of curriculum. The DTUs must prepare themselves to meet the demands of the decade when many more universities will be required to sustain the fast growing global competition. Currently, one of the strategic issues in improving quality of teaching learning services is to how DTUs manage blended learning pedagogies to support student success. While many distance learners in the Southeast Asia mostly depend on their teachers for face-to-face (F2F) tutorial sessions, the use of online learning has been regarded as a new demand.

The advancement educational technology and modern communication media have a significant impact on the delivery modes of distance education (DE). As electronic communications technologies more common and advanced since early 1990s, the use of computer-mediated communications (CMC) has broaden the opportunities for the growing of distance education (Rovai, Ponton, & Baker, 2008; Schlosser & Simonson 2006; Simpson, 2002). The use of CMC in learning allows the transfer of information between individuals in many ways either asynchronous such as discussion boards or synchronous such as real-
time audio and video (Rovai, Ponton, & Baker, 2008). Nowadays, computer networks are becoming commonplace and convenient way to distribute learning materials; they have made online learning programs more attractive to both students and distance teaching providers (Ally, 2004; Anderson, 2004; Koontz, Li, & Compora, 2006). Keegan (2000) adds that the information and communications technology (ICT) associated with the electronics revolution of the 1980s made it possible to teach face-to-face at a distance. According to Kaufman (1986), “the marriage of computers with communications technology” (p. 297) has provided a significant impact on developing and delivering learning materials in various instructional modes. The delivery modes of instruction in distance education have been changed from paper based and processed correspondence study to web-based instruction and other kinds of online learning programs that leads to the possibilities of virtual learning environments (Han, Dresdow, Gail, & Plunkett, 2003; Haughey, Evans, & Murphy, 2008).

While the use of online computer networks have gained pre-eminence in developed countries, in developing countries such as Thailand and Indonesia, not all people have the same opinion with the adoption of online learning deliveries. The importation of online learning programs from the developed countries to developing countries tends to be discouraging and difficult for students. Some researchers, such as Luschei, Dimyati, and Padmo, (2008) and Riana, Zuhairi, and Maria (2006) disclosed that the innovation of online learning in developing countries, such as Indonesia, has proved a daunting task simply because many students in developing countries do not have access to the Internet. Access to online learning is relatively difficult for many students residing in rural and remote regions of the country. Moore and Kearsley (2005) disclosed that distance education is much more complex than simply integrating technology in a conventional classroom. Others, such as Baturay and Yukselturk (2015) suggested that “Meeting learners’ expectations such as...user-friendly, easily accessible and an effective learning environment is important for their success” (p. 9). Therefore, it is important for DTUs to seek ways to better understand how to integrate ICT in designing blended learning strategies. The need for analyzing the strengths and weaknesses as well as future opportunities and challenges of employing advanced educational technology as part of blended learning pedagogies may become a critical issue.

These challenges have enticed for an examination of curriculum improvement specifically in teaching learning provisions in DTUs. At this point, it seems important to study blended learning deliveries at distance teaching institutions involving printed learning materials, F2F tutorial sessions, and online learning. Two DTUs in Southeast Asia, Sukhothai Thammathirat Open University (STOU) in Thailand and Universitas Terbuka (UT) in Indonesia, have been selected to support the purpose of this study. The rationale behind the selection of these universities is determined on the basis that the universities are expected to advance my understanding of blended learning pedagogies in the DTU context in the Southeast Asia. They are state universities which employs a single mode distance education system. STOU and UT have been designed to facilitate a widening access to higher education using a single mode distance education system incorporating the use of print, F2F tutorials, and online learning (as their major learning services) for teaching distance students.

PURPOSE

The specific objectives of this study is to disclose the different approaches and methods in developing and implementing blended learning pedagogy, as well as compare and contrast their key characteristics.
METHODOLOGY

This study employed qualitative case study to explore how blended learning pedagogy has been implemented in these two universities with different social, cultural, and educational settings. Qualitative case study allows the researcher to understand blended learning pedagogy in particular distance teaching institutions i.e. UT Indonesia and STOU Thailand. These universities were selected based on the reasons that they are single mode universities that employ a distance education system incorporating the use of blended learning deliveries; both universities employ F2F tutorials and online learning supported by printed learning materials as their current learning services. Besides, these two institutions also share contextual relevance in many respects; they share socio-economic, cultural, geographic, and developmental features as they operate in neighbouring and developing countries.

To support the present research which attempts to optimize my understanding of the blended learning phenomena in the two universities, the selection of the participants becomes an important part of this study. This research involved faculties and policy contributors in the two universities who have knowledge and experience in the field being explored. There were six key informants in each university coming from different units included top management level, head of faculty, head of regional office, academic staff, tutor, and head of quality assurance center. When the fieldwork was conducted, however, there was a change of the interview schedule and the number of the key respondents at both universities. At STOU, I was not able to conduct an interview with the participant from the regional office due to her healthcare reason. Meanwhile, at UT, there was eight people being interviewed as it was suggested by management. All participants were identified and approved management of UT and STOU based on consideration that they possess required information and willing to provide significant contributions to the blended learning programs and research questions under investigation. Prior to the study being conducted, research approvals from UT and STOU as well as informed consent from participants being involved in this study were obtained for the purpose of ethical considerations.

RESULTS FROM INDIVIDUAL CASE STUDY

The separation of teaching providers and students in distance education environments necessitates the provision of an effective support system for students. It was reported that in order to remove students’ barriers for learning, the three universities selected in this study have developed blended learning pedagogies. The blended learning pedagogies were delivered through diverse printed-learning materials combined with F2F tutorials, and online learning as their major teaching-learning modes. The following section summarizes as to how these two universities improve their curriculum through blended learning pedagogies in order to support student learning.

Part I: Sukhothai Thammathirat Open University (STOU) Thailand

Blended Learning Programs

STOU’s educational system allowed students to use their free time to study independently, rather than having to enter conventional universities (STOU, 2004). The university has developed a variety of learning materials and employed different instructional delivery modes through highlighting the need for students to initiate and manage their own learning approaches and strategies. To support its curriculum, textbooks have been developed for all subjects as major media to promote student independent learning. Other media such as CD and DVD have been also developed to equip and promote students’ self-managed learning (STOU-01). The university has also been equipped by STOU’s television channel to reach students learning experience at home (STOU-04).

To support student learning, the university has also provided F2F tutorials. Tutorial sessions were provided based on the requirement determined by curriculum developers. As
F2F was not compulsory for distance learners, tutorial sessions are developed only for some courses that are difficult for students (STOU-03). Special intensive tutorial services were also delivered for very difficult courses involving students who could not pass a final exam (STOU-06). F2F tutorials were conducted at STOU’s learning centers spreading out all over the country. One of the key informants explained in more detail in terms of how F2F services were carried out:

*We have 15 units in our textbooks and we divide by three. So the first time we have face-to-face tutorial, students have to read the first 5 units before they go to the tutorial, and the professor will brief on these 5 units, and if they have any questions they can ask. And for the second time, another 5 units add for the third, 5 units.* (STOU-04)

F2F general tutorial sessions, not special tutorial classes, were managed by the Office of Educational Services with the objectives to (1) assist students in enhancing their understanding of academic content and (2) provide students’ access to academic guidance and support services provided by the university.

Currently, the use of Internet network for educational purposes has been placed as a strategic issue, especially for graduate students. At STOU, the development of the Internet-based support services was available for graduate students as it was confirmed by a participant that “professors have the web board of the School. We have students come every day to the web board to ask some questions” (STOU-04). The faculty also integrated social media networks for their instructional process. The participant revealed this as follows:

*I created Facebook pages for my courses and also students come to my Facebook …. When they have a problem, they can post on Facebook and I answer them and try to help them … some students, they develop their Facebook, only that group.* (STOU-04)

The university has developed fully online courses as a new prototype to support student learning. The participant explained this as follows: “the policy has changed. We don’t have online courses for undergraduates” (STOU-04) but now the university has developed fully online course as a new prototype for the English curriculum. The participant went on to explain:

*They have the course where students have to be online at a certain time. And the students will get into groups…. They don’t have face to face. This is the new prototype for STOU. Formerly, we had to submit the textbook, but they don’t have textbooks, they have electronic modules. And they set the time for students, which time they have to chat.* (STOU-04)

The university has also employed a policy to promote Internet-based support services through the development of the electronic seminar (e-seminar). Application for this e-seminar is developed using the Moodle online program (STOU-04).

To support the implementation of online learning and other internet-based instruction, STOU’s leaning support areas has moved forward in line with the advancement of educational technology. The university has developed electronic modules and fully online courses, synchronous teaching delivery for English curriculum, web boards, e-seminars for graduate students, a-tutor, Moodle and the Design for Learning (D4L) program (STOU-04).
In meeting the challenges for the future, the university has also employed an Internet network to support student success.

Student Development Activities to Support Blended Learning Programs
To support the implementation of the university blended learning pedagogies, STOU provides different counseling and information services and various student activities to support student success. The Counselling Section under the Office of Educational Services arranged counselling services for students starting from their enrolment until their completion. Key interview subject from that office explained that counselling activities consisted of guidance for interested people, orientation for new students, educational and professional counseling services and graduate counseling services (STOU-05). The KI went on to explain in more detail of these support services:

We have some programs...First is orientation. This is an opportunity for anybody to come and participate. We invite them...There is also a personal counselor program, for which we sent letters to the students informing them of who their personal counselor is, then they can contact this person at any time up until they graduate. We also keep in contact. We send e-mails once a month, just to those who need it. First we will survey and if they need help they will send us a request. These are services we provide to students. (STOU-05)

As distance teaching institution, the university provides individual and group counseling on specific learning problems and information on professional development delivered in order to support student success. With regard to the counselling services, the KI confirmed that “counseling by face-to-face appointments has very few students. It’s more common to have counseling by phone” (STOU-05).

Mostly KIs revealed that STOU’s Student Clubs were the best place for students to go. Student clubs have been endorsed to promote student activities and supplement curricular activities. The clubs provided opportunities for students to come and see each other, share their knowledge and experience, and get involve in STOU academic and non-academic programs including. These student clubs were arranged by the students themselves, are in 76 provinces scattered the country. The more detailed information of student clubs was provided by one KI as follows:

At STOU we have student clubs for each province – we have 76 provinces. And we ask students in each province to create their STOU student club. If they have some problems they can join together and go to their club, meet together, and ask the senior students to help them. And some student clubs have their projects. STOU provides the budget for them to do their small projects. Some projects they did, like tutoring “brother helps sister” [pi chuai nong]. They create projects to help each other to study, to pass. (STOU-04)

The university has appointed advisors for each student club with three main objectives: first, to provide academic counseling and career to community college students. Second was to manage participating students, and third was to manage student’s work as planned. One of the KIs stated that

Maybe one province has three advisors. And sometimes we go to join their projects – go to their provinces when they have an event or project. They invite the advisors to go and join them. If we have time, we go to encourage them. (STOU-04)

For each student club, the professors had to select which student club they would like to be the member of. This was professors’ responsibility to provide support for student success.
Part II: Universitas Terbuka (UT) Indonesia
Blended Learning Programs

From the interview data, supported by official documents, it was found that the employment of blended learning pedagogy to support student learning has also been applied at UT. As a DTU, UT is very focused in developing different modes of teaching deliveries to support students’ independent learning. Blended learning strategies involve developing self-explanatory printed materials as a major source for student learning. The university also developed audio-video programs, F2F and online tutorials, correspondence tutorials through UT magazine (Komunika), and broadcasting tutorials via radio and television programs. In general, however, there were three major instructional delivery methods: self-directed learning using printed learning materials, F2F tutorials, and online learning.

It was disclosed that UT has developed learning materials (modules) that were specifically designed for independent study (UT-09). The writing of learning materials was done in a structured way in order to ensure quality and completion as scheduled, starting with a workshop on learning materials development. Before 2010, workshop on learning materials development was only limited to sharing perception about subject design, technical explanation about format of writing and duration of writing and contract signing. The components contain targets of learning to be achieved by students after learning the materials and details of materials to be discussed, types of media and learning supports provided, as well as evaluation tools used to measure student’s mastery of the learning. Therefore, course guideline was presented to the writers at the workshop and it became the basis for writing learning materials. Moreover, the guideline also set the number of pages per module. Number of pages is set based on the time spent by students to read and understand the materials presented on each page. UT set that for subject with calculation, the number of pages for each module is 30-40 pages and for the non-calculation subject, the number was 50-60 pages.

In line with the activity of curriculum reanalysis, each study program identifies the subject offered with regard to its learning outcome including the suitability of learning outcome with the level of competence. In addition, the study program also analyzes the credit points of each subject and number of pages of each module used. The result of study shows that there are learning materials which are not in line with the existing regulation. The result of study is used to revise the learning materials which are not in line with existing regulation. Revision is done in accordance with the age of the learning materials.

One of the respondents explained that all printed learning materials have been regarded as major resource for student independent learning. Thus, all printed-learning materials have been developed as self-contained or self-instruction. The respondent explained further that “students can understand the teaching materials without help from others because all the information necessary to understand the teaching materials is available in their modules” (UT-09). Another respondent also recounted that:

*UT learning materials have been developed in such a way in accordance with the principle of self-contained so that they can be studied independently by individual students. By reading their modules, it is hoped that students can fully understand the content without getting help from instructors, because modules represent their lecturers in distance education system.* (UT-07)

In addition to the use of self-contained learning materials, the university has also developed F2F tutorial sessions to support student learning. F2F tutorial deliveries were provided based on the curriculum requirements and students’ requests. F2F tutorial services were organised by regional offices all over the country and conducted on weekends. The key respondent from regional office described these F2F tutorial services as follows:
The major mode of learning support services that we provide are face-to-face tutorials... The implementation of F2F tutorial sessions are controlled by regional office and audited by external auditors. The results of these quality assessments are recorded and analysed for appropriate improvement. (UT-09)

To ensure the quality of F2F tutorial sessions in promoting students’ learning, the university has developed tutorial kits since 2007. The main purpose of this tool was to standardise the implementation of F2F services in all 37 regional offices throughout Indonesia (UT, 2010).

Further, online learning deliveries were now becoming the more popular mode of teaching at the university. UT has implemented online services, including those designed for tutorials, web-based supplementary materials, self-exercise tests, and online counselling. Online learning services were used to decrease the constraints of distance and time. The number of online courses increased in response to students’ demand and so did the availability of access points in different regions all over the country (UT-05; UT-06). When this study was conducted, it was reported that all academic staff were very busy in preparing the implementation of new policies to offer online learning services for all courses in 2013. These preparation steps include developing online tutorial scripts and conducting online tutor trainings involving internal and external academic staff.

Student Services to Support the Implementation Blended Learning Programs
To support student success, UT has developed different students support programs. It was reported that the university provided support services in the following areas: independent learning manuals, study skills workshop, and counselling program, (UT-05). These support services can be elaborated as follows.

Study skills workshops—these workshops were provided during orientation sessions addressing a crucial issue for new enrolments, how to be successful as distance learners. This program was conducted at 37 UT’s regional centers to help new students into the distance education system. In this workshop, staff at UT’s regional offices get involve in educating new students about distance education system. In addition, students were trained how to improve their reading skills, how to create an email account as their identities to access for UT Online ranging from registration, purchasing of teaching materials, registering for tutorial sessions, checking their academic grades, and reporting their academic problem (UT-09).

Counselling services—counselling services were available at regional offices to all students for free with the aim to provide opportunities for students to explore issues of concern and to discover ways of learning in the distance education system. Counselling programs have been carried out by assigned academic staff for local students in every sub-district. Counseling services might include time management, motivation, and different concerns regarding academic and non-academic issues. Local students could meet in person or using different media with their counselors called Penanggung Jawab Wilayah during operational hours at regional offices or during F2F tutorial sessions (UT-09).

UT also encouraged students to be involved in different student support activities. In order to get students involved more, UT has designed and implemented a number of student activities in its 37 Regional Centers. The activities took the form of Scientific Discussion, Sports and Art Festival, student academic achievement, and student writing competitions. In addition, UT also participated actively in activities carried out by the Directorate General of Higher Education (DGHE), such as English debate competition, Math and Science National Olympic, and business model competition. To ensure smooth running of student activities, UT has developed a guideline for student activities which is in line with the guideline issued by DGHE.
Student activities, the Scientific Discussion, Sports and Art Festival, for example, have been developed to reduce communication gap between students. This kind of activities, even though periodically done in 4-5 days per year, can be expected to reduce the “loneliness” or “alienation” felt by most students in distance education system. These students’ activities have been regarded as a forum for students to share experience in order to internalize distance learning system. This activity will give new motivation to students who take part in this kind of activity which is expected to affect their academic achievement.

**DISCUSSION**

This section discusses the implementation of blended learning pedagogy in each university viewed from three major theories in distance education i.e. interaction and communication theory (Holmberg, 1995), autonomy and independence theory (Moore, 1994), and community of inquiry model (Garrison, Anderson, & Archer, 2000).

**The Implementation of Blended Learning Pedagogy at STOU**

Based on the results as presented at the outset, it discloses that curriculum at STOU have been developed in such a way to support a high degree of flexibility for students and instructors to maintain their interaction and communication. Different methods for supporting the implementation of blended learning have been carried out involving self-instruction learning materials combined with different learning services. The university developed different learning support programs to increase student teacher interaction that include F2F, telephone call, and internet-based communication. Although F2F tutorials is not compulsory for students, it seems that residential meeting at student clubs and F2F sessions at learning centers have become a critical element for promoting Holmberg’s (1985) interaction and communication to support student learning. One KI explained “I have to go three times... for face-to-face tutorials...and I will teach my students, sometimes in a big group or sometimes in a small group, give assignments, and sometimes the small group can present the assignment in front of the class (STOU-04).

The development of personal relationship, as it has been addressed in interaction and communication theory (Holmberg, 2003), has also been carried out by distance through telephone call in order to help students in their learning process. A faculty member who was assigned as a KI for this study highlighted the importance of willingness to provide help and develop personal relationship with distance learners as follows:

*We are an open university. You have many types of students, and you have to be prepared to help...for example – student who called from Dubai. Every time that she called I explained to her, and she felt very good, and she also said "You are a good teacher. You have time for me." Even for the master's thesis advisees, I think if I have a good relationship with them, maybe it can motivate them to work successfully. If they have a problem, they can come see me. I never refuse my students, never. If I have time, I will help them. (STOU-04)*

With regard to the importance of teaching learning conversation in the context of DE environment (Holmberg, 2007), this KI has also addressed a very crucial point by giving her advice that feeling of empathy (Holmberg, 2003) is very important to motivate student learning (STOU-04). The KI went on to clarify that creating atmosphere for friendliness (Holmberg, 2003) was necessary to promoting trust in personal relationship.

*The atmosphere, you have to try to be their friend. You have to be friendly to them. They can tell you anything – not only just study problems, but even family problems, personal problems. Some students ask me and if I have some comments I will tell them...When I can talk with them and the students tell their personal problems, that's when he or she trusts you, right? That's why they would like to get some suggestions from you.*
Student-instructor contact has been viewed as essential by faculty at STOU that involved language matter as it was confirmed that “language is very important. The sentences that you use to talk to the students are very important and the tone that you use to talk to them” (STOU-04).

Correspond to Wedemeyer’s (1981) and Moore’s (1994) autonomy and independence theory, from the beginning STOU has been totally devoted to use an instructional system which enable their students to study by themselves with or without having assistance from tutors or instructors. The University educational system “allow students to use their free time to study independently, rather than having to enter a traditional classroom setting” (STOU, 1996). To support this educational system, STOU has long been involved in implementing instructional deliveries that enable students to enjoy learning services at their home, learning at the back door (Wedemeyer, 1981). Students receive their teaching services through different forms of educational media:

- **Learning materials (workbooks, modules, CD, DVD) sent through postal service**
  The University aimed to enable students to study independently, develop their thought and apply knowledge from various sources and use self-contained textbooks as their major media (STOU-04). Printed modules might include content, concepts, activities and guidance (STOU, 2004). The University has also developed supplementary media to enhance student understanding and support students’ independency. These included audio-visual media (CD and DVD) (STOU-01).

- **Radio programs and television channels**
  The University has delivered instructional services to support students’ independence through radio and television programs. The programs have been produced in different formats such as dramas, discussions, and interviews (STOU, 1996; STOU, 2004, Sungkatavat & Boonyarataphan, 2012).

STOU also has been involved in providing different learning services for students in their localities. These services included:

- **Self-study at STOU corners in provincial and municipal public libraries**
  The University has set up 75 STOU corners in provincial libraries. These corners set up through partnerships with the Department of Non-formal Education, Ministry of Education (STOU, 2004).

- **Attending F2F tutorial session at learning centers**
  As presented at the previous section that STOU provides F2F sessions to help independent learners as a non-compulsory mode. F2F tutorials have been served for three times per semester for selected courses

Through the use of different media and teaching deliveries, independent learners residing in different provinces throughout the country have their opportunity to study by themselves in accordance with their own time and space, individual convenience, and interests.

Further, in line with the community of inquiry model for distance education (Garrison, Anderson, & Archer, 2000), the University online learning platform has also been used to support and strengthen student learning. Faculty members must not only went to learning centers for F2F sessions but also carried out instructional services through online discussion forums available for graduate students. These online forum discussions seem to be crucial that enable students to learn and construct knowledge beyond classroom. The forums allow STOU students to enlarge their knowledge and enrich their experience through posting and dialogue with online tutors and peers. One of the interview subjects confirmed that the
University has employed Moodle program and D4L to support virtual learning environment (STOU-04).

We have Moodle and D4L. D4L is suitable for Ph.D. students, but Moodle is maybe better for master’s degree. But you can mix together on the course team...D4L was developed by the University of Waterloo in Canada. D4L [Design for Learning]. First, they developed the learning model. They said the students can learn by using the T5 model...They developed this model first, and after that they progressed to D4L, and they wrote their own software. They developed their own LMS.

When the researchers asked the KI about how this D4L program could support online collaborative learning, the KI went on to explain that:

Yeah so they [students] have to practice together. Especially for the D4L LMS. So if we use D4L we have to follow this rule. First, you have to work alone. And after you finish, you upload your assignment and your friend will download and criticize it and give the feedback for you, and when you read the feedback, you have to criticize the feedback. Is it good feedback or not? Did your friend write the feedback based on the theory, or based on their thinking? Something like that. After that, for the last one – task 4 – they will know who is in their group. They will work together and give feedback from everything, and write only one paper and submit it to the professor.

This forum was an asynchronous interaction medium that involved instructors posted an individual assignments or group assignments or questions and later students posting their responses whilst instructors monitor every student’s participation in the discussion. The use of D4L program has supported two-way communications and promoted collaborative partnerships among students, teachers, and peers.

The Implementation of Blended Learning Pedagogy at UT

Instructional processes at UT have been designed in line with its nature as higher education that adopted distance learning system. Through this learning system, the delivery of its instructional processes has been developed in order to promote autonomous and independent learning (Moore, 1994; Wedemeyer, 1981). This autonomous and independent learning emphasised the dynamic role of students in organising their study and reducing the role of instructors as well as those of the university. In order words, self-managed learning or self-directed learning became important aspect that should be posed by distance learners. One of the KIs addressed this as follows:

Self-directed learning is important in distance education. Students have freedom to decide whether they want to learn through modules and do not want to be involved in tutorial. It's up to them. Therefore, any instructional process whether it is self-study, study groups, tutorials and others should be able to raise student self-direction and autonomy. Students’ autonomy is in terms of how fast they want to finish their study? What teaching learning deliveries they want to choose? When they want to learn? When they want to graduate? It is absolutely up to them. However, they must achieve the same standards of competencies. (UT-01)

This participant recounted this self-directed issue by mentioning, “In distance education, students must have a drive for self-direction. They must develop their self-directed learning by themselves. If they cannot, it is our responsibility to make sure they have self-direction for learning (UT-01).
The university has engaged in different methods in providing appropriate choice for students to be involved in learning based on their time and learning methods. As it was articulated by one respondent as follows:

*Vice Rector in Academic Affairs has done a lot to make sure students have opportunity to develop their independent learning skills. Numerous efforts have been set involving a variety of learning resources delivered through online such as iTV. Learning support services have been integrated and enriched to promote better student learning. Many media are used to ensure that students can learn according to their conditions and pleasure.*

(UT-01)

Another participant noted that all learning materials and various instructional deliveries have been developed “in order to support student learning independence. We develop self-Contained module, audio-video cassette, web supplements and study guide in order to promote independent learning” (UT-04).

Closely aligned to interaction and communication theory (Holmberg, 1994), the enhancement of communication and interaction among participants in learning process has become major principle at the university which required significant efforts to organise learner support services. Since its early operation, UT has been equipped by learner support system in order to establish communication among all learning parties. In line with the advancement of information and communication technology, UT has also put forward different strategies to integrate current technology for instructional purposes that support interaction and communication among teaching learning parties. One of the KIs highlighted this as follows:

*I think communication is important for students because they need friends to talk. To establish social relationship, we provide F2F activities. UT also provides good online forums... It seems to me that there is no obstacle for students to interact with peers for interaction. For PGSD students, for example, they come every weekend during tutorial sessions. They can talk and share with tutors and other peers.*

(UT-01)

The importance of interaction and communication for students’ learning also confirmed by another participant who was a senior tutor at the university; he argued that in distance education:

*There are students who feel lonely and isolated, no friends to talk. So communication between tutors and students is needed. Not all students are able to learn relying on modules or other learning resources that we prepared. Two-way communication is necessary to motivate students’ learning.*

(UT-07)

When the researcher asked about feeling of empathy, this KI expressed that feeling of empathy and good relationship, based on his experience as tutor, were beneficial for both students and tutors. As he noted as follows:

*By establishing good communication, empathy and maintain a close relationship, tutors can help students to be more openly expressed their problems they face. Good relationships promote student success. In every tutorial session, I always try to establish friendly communication and establish good relationships with my students so that they trust, open and willing to express their problems during study. I can see that empathy motivate my students to study.*

(UT-07)

According to one participant who responsible for student affairs areas, good relationships with students can be facilitated by various means such as telephone call, email, online
forum, or students can come for F2F consultation. This KI argued that “for us, developing communication with our students is needed not only for motivating their learning but also to decrease feeling of distance between students and ourselves as teaching providers (UT-06).

To support student learning, UT has also initiated online learning to provide different learning mode for students who have internet access. Online learning program has been offered in line with the growing needs of students’ demand. The increasing access to internet along with decreasing cost in using internet has steered new demand for intensifying interaction and two ways communication through UT online (UT, 2010). Online learning has been considered as crucial component in learner support areas specifically for promoting communication among instructional parties and supporting the idea of community of inquiry through online collaborative learning.

Even though there is no specific statement spelled out by respondents about the adoption of Community of Inquiry (COI), there are series of evidence representing the idea of how teaching presence, cognitive presence and social presence have been maintained in UT online learning deliveries. One of the KIs explained his experience as follows:

Before starting online tutorials, I have to develop 8 quality topics for discussions and 3 assignments that will be uploaded regularly during one semester. In this online discussion forum, I have to direct the discussion and encourage participants to participate in the discussion. (UT-07)

Another respondent recounted about the importance of tutor in moderating online collaborative learning. The respondent noted that:

Tutors must initiate the discussion in online tutorials presenting materials to initiate collaborative learning. Tutors must encourage students to express opinions and provide respond to others’ ideas. I see English course interaction is very well because it is supported by a good tutor, active, and responsive. This leads students to actively involve in the online discussion forum. (UT-05)

Concerning the role of tutor in creating social presence, one KI argued that collaborative learning through online discussion support virtual learning community. This KI noted that:

In online learning, I post what we call materi inisiasi [initiation learning materials] first to stimulate student learning initiatives and develop collaborative learning. I must also post my own opinion, respond to students’ view. Students also do the same thing. Online learning provides opportunity to employ learner-centered approach...I think this approach allows for discussion and it is good to develop sense of community. (UT-07)

The respondent expressed that virtual learning community through online discussion forum provided good opportunity for tutors and students for knowledge exchange and promote students’ success. Students have opportunity to take part in the discussion and expressed their ideas and respect different perspectives. (UT-07)

CONCLUSION

This comparative study confirms that the two ODL providers involved in this study shared similarities in developing and implementing blended learning programs to support their students. These universities exemplified some common comparison in providing modifying blended learning services for their students incorporating self-managed learning using self-instructional materials, F2F tutorial sessions, online learning, mobile learning (M-learning), and tutorial by radio and television. However, self-instruction learning materials, F2F sessions, and online tutorials have been regarded as their major teaching deliveries.
Since their early operation, these universities have long been involved in employing self-instructional materials to promote self-directed learning. According to STOU (2004), self-instructional materials “enable students to study by themselves without having entered conventional classrooms” (p. 22). The university’s distance system also allows students to study “in different localities with the opportunity to study by themselves in accordance with their individual circumstances and interests” (p. 22). To support self-managed learning, STOU has developed mixed media packets comprised of textbooks, workbooks, cassette and video tapes, radio and television programs, tutorials, and practice in STOU’s study centers (STOU, 2004). Self-directed or self-managed learning requires distance learners to have initiative, self-discipline, and strong motivation to study. According to UT (2010), self-directed learning addresses the needs for students to initiate, develop, and manage their own learning approaches and strategies. Self-managed learning also acquires all distance learners to build their internal drives to become independent learners.

To support student success, these universities also have advanced to facilitate real communication among tutors, counsellors, and students through different channels such as F2F tutorial sessions. Whilst F2F tutorials have commonly been removed for DTUs in developed countries, this study disclosed that F2F tutorial sessions have been identified as major academic services provided at STOU and UT. The universities have moved on some scholars’ ideas in distance education, such as Keegan (1998) and Holmberg (1995). F2F provisions as one of the learning support services in DTUs have been addressed by Holmberg (1995) as follows:

In many distance education programmes there are also elements of face-to-face interaction between tutors and students .... [F2F] interaction as a supplement to distance study can be applied in more profitable ways ... the occurrences of [F2F] is dependent of the possibility, opportunity, and inclination of students to go to and take part in [F2F] meetings. (pp. 113-115)

Moore and Kearsley (2012) also stressed that although an increasingly large range of materials for students were delivered by the Internet, some learner support services were better provided in a F2F group setting. In this research, it was confirmed that F2F tutorial sessions at the two universities have commonly been conducted in their study centers or learning centers. At STOU, the purpose of F2F services is to expand students’ knowledge and understanding of course content. These services are provided by qualified tutors from either STOU or other universities and agencies (STOU, 2004). At UT, F2F provisions have been integrated into its learning support services along with self-managed learning and online learning services (UT, 2010). The roles and responsibilities of tutors and other issues relating to teaching learning provisions have been highlighted in their quality manuals to ensure the quality of tutorial services. Tutors at STOU and UT must be involved in continuous quality improvement by looking out for innovative instructional strategies to enhance their tutorial practices, not only in performing F2F tutorials but also in moderating online discussion forums.

The current advancement of educational technology has also enhanced the quality of real communication among teaching learning participants. The use of e-mail, telephone, video conferences, and Webinars has become common practices that support Holmberg’s (2011) current works—teaching-learning conversations. The advancement and use of computer-mediated communication has gradually revolutionized the new practice of distance education in these two universities. The availability of online learning platforms at STOU and UT seemed very important in supporting students’ learning. Online learning has empowered distance students to interact with tutors and other students in more flexible ways (Magano & Carvalho, 2010). At STOU, for example, online learning services have been delivered for graduate programs (STOU-04). The use of online learning allowed the
students to update teaching content from tutors and online discussion that fit with their own schedules.

At STOU, web boards have been operated to promote students’ learning and support tutor—learner interaction (STOU, 2004). The employment of online learning services has strengthened student engagement and improved student experience in the instructional process (STOU-04). The use of online learning provisions allowed faculty to invite student engagement in the instructional process, such as through a discussion forum. Since STOU served students residing throughout the country, it seemed important to promote student engagement to address their interests, thinking, and contributions to the teaching learning process.

UT also shared a long experience, similar to that of STOU, in involving online learning for promoting students’ learning. UT-Online was launched in 2002 (UT-03), based on the assumption that this service could significantly extend students’ access to UT’s services. Currently, fully online programs have also been offered in response to market demands (UT, 2010). According to UT (2010), the university’s innovation in the use of the Internet for instructional purposes could be seen as a pioneering initiative in the Indonesian higher education landscape. UT has implemented and continually improved its online learning services in line with an increasing trend of using these services by UT students and the availability of access points in students’ local areas throughout the country (UT, 2010).

The implementation of online learning exemplified by STOU and UT has potential to bring learning opportunities to a larger number of students that meets the needs for mass higher education. Online learning services at these universities have offered significant contributions to expanding access, enabling universities to teach far more students than they would otherwise be able to do, to teach more students living at a distance from the campus (Holmberg, 1995). Indonesia, the country with a very large population was a good example in this matter. UT, which has been equipped with various learning support services, has the advantage of enrolling a large number of students.

From the results discussed in the outset, this study affirms that the implementation of blended learning pedagogies in DTUs resonates with the major theory in distance education, interaction and communication theory (Holmberg, 1995), autonomy and independence theory (Moore, 1994), and community of inquiry model (Garrison, Anderson, & Archer, 2000). The findings of this research may confirm the two selected universities employed printed learning materials for supporting students’ independent and autonomous study (Moore, 1994). These universities developed different programs to support the interaction and communication (Holmberg, 1995) and currently the universities also heavily involved in developing online learning deliveries that addressed social presence, teaching presence and cognitive presence (Garrison, Anderson, & Archer, 2000). Although this research is very limited and interpretative paradigm in nature, it is hoped the findings provide some understandings on how the existing theories in distance education may be used for analytical lens and point out the practice of QA program in DTUs. These findings, in some ways, confirm that there is a mutual relationship between theory and practice of distance education; they inform each other.

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Dr. Ojat DAROJAT is an Academic staff at Faculty of Education Universitas Terbuka (UT) Jakarta Indonesia who has more than twenty five years of experience working for distance teaching university. Currently he has been assigned as the chairman of the Institute for Development of Learning Materials, Examination, and Information System at UT Indonesia. His main area of research interest is curriculum and quality assurance system for distance higher education. Darojat earned his Ph.D in Curriculum Theory and Implementation from Simon Fraser University, Canada.

Dr. Ojat DAROJAT  
Faculty of Education  
Universitas Terbuka, Jakarta, Indonesia  
Phone: +62-21-7490941 Ext. 2014  
Mobile: +62-81281393444  
e-Mail: ojat@ecampus.ut.ac.id

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BOOK REVIEW

OPEN EDUCATIONAL RESOURCES: Policy Costs and Transformation
Edited by Fengchun MIAO, Sanjaya MISHRA and Rory MCGREAL

Lecturer Can GULER
Department of Distance Education
Anadolu University, Eskisehir, Turkey

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This book presents 15 case studies contributed by researchers and policy makers. The Open Educational Resources (OER) implementations are expressed through different point of views. This book focused on three themes: policy, costs and transformation. Policy theme is related to the establishment of priorities for supporting the decisions made by an institution or organization. Costs theme explores the funding of OER, particularly in the sense of cost effectiveness. Transformation theme provides examples that demonstrate how OER can be used in ways that go beyond replication of current teaching and learning models. The editors in the Introduction elaborately describe these three themes.

In Chapter 1, C. Bossu provides information on Open Educational Practices (OEP), which had become popular in Australia in the near past and affected institutions in various terms, such as collaboration, resource and infrastructure development, open policy, teaching-learning and research etc. Australian government and its organs mostly dealt with open access closely via 3 different initiatives. These are the policy of Australian government on Open Source Software, administrative reflections of Web 2.0 facilities (Government 2.0), and open access and licensing framework of Australian government (AusGOAL). Although Australia has open licensing for the information that is financed by several institutions that adopted Australian public and OEP, copyrights of authors continue to constitute a problem in terms of open content development. Furthermore, other impediments that are faced in terms of OEP may be listed as lack of policy in national and organizational context or insufficient financing.

In Chapter 2, N.E. Al Khater, H. Amer and F. Tallaq determines the difficulties that are faced in terms of education in Bahrain, particularly the ineffectiveness of student-centered learning practices, lack of Arabic education materials and lack of lifetime learning facilities. Also, it is emphasized that OER has begun to be used in Bahrain in order to develop learning and teaching quality. OER Policy is expected to solve such problems. OER Policy covers 4
basic areas. These are as followings: 1- Teaching and learning at all levels, 2- Teacher training and professional development resources, 3- Educational observation resources and 4- Content produced by students. On the other hand, it is estimated that several complexities shall emerge by pursuing this policy as well. These complexities are as follows: establishment of cultural and linguistic relationship, quality assurance, copyrights and licensing, content production costs and accessibility of education content; validity of digital devices, internet access speed and production and downloading of digital content. In the study, information is provided on the goals of the government for 2020, such as provision of fund support, legalization of content sharing, infrastructure, sufficiency of teachers, development of an evaluation mechanism for course books and learning materials etc.

In Chapter 3, C. Rossini and O. Castro argue the Open Educational Resources (OER) movement, which is a grassroots initiative with regards to the educational, legal and political system of Brazil. National and regional OER policies and processes are explained. Two projects (community based OER project and corporate based OER project) are developed in the direction complexities (such as adaptation of learning materials due to legal reasons) that emerge as a result of usage of OER. Authors also declare their ideas on how OER projects shall be developed in terms of increasing access to education materials. They emphasize such thoughts as provision of local contents suitable for being developed, provision of a good proceed for the resources financed by the public in terms of public investment accountability and taxpayers, and combination of technologic and methodological innovations.

In Chapter 4, R. McGreal, T. Anderson and D. Conrad explained the development of Open Educational Resources (OER) and Massive Open Online Courses (MOOCs) in Canada. Following is reported in the Chapter; OER adoption status, efforts, policies and programs of those, who adapted test practices in relation with innovation after secondary education. In the Chapter, while provincial and organizational initiatives made for Open Higher Education and OER are mentioned, OER movement and development level are also emphasized. In the study, following are emphasized as national open education initiatives; Open Data pilot project of the Government, 2012 Paris Declaration on OER, which is supported by the Council of Ministers of Education, Canada (CMEC), Canada CC license and Open Access Policy, on which three Canadian institutions agreed. Furthermore, OER of the provinces of British Columbia, Alberta and Saskatchewan is supported on regional basis as a fundamental part of Open Training initiatives.

Chapter 5 includes a study where A. Moore and S. Hoosen introduce the model of Antigua & Barbuda of ICT in development of Education Policy and explain how Caribbean OER project is initiated within the scope of Education Policy. In the study, preparation of an online math course book is discussed as an OER Virtual Learning Environment (VLE) deployment prototype and qualified OER. 3 different strategies are introduced as distribution strategy. These are listed below; Minimum (minimal) Deployment Strategy, which is open to public access, but in which contents may not be organized or changed, and which is teacher referenced, and Standard Deployment Strategy, in which learning contents may be changed by educators in order to be re-used for another purpose, and Developed Deployment Strategy, in which students may play a part as content writer. Authors also draw attention to a requirement in terms of realization of educational changes effectively during application of OER projects. In this chapter, both the role that OER may play in order to support pedagogic transformation at school level and approaches towards transformation in conventional school system are assessed. Based on this issue, steps that are taken for preparing an ICT infrastructure according to the policies of the government, providing assistance to development of a supportive policy and developing school ICT integration in order to meet the ICT requirements of a school.

Chapter 6, Includes an interesting study of U-D. Ehlers on how OER is perceived in Germany. Author emphasizes that, although OER was not of top priority in Germany in
2012, several OER projects are currently being implemented in the country. Author emphasizes that, although open access is supported extensively, it is not popular in the country since German academicians do not consider resources innovative. Author also determines that digital learning materials are not sufficient. On the other hand, author emphasizes that there is no problem in terms of access to course books in Germany, a country that has a free university education policy, states that institutions currently tend to move towards Open Educational Practices (OEP) explicitly. OEP covers the dimensions of the deficit both in terms of resource usage and creativity, and pedagogic models. Author determines that both of these dimensions may be of benefit to the individuals and institutions in terms of self-assessment and position in itself.

In Chapter 7, M. S. Krishnan explains how one of the largest OER databases of the world is created by initiating and adopting open licensing. In this chapter, author emphasizes how progress is made in National Program on Technology Enhanced Learning (NPTEL) in India by development of content by specialists, support of public funds and approaches to adopting OER. In this content, author indicates that opening up of education has officially become active with the usage of ICT in India thanks to Gyan Darshan TV channel, which became active under the management of Indira Gandhi National Open University in 2000 and NPTEL, which became active under the management of seven Indian Technology and Indian Science Institutes in 2003. Author of this chapter also emphasizes that both of the above are supported by funds provided by the Indian government. It is emphasized that NMEICT was initiated in 2009 thanks to 1 billion dollars of government approved financial support and combination of the same with NPTEL project, which has become the first project to receive fund support. Author indicates that, as a result of these progresses, it is ensured that the copyrights of OERs are reviewed again and that all of the NMEICT projects that receive fund support are united a single roof. In the conclusion chapter of the study, it is determined that, similar to the licensing in Wikipedia, CC BY-SA (Creative Commons Attribution-ShareAlike) license is established not only for India, but for the entire world.

In Chapter 8, P. W. Bodrogini and M. Rinald assess OER development in Indonesia since 2012. Authors emphasize in this chapter that governments must develop "Open Learning Resources" as stipulated under Higher Education Law 2012. This is considered as a common policy for OERs, although there is no open licensing. Authors indicate that Indonesia provided support to adoption of 2012 Paris OER Declaration of UNESCO thanks to its OER initiatives in 2012. They emphasized that this also lays the foundation for OER policies. Development of the OER program of the country, its benefits, difficulties and opportunities are explained in the study in general. In the first section of the study, OER policy is revealed in terms of explaining more developed laws and regulations at higher education level. In the second section of the study, information is provided on how the Ministry of Education and Culture of Indonesia publishes rich online educational contents at primary and secondary education. Therefore, Indonesia has several OER projects, including materials that are published by Terbuka University and Ministry of Education and Culture. These materials also provided guidance to OER initiatives of Indonesia. In the third section, fundamental benefits are emphasized, such as scalability, synchronicity and opportunity to learn at any time in anywhere etc. Authors also provide advices to decision makers and education stakeholders in terms of OER policy and its practices.

In Chapter 9, T. K. Liew assesses the use of OER in Wawasan Open University (WOU). Author indicates that WOU preferred OER, as an economically sustainable option, for developing and delivering courses within the scope of open education. Furthermore, author emphasizes that WOU developed a policy for usage of OER and that it benefits from the same for development of teaching and learning materials. In the chapter, it is emphasized that the demand for low cost higher education increases rapidly and that WOU is aware of increasing inflation ratios. Therefore, since WOU obtained successful results in terms of developing OER based course materials in 2012, WOU has increased its studies on adopting and adapting its OER in terms of development of course materials. Three models are adopted to accelerate production of course materials. These are as below: 1) Using pre-
developed proprietary course materials under license from more established ODL institutions, 2) Developing course materials using the “wrap-around textbook” model, 3) Developing course materials as stand-alone resources without making any reference to a particular textbook. In this chapter, it is assessed, how quality control mechanisms may be of benefit in meeting the requirements of quality control committee in OER development processes and in providing cost efficiency. Following are discussed in brief; adoption of WOU’s OER, development of quality OER based course materials, benefits of OER usage and WOU’s corporate policy on its cost.

In chapter 10, W. Macintosh emphasizes the incremental design, disaggregated service approach of OER universities (content, interaction, credentialing, technology, support, assessment services) and how sustainability may be achieved in financial terms. In this chapter where development and incremental design of the OER universities consortium, which is established with the collaboration of post-secondary education institutions is assessed, it is emphasized that OER courses are used for providing more suitable access to higher education. Author finally bases the success of OER collaboration on the following key principles:

- Responding to a compelling vision that is well aligned with the core values of the contributing institutions
- Open sourcing everything
- Respecting the decision-making autonomy of partner institutions
- Generating a viable value proposition for partner institutions
- Avoiding the temptation to innovate on too many fronts simultaneously
- Minimizing risk while maximizing impact
- Guaranteeing recoupment of future operational costs of contributing partners
- Adopting an incremental design model combined with rigorous strategic planning
- Designing for sustainability from inception using a low-cost base.

Chapter 11 is related with Oman, which developed OER policy in 2013. M. A. Abri and S. H. H. A. In this chapter, Busaidi discusses the strategies that shall be pursued for development and implementation of policy. Authors determine that the Oman Government turned towards development of sustainable development strategies due to the problem of trust in oil revenues. Therefore, government planned to take necessary steps in order to diversify the economy, which requires a powerful labor force that possesses the skills required in 21st century, to support industrialization and in terms of expropriation. In this direction, authors emphasize that the Oman Government decided to benefit from the skills of ICT in order to bring in innovative practices in teaching and learning while selecting the approaches that shall be adopted for sustainable development and to increase technology literacy. It is indicated in this chapter that an OER policy was developed in 2013 under the guidance of UNESCO with the vision to ensure high quality learning for all of the citizens of Oman and to establish a sustainable information society. This policy aims to fight against various difficulties related with education. These difficulties are listed as increasing the quality of learning outputs, development of teacher performance, increasing ICT perception of the society in education approaches, providing education that is consistent with the labor market and supporting research and education studies. In conclusion, authors emphasize that, with the implementation of OER policy, there are expectations for increasing the performances of practices and teaching performances of teachers, enrichment of digital Arabic sources and providing support to information production.

In Chapter 12, A. Tarkowski examines the development of OER in Poland with the usage of information and communication technologies (ICT). He makes such examination by narrating the development of open e-textbooks. It is determined that OER has begun to be used within the framework of plans that mainly aim for strengthening education via various initiatives, such as modernizing education or providing cheap access to basic education resources in Poland. Author highlights openness as an effective concept in this context. In
this chapter, it is determined that the educational content of Digital School Program has begun to be used 5 years ago, and that it was introduced as a tool that provides accessibility to larger masses. Furthermore, it is determined in this section that openness concept is not the main objective of political efforts and that there was no solid political support during implementation of program. Author determines that the Digital School Program approved by the Council of Ministers in April 2012 is comprised of 4 components. These are as follows: e-Teacher, e-textbook, e-school and e-student. The program meets various requirements in terms of a multi-platform approach, flexibility, modularity, security and scalability. In the chapter, openness mode, which is developed as a part of the program, is also explained. Also, public discussions on the program and its effects on the market are examined. Finally, it is argued whether a general policy may be developed in Poland with regards to openness of education resources.

In chapter 13, S. Knyazeva and A. Sigalov present a detailed examination of OER, which was included to copyrights law in Russia in 2014 and which has a legal provision for open license. This law defines availability for educational purposes and in terms of being treated as OER. In this chapter, a series of projects applied in Russia Federation are examined in order to establish a national education portals system. In this chapter, authors emphasize the initiatives of the Ministry of Education and Science of Russia Federation, which support production of open license education resources. One of the main goals of these initiatives is to support usage of OER in higher and secondary education institutions by a larger population. Authors determine that projects are financed by MES of Russia Federation and are implemented under the leadership of Russian universities and research centers. Furthermore, authors emphasize MOOCs (Massive Open Online Courses) initiatives as new projects in open education and they also determine that various categories of open online courses are developed for learners. Also, it is emphasized that MES organizes annual events to promote usage of OER. Authors determine that amendments were made on Russian legislation as a result of the open license law that became effective in 2014. It is determined that it has become an obligation to obtain permit from authors and title holders, and that this situation shall provide various other opportunities for usage of resources. Opportunities shall increase for both open education and corporate e-learning systems in higher education institutions in terms of ensuring legal usage of online courses particularly.

In Chapter 14, T. Welch and J. Glennie reviewed language development project related with early childhood period in connection with the local languages used in Kenya, South Africa, Lesotho and Uganda. It constitutes a problem that there is no sufficient number of suitable material in order to enable African children to learn reading. This is the main reason behind the low ratio of literacy observed in African children. Authors determined that African Story Book project is planned to provide a solution for this problem. It is believed that this project shall accelerate development, shall promote translation of stories to local languages, shall provide assistance to protection of languages culturally and shall also provide assistance to keeping languages alive. The web site that is used in African Story Book project provides open licensing, and it is also observed as a tool that ensures translation of stories and creation of stories. Since contents may be used with an open license, it is easy to translate contents, to change illustrations and diagrams and to adopt stories to local contexts. Authors emphasize that the difficulties that are experienced in the project in relation with Kenya, South Africa, Lesotho and Uganda are not restricted with internet connection, electricity access or lack of ICT skills in target audience. In addition to these problems, it is observed that another variable is the readiness in adoption of OER. However, it is believed that the project shall be beneficial in terms of making people love reading and producing quality stories in local languages. Furthermore, approach for publishing digital open license in African Story Book initiative shall also be beneficial in terms of meeting a necessary requirements, as well as motivating teachers. It is also observed as a critical component of sustainable literacy development.
In chapter 15, B. Chae and M. Jenkins present a systematic strategy for adoption of OER in the system of Washington Community and Technical Colleges. In this chapter, authors determine their opinions, which indicate that development of a strategic plan in terms of policy development shall ensure determination, funding, design and development of OER projects. In this chapter, authors analyze how open policy is used in terms of providing fund support to the system and providing support to implementation of open projects, how the system is designed properly in terms of duty and planning support and how coordination is established in such studies. Authors determine that the open initiatives of Washington are categorized under three levels, i.e. development, application and outreach. Authors also present a model for research and policy development in terms of supporting open initiatives. This is a general model that may be adopted to OER development and promoting by any institution.

BIODATA and CONTACT ADDRESSES of the AUTHOR

Can GULER is a lecturer in Distance Education at the College of Open Education of Anadolu University. Guler undertook undergraduate (Department of Computer Education & Instructional Technologies, 2002) and graduate studies at Anadolu University, Turkey (Department of Distance Education, 2007). He is currently studying for a PhD in Department of Distance Education. His research interests are instructional design, open and distance learning, educational technology, innovation and change, Interaction and communication in learning communities, and social media in education.

Lecturer Can GULER
Anadolu University, College of Open Education
Distance Education Department, 26470, Eskisehir, Turkey
Phone: +90 (222) 3350580 Ext: 2431
eMail: canguler@anadolu.edu.tr

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E-learning systems have been attainable for years with their different options and flexibilities. These systems provide opportunities like flexible structures with respect to time and space, personalization of learning and sharing of adaptable learning experience. With these features, e-learning systems gain places in the education environments. In this context, we reviewed the book “E-Learning Systems, Environments and Approaches: Theory and Implementation” edited by Pedro Isaias, J. Michael Spector, Dirk Ifenthaler and Demetrios G. Sampson (2015) which included theoretical knowledge on the e-learning technologies and contributed to the literature with experimental implementation examples in the education environments.

The parts in the book focus on the subjects like technology integration, the change caused by the effect of e-learning on social environment, the effect of e-learning applications on communities and the cooperative and student-centred e-learning. The researchers studied these subjects through different research types and with regard to the pedagogical and technical aspects.

The book is a study on twenty research subjects divided to four basic areas. The studies are presented in a very significant experimental and theoretical integrity with support from exemplary implementations, visuals and resources.

Part I: Exploratory Learning Technologies
The part includes four different studies with guiding findings to the researchers who want to carry out experimental application on the effect of technology integration in education. The studies in this part cover the subjects like Measuring Problem Solving Skills in Portal 2, iPads in Inclusive Classrooms: Ecologies of Learning, Supporting the Strengths and Activity of Children with Autism Spectrum Disorders in a Technology-Enhanced Learning Environment and Learning with the Simpleshow. It was determined with these studies that the use of technology in the education process increased the learning achievements of the
individuals. Particularly, the learning with technology by the children with autism spectrum disorder brought out their existing learning skills and ensured their active participation in the learning process.

In this part, the researchers studied the benefits of technology with its pedagogical and technical aspect. The learning environments in the studies on the technology integration consist of the pedagogical, technical, social and physical environments. In addition, the benefits of the iPad use for the students during education activities are included without mention to negative aspect of this matter with respect to pedagogy and technology addiction. On the other hand, it is observed that the mobile learning applications are becoming more popular in the e-learning environments. The book includes the iPad application but doesn’t cover any study or application examples where the more popular smart telephones can be used in e-learning.

Part II: E-Learning Social Web Design
This part includes five different studies on the learning environments and requirements together with technology in the changing world conditions. In addition, the importance of learning by sharing the knowledge and methods complying with these conditions is emphasized. Significant contribution is expected to the literature by these studies. The studies in the book cover the subjects like Live, Laugh and Love to Learn Turning Learning from Traditional to Transformational, The Configuration Process of a Community of Practice in the Collective Text Editor, Using an Ontological and Rule-Based Approach for Contextual Semantic Annotations in Online Communities, Recognizing and Analyzing Emotional Expressions in Movements, Student-Driven Classroom Technologies: Transmedia Navigation and Transformative Communications.

Part III: Learner Communities through E-Learning Implementations
This part includes four different studies and covers guiding findings for teachers and researchers who want to carry out applications on the learning experiences of the systems that allow discussion communities or individual sharing by students. These studies cover the subjects like ICT Support for Collaborative Learning—A Tale of Two Cities, The Investigation of Pre-Service Teachers’ Concerns About Web 2.0 Technologies in Education, Teacher Training Using Interactive Technologies: Performance and Assessment in Second Life and Simschool, A Study on Improving Information Processing Abilities Based on PBL. As a result of these studies, it was determined that the learning experience of individuals increased in the systems that allow discussion groups or individual sharing. In addition, it was highlighted that the teachers may experience their difficulties in classroom management with these methods and reduce their real classroom difficulties.

These studies revealed that on-line application communities emerged with the combination of the internet and the idea of application communities after the sharing of information. When we look at the literature, the biggest problem in this field of research is to keep the members of these communities active in the community, to ensure their participation in the medium and to keep this community alive for long time. This part doesn’t include recommendations for keeping the application communities alive for long time. There may be future studies to guide researchers on these matters.

Part IV: Collaborative and Student-centered E-Learning Design
This part includes seven different studies with respect to the use of student centered technologies and sharing, editing and diversification of knowledge in the learning process of students. These studies provide guidance in the literature on how collaborative e-learning environments can be created. This studies cover the subjects like Constructivism vs. Constructionism: Implications for Minecraft and Classroom Implementation, Student-centered, e-Learning Design in a University Classroom, Some Psychometric and Design Implications of Game-Based Learning Analytics, Self-Assessment and Reflection in a 1st Semester Course for Software Engineering Students, Don’t Waste Student Work: Using Classroom Assignments to Contribute to Online Resources, The Ancestor Project: Aboriginal Computer Education Through Storytelling, Perceived Affordances of a Technology-
Enhanced Active Learning Classroom in Promoting Collaborative Problem Solving. The objective of these studies is to centralize the learners with the e-learning environments and to create their own learning prototypes. As a result of the application of these learning methods, individuals stated that they would prefer collaborative study instead of a competitive study methods. In this method, it is understood that the individuals with their own prototype (e-learner) should have some qualities. This part doesn’t include the findings on the e-learner qualities that can use the e-learning tools. However, the e-learning tools are highlighted in detail.

As a result, the developing technologies allow more comprehensive and enhanced studies on the learning and teaching systems. The books states that the learning is increased when the developing technologies are used in education. The book as a whole includes the experiences on certain subjects regarding the use of technology in education from a theoretical and experimental aspect. The book includes exemplary application in addition to the knowledge which is appropriate with regard to theory and content. In addition, the book includes the results of the experimental studies on the subjects of research. The studies include applications which can be used in a synchronous or asynchronous manner which is a guidance for the teachers who want to carry out e-learning applications. The fact that the studies in the book are conducted with participants of different education level provides a guidance to the researchers who will study with different age groups. The target audience which this book may be useful to are the education designers and teachers who study technology integration, education by e-learning, application communities and collaborative learning in e-learning.

**BIODATA and CONTACT ADDRESSES of the AUTHOR**

Recep ONDER is working as a part time lecturer in different universities, Izmir, Turkey. He received his MSc degree in Computer Education and Instructional Technologies Teacher Education from Dokuz Eylul University, Izmir, Turkey. Currently he is pursuing his PhD degree in augmented reality at Anadolu University, Eskisehir, Turkey. He teaches undergraduate courses in computer education and instructional technologies. His research interest includes augmented reality, graphics and animation in education, smart board, constructivism etc.

Recep ONDER  
Yildiz mah. 206/35 sk. No: 19/1  
Buca, IZMIR  
Phone: (+90) 531 520 2708  
E-mail: onder.recep@hotmail.com

**REFERENCES**