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Dear TOJDE Readers

Welcome to Volume 20 Number 3 of TOJDE

There are 13 articles and 2 book reviews in July 2019 issue. 28 authors write the articles from 9 different countries. These countries are Bangladesh, Colombia, India, Malaysia, Mexico, Rusia, Slovenia, Turkey and Ukraine.

FACTORS INFLUENCING LEARNERS’ SELF-REGULATED LEARNING SKILLS IN A MASSIVE OPEN ONLINE COURSE (MOOC) ENVIRONMENT is the title of 1st article. The first article written by Nour Awini Albelbisi and Farrah Dina Yusop. This study identifies factors that influence self-regulated learning and determines relationships between these factors and self-regulated learning. The results of the study indicate that improvement of service quality, attitude, and course quality is very important for promoting self-regulated learning in MOOC environments.

The title of the 2nd article is WHATAPP AS A TOOL FOR SUSTAINABLE GLOCAL LINGUISTIC, SOCIAL AND CULTURAL INTERACTION. Aysegul Takkas Tulgar is the author. In the study, the author investigates the role of WhatsApp in maintaining glocal linguistic, social and cultural interaction among a group of foreign learners of Turkish. The results of the study revealed that WhatsApp is an effective application to promote the maintenance of glocal cultural interaction among the participants with its personal, social, and linguistic contributions.

The 3rd article is written by Marko Radovan. SHOULD I STAY, OR SHOULD I GO: REVISITING STUDENT RETENTION MODELS IN DISTANCE EDUCATION is the title of the article. The study shows that the dropout rate in distance educational programs is higher than the the dropout rate in traditional programs. Participant in distance education usually requires more motivation and effort from a student in comparison to the self-motivation required in a face-to-face education. Therefore, the study suggests that the dropout rate should be considered in the planning and implementation of distance education programs.

AN EVALUATION OF CONTENT CREATION FOR PERSONALISED LEARNING USING DIGITAL ICT LITERACY MODULE AMONG ABORIGINAL STUDENTS (MLICT-OA) is the title of 4th article. Nor Syazwani Mat Salleh, Aidah Abdul Karim, Mazzlida Mat Deli, Siti Zuraida Abdul Manaf, Noor Fazrienee JZ Nun Ramlan, and Analisa Hamdan are the authors. The results of this study revealed that personalized learning positively supported the use of a digital ICT literacy module as a teaching and learning approach. Therefore, this study suggest that the digital ICT literacy module is an adaptive educational resource for personalised learning to meet the learning needs of aboriginal students.

The title of the 5th article is COMPETITIVENESS IN ODL FROM STAKEHOLDERS’ PERSPECTIVE: A REVIEW AND RESEARCH AGENDA, written by Nikhil Kant. The study set the research agenda on the topic of competitiveness in ODL in higher education from the perspective of the relevant stakeholders and not learners only with the help of Systematic Literature Review (SLR). This study highlights the different aspects of the concepts of ODL, competitiveness and stakeholders and their interrelations in the context of Indian higher education.

INFLUENCE OF AN INSTRUCTIONAL STRATEGY ON THE ATTITUDES OF UNIVERSITY PROFESSORS TOWARD DISTANCE EDUCATION is title of the 6th article, written by Juan Ignacio Barajas Villarruel, Ricardo Noyola Rivera, and Maria Gregoria Benitez Lima. This study determines the influence of an instructional strategy for the use of DOKEOS, Course Management System (CMS) on the
attitudes of professors toward distance education. The results of the study show that the instructional strategy contributed to a more positive attitude of professors toward distance education.

Iryna Vorotnykova is the author of the 7th article. ORGANIZATIONAL, PSYCHOLOGICAL AND PEDAGOGICAL CONDITIONS FOR THE USE OF E-BOOKS AND E-TEXTBOOKS AT SCHOOL is a title of the study. This study defines the organizational, psychological and pedagogical conditions for the use of the e-books and e-textbooks at school. The experts identified four conditions. These are educational policy, the availability and diversity of e-textbooks and e-books on the educational services market, ergonomics and readiness of teachers, students, their parents to use e-textbooks and e-books. The results of the study indicate that the prospects of using e-books and e-textbooks at school needs further implementation.

OPERATIONAL INDICATORS OF THE LEARNING MANAGEMENT SYSTEM IN VIRTUAL SPACES SUPPORTED BY ICT is title of the 8th article, written by Jose Capacho, Miguel Jimeno, and Augusto Salazar. The study presents the conceptual framework and operational indicators of the Learning Management System in virtual spaces supported by ICT. The results of the study indicate that the operational indicators are based on their research horizon for the construction and validation of the management and decision indicators of the learning management systems in virtual spaces.

The title of the 9th article is EFFECTIVENESS OF GAMIFICATION ELEMENTS IN BLENDED LEARNING ENVIRONMENTS. The authors of this study are Can Mese and Ozcan Ozgur Dursun. The study aims to determine the effectiveness of blended learning environments enriched with the use of gamification elements. The results of the study show the fact that gamification elements in blended learning environments have positive effect on these variables, on the otherhand vice versa. The gamification elements in blended learning environments have both positive and negative effects with respect to the community of inquiry model, academic achievement and motivation.

The 10th article is written by Mahedi Hasan and Nazrul Islam Mondal. BANGLADESH BETAR’S FARM PROGRAMS TO MOTIVATE FARMERS: AN ANALYSIS OF EFFECTIVENESS AS DISTANCE EDUCATION is the title of the article. This study aims to evaluate the effectiveness of farm programs of Bangladesh Betar (BB) as distance education through assessing its capacity to motivate the farmers. The study revealed that every sector the farmers who listen to the FP’s pf BB are more aware of the modern technologies for farming and are more likely to adopt the new farm technologies more than the farmers who do not listen to the Farm Program of BB.

THE COMPARISON OF TRUST DEVELOPMENT IN VIRTUAL AND FACE-TO-FACE COLLABORATIVE LEARNING GROUPS is the title of 11th article, written by Meltem Huri Baturay and Secip Toker. The study investigates the effect of delivery types of collaborative learning environments on the development of trust among group members in a graduate course. The results of the study indicate that trust increased over time among virtual course participants are lower than those of face-to-face participants. This study demonstrates that trust can develop in virtual environments.

The title of the 12th article is A FULLY ONLINE COURSE EXPERIENCE FROM STUDENTS PERSPECTIVE: READINESS, ATTITUDES AND THOUGHTS. Emine Cabi and Filiz Kalelioglu are the authors of the article. The aim of the study is to identify the effect of a course taken through distance education on students’ readiness and attitudes. The results of the study indicate that the course taken through distance education had a significant effect on students’ gaining Computer and Internet Self Efficacy and was effective in improving undergraduate student’s self-directed learning skills.
DATA MINING FOR THE E-LEARNING RISK MANAGEMENT is the 13th title of the article. Oksana Gushchina and Andrew Ochepovsky are the authors of the article. The article shows that the role of data mining methods at the stages of the e-learning risk management for the various participants. The article mentions that different stages of the risk management: 1) for quality authentication of the risks of quality authentication of the risks the classification based on using the method called “decision tree” is applied; 2) for making the analysis of risks the brainstorm method for mind map creation is used. The mind map displays the e-learning risk groups that are then rated on the prioritization criteria with the help of expert evaluation method; 3) for the assessment of probability of risk impact on organization of e-learning the expert evaluation method, cluster analysis and bow-tie analysis are used.

There are two book reviews in this issue. ONLINE LEARNING AND ITS USERS: LESSONS FOR HIGHER EDUCATION is the title of the 1st book. The writer of this book is Claire McAvinia. The reviewer is Mehmet Kara.

Other book’s title is ASSESSMENT STRATEGIES FOR ONLINE LEARNING ENGAGEMENT AND AUTHENTICITY. Dianne Conrad and Jason Openo are the writers of this book. Abdulvahap Sonmez is the reviewer.

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

Dr. T. Volkan YUZER
Editor-in-Chief
FACTORS INFLUENCING LEARNERS’ SELF-REGULATED LEARNING SKILLS IN A MASSIVE OPEN ONLINE COURSE (MOOC) ENVIRONMENT

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ABSTRACT
The importance of self-regulation in a MOOC has been extensively discussed in research studies that provide evidence about the significant relationship between self-regulated learning and success in an e-learning environment. Learners with high self-regulated learning are more independent in regulating their learning and have a greater probability of success in their online courses. This study identifies factors that influence self-regulated learning and determines relationships between these factors and self-regulated learning. A conceptual model is proposed for combining success factors for self-regulated learning in a MOOC environment. A research instrument based on the model was designed and administered to six hundred and twenty-two MOOC students enrolled in five universities. Relationships between relevant factors and self-regulated learning were examined using a Partial Least Squares Structural Equation Modeling (PLS-SEM) technique, and the statistical findings revealed that three factors - service quality, attitude, and course quality - influence self-regulated learning in a MOOC.

Keywords: MOOC, Massive Open Online Courses, self-regulated learning, MOOC success.

INTRODUCTION
A Massive Open Online Course (MOOC) is a new phenomenon in e-learning sector that has substantial capability to provide free online courses to a huge group of learners around the world. MOOC contributes to improvement of educational institutions (Mazoue, 2014) by allowing learners to effectively exchange knowledge and experience through collaborative learning. MOOC offers several features such as interaction, self-reflection, collaboration, and evaluation that support learning experiences (de Waard et al., 2014).

Despite the growth in MOOC implementation, there are some issues surrounding its successful implementation in higher education contexts; one such issue is the high dropout rate among MOOC learners (Parr, 2013). Research studies (e.g. Alraimi, Zo, & Ciganek, 2015; Hew & Cheung, 2014) have indicated that completion rates in MOOC courses could be less than 10%, and such high dropout rates have occurred across multiple institutions. The Massachusetts Institute of Technology (MIT), for example, established its first MOOC in 2012 with a total of 155,000 students enrolled, experienced a dropout rate of more than 95%, meaning that only 7,000 out of 155,000 students successfully completed the course (Daniel & Uvalic-Trumbic, 2013). Such a high dropout rate obviously reflects an unsuccessful implementation of MOOC at the institutional level.

Since the literature strongly indicates that the high dropout rate in online learning courses may be due to a mix of factors associated with courses, services, and educational quality (Alsabawy, Cater-Steel, & Soar, 2012), understanding the factors that affect MOOC success is critical and careful consideration of these factors could help improve the effectiveness of implementing MOOC and diminish its failings (Alsabawy et al., 2012; Authors, 2018), especially for MOOC stakeholders, administrators, managers and scholars (Alsabawy, Cater-Steel, & Soar, 2011).
Current MOOC literature has described the important role of learners’ self-regulated learning (SRL) skills in accomplishing MOOC success (e.g., Hood, Littlejohn, & Milligan, 2015; Littlejohn & Milligan, 2015; Terras & Ramsay, 2015). MOOC provides learners with powerful self-regulated learning skills (i.e., time management and effort regulation) to promote learning, particularly self-directed learning (Kizilcec, Pérez-Sanagustín, & Maldonado, 2016; Magen-Nagar & Cohen, 2016). This leads to a high degree of self-regulation that in turn leads to greater engagement within learning via MOOC and makes students more likely to succeed in their learning (Kizilcec, Pérez-Sanagustín, & Maldonado, 2017; Liaw & Huang, 2013).

Adopting from the DeLone & McLean Information System model (2003), this study extends the current literature by examining five (5) major factors that influence learners’ SRL skills. The five factors are: (1) system quality; (2) information quality; (3) service quality; (4) attitude; and (5) course quality. Understanding the influence of each of these factors is important to support building a successful operational framework of MOOC success factors.

**AIM OF THE STUDY**

This study aims to combine the MOOC success factors for self-regulated learning in a proposed model based on the D & M (2003) model, and to identify the relationships between these factors and SRL. It also seeks to offer interested researchers scientific results related to self-regulated learning skills in MOOC environments. Within this perspective, the research objectives for this study are as follows:

1. To determine the key factors that influence self-regulated learning in MOOC; and
2. To determine the relationships between the factors in the proposed model.

This study has been guided by the following research questions:

1. What are the key factors influencing self-regulated learning in MOOC?
2. What are the relationships between 5 success factors (i.e. system quality, information quality, service quality, student attitude, course quality) and learners’ self-regulated learning?

**SIGNIFICANCE OF THE STUDY**

This study intends to contribute to a better understanding of MOOC literature by highlighting the factors influencing self-regulated learning and combining them into a framework based on the D & M (2003) model to guide researchers, educators, and instructional designers to develop effective MOOC environments that can effectively support learners self-regulated learning skills and subsequent success in MOOC.

**LITERATURE REVIEW**

**Self-Regulated Learning**

The concept of self-regulated learning relates to how individuals manage their personal learning processes, especially how to monitor, regulate, and evaluate their own learning, and plan learning actions and behavioral processes that increase likelihood of goal attainment (Zimmerman, 2015).

Self-regulated learning has received great attention in the online learning literature (Cho & Kim, 2013; Terras & Ramsay, 2015; Zhao, 2016). In these studies, the vital role of self-regulated learning with respect to learner behavior online was highlighted, and the influence of self-regulation on promoting success in online learning environments was revealed (Cho & Kim, 2013; Terras & Ramsay, 2015). Student success in e-learning clearly requires effective use of self-regulated learning strategies (Barnard-Brak, Paton, & Lan, 2010).

Cho and Shen (2013) examined the role of self-regulation skills and found that since learners with a high level of self-regulation are more independent learners in regulating their learning thus, their probability of success in online courses is greater. Self-regulation skills contribute to supporting learners’ engagement and improve learning strategies achieved through instructional interventions and practice in implementing the self-regulated learning process. Self-regulated learning skills can enhance learners’ ability to regularly
review their material, to effectively manage their time, to seek assistance from peers or instructors, and to provide the required metacognition skills that reflect their own learning (You & Kang, 2014). Self-regulated learning (SRL) contributes to develop learners’ skills related to being active learners in obtaining the required knowledge and improving their personal steps toward mastering that knowledge. Enhanced self-regulated learning skills help learners to find the best solutions for challenges or obstacles facing them, thus achieving their learning goals and succeeding in their learning process. Broadbent and Poon (2015) indicated that highly self-regulated learners exhibit effective positive motivation and self-efficiency with respect to their own learning processes through such activities as selecting learning content, identifying learning goals, and organizing and controlling their learning processes.

Conversely, not all students have the motivation required to organize their online course activity, and not all of them are able to effectively regulate their online learning. Many studies have identified the lack of SRL skills among participants involved in online learning settings (Kizilcec & Halawa, 2015; Lee, Choi, & Kim, 2012; Nawrot & Doucet, 2014). For instance, Lee et al. (2012) argue that students without the ability to manage their own online learning will face difficulties and this may hinder their success in online courses. The literature indicates that learners with low self-regulation skills would be less likely to achieve success in the e-learning field (Cho & Shen, 2013; Kizilcec & Halawa, 2015). You and Kang (2014) highlighted that lack of self-regulation skills in e-learning environments may result in learners consuming extra time in completing the assignments, causing turning in late assignments or generally poor-quality work. Nawrot and Doucet (2014) also indicated that lesser student experience with regulating their own learning (such as poor time management) can lead to increase in course withdrawal, frustration, and consequently poor academic outcomes.

**MOOC and Self-Regulated Learning**

MOOC is a platform for communication and collaboration in which participants exchange information to enhance their knowledge (de Waard et al., 2014). Many MOOCs have been designed to encourage learners to regulate their learning all by themselves rather than depending on instructor guidance. Since MOOC learners can independently select learning resources and choose to participate in activities (Davis, Chen, Jivet, Hauff, & Houben, 2016), they may require learners to regulate their learning while using MOOC. Previous research suggests that MOOC learners with highly self-regulated learning exhibit different cognitive, affective, and behavioral reactions toward learning in MOOC than those who exhibit lower levels of self-regulated learning (Hood et al., 2015; Littlejohn & Milligan, 2015). It is clear that MOOC success requires high levels of self-regulated learning (SRL) skills, but at present not much research is available on how to support self-regulated learning skills in a MOOC environment (Onah & Sinclair, 2017).

There is also growing evidence that MOOC has significant potential to support student self-regulated learning (Littlejohn, Hood, Milligan, & Mustain, 2016). Since MOOC learners must be independent and active participants in the learning process, those with higher self-regulated learning skills exhibit more ability to engage in learning by individually setting learning objectives, identifying the effective learning techniques, and monitoring the processes of achieving their objectives (Kizilcec et al., 2016). Unfortunately, many groups of MOOC learners continue to struggle with self-regulating their learning (Milligan, Littlejohn, & Margaryan, 2013). Consequently, because of the importance of SRL skill in MOOC system success and the rarity of available studies about the relationships between MOOC and student self-regulated learning, this study examines SRL as a dependent factor and investigates the factors that influence SRL in a MOOC environment.

**THEORETICAL FRAMEWORK**

**DeLone and McLean Model**

The DeLone and McLean model is considered one of the most important models contributed to assessment of e-learning systems success (Alsabawy et al., 2011). The model hypothesizes that factors of information quality, system quality, and service quality all have positive influence on user satisfaction and use/intention to use particular systems. Figure 1 the displays DeLone and McLean (2003) model.
System quality relates to how well the hardware and the software work together; in other words, it refers to the effectiveness of processing system information (DeLone & McLean, 2003). Information quality is related to measurement of the quality of information created by a system (Petter, DeLone & McLean, 2008) while service quality refers to the level and manner in which services are provided by the information system sector or system providers (DeLone & McLean, 2003).

Many studies (e.g., Freeze, Alshare, Lane, & Wen, 2010; Hassanzadeh, Kanaani, & Elahi, 2012; Tella, 2011; Wang & Chiu, 2011) have tested the validity of DeLone and McLean’s model. Some of these studies adopted DeLone and McLean’s model in its entirety while others partially tested the model by examining some of its specific factors. Some studies, on the other hand, extended the DeLone and McLean model by including other external factors to achieve deeper understanding of system success.

Because of the vital role of self-regulated learning skills in e-learning environments, many studies have indicated that a self-regulated learning factor should be considered as a principal dimension in evaluating systems success, so Lee and Lee (2008) modified the D & M model by adding self-regulated learning as a moderating variable. Zhao (2016) also proposed a new learning system success model in the particular context of e-learning 2.0. This model reframes the original D & M model by adding communication quality and replacing net benefit with self-regulation as dependent variables, as shown in Figure 2.

![Figure 1. DeLone & McLean (2003) model.](image)

![Figure 2. Modification of DeLone & McLean (2003) model by Zhao (2016).](image)

**Research Model and Hypotheses**

Samarasinghe (2012) indicated that there are insufficient dimensions in the D&M (2003) model to measure system success and cover all of the relevant e-learning success features, so he recommended inclusion of other significant factors related to both learners and courses in the model.

This study therefore proposes a model that includes a total of six variables: information quality, system quality, service quality, course quality, attitude, and self-regulated learning. Arrows can be used to denote proposed relationships among the six variables in the research model as shown in Figure 3.
In this model, system quality refers to the degree to which learners perceive that a MOOC system is easy to use, easy to learn, has integrity, and is reliable. The second factor in this study, information quality, represents the quality and relevance of the information offered by MOOC systems. In other words, information quality refers to the ability of a MOOC to provide information that exactly meets learners’ needs, is relevant to learners’ job, is easy to understand, and is up to date. On the other hand, attitude refers to the set of learner beliefs in using MOOC regarding whether it is good or bad. Finally, course quality in this study refers the extent to which a learner believes that a MOOC offers quality content.

**Hypotheses**

Barnard-Brak et al., (2010) defined self-regulated learning as voluntary behavior of an individual to measure his or her own success in learning. MOOC can enable learners to individually regulate their learning processes by promoting self-reflection, developing learning objectives, planning time use effectively, and managing skills (Onah & Sinclair, 2017). Some researchers (e.g., Littlejohn et al., 2016) have also discussed MOOC used to promote self-regulation skills. Learners with high self-regulation levels contribute to engagement within e-learning and are more likely to succeed in e-learning environments (Liaw & Huang, 2013; Zhao, 2016). In a related study, Zhao (2016) examined factors influencing self-regulation skill in an online learning environment such as MOOC and revealed the three (3) main factors related to system success: system quality, information quality, and service quality. The following hypotheses are therefore proposed:

**H1:** There is a positive relationship between system quality and learners’ self-regulated learning in MOOC environment.

**H2:** There is a positive relationship between information quality and learners’ self-regulated learning in MOOC environment.

**H3:** There is a positive relationship between service quality and learners’ self-regulated learning in MOOC environment.

Since many studies have shown that self-regulation is a critical factor affecting student attitudes toward e-learning (Kramarski & Gutman, 2006; Zimmerman & Schunk, 2001), H4 is also proposed.

**H4:** There is a positive relationship between attitude and learners’ self-regulated learning in MOOC environment.

Lin, Lin, and Hung (2015) argue that the perceptions of learners toward the quality and richness of course content have significant influence with respect to accepting the knowledge provided. Rai and Chunrao (2016) noted the role of quality of course in MOOC systems success. Therefore, H5 is proposed.

**H5:** There is a positive relationship between course quality and learners’ self-regulated learning in MOOC environment.
METHODOLOGY

Research Instrument

The questionnaire used in this research was gleaned and compiled various validated instruments from the literature reviewed on e-learning and MOOC but some modifications were made to wording to suit the context of this research. System quality and information quality factors were measured with a scale developed by Alsabawy et al. (2012) while service quality was measured by a scale developed by Ozkan, Koseler, and Baykal (2009). Course quality items were adapted from a study by Rhema and Miliszewska (2014) whilst self-regulated learning factor was examined by a scale for Onah and Sinclair (2017). Most of these studies employed the D & M (2003) model in their researches.

The research instrument is divided into two parts. Part 1 includes demographic information, including gender, age, and previous experience with MOOC, while the second part includes measurement items of the research model based on six constructs: system quality, information quality, service quality, attitude, course quality, and self-regulated learning. The questionnaire covered 41 items using a 5-point Likert scale ranging from “Strongly agree (5),” to “Strongly disagree (1)”.

Data Collection and Analysis

The questionnaire was administered to 1000 undergraduate students from the top active MOOC user universities in Malaysia. All participants had been enrolled in at least one MOOC course via the OpenLearning platform, the official MOOC platform in Malaysia.

From the total number of 1000 questionnaires administered, 622 valid questionnaires were returned, an effective response rate of 62.2 %. In the final sample population, 63.8% participants were females and 35.9% were males. The majority of the participants, 54.2%, were of ages between 20 and 30 years. With regard to participants’ experience in MOOC, 41.3% of the participants had limited experience with a current MOOC course.

Data from the questionnaires were analyzed using the Partial Least Squares Structural Equation Modeling (PLS-SEM) technique (Ringle, Wende, & Becker, 2015) because PLS-SEM enables researchers to acquire an accurate study model and is considered suitable for testing new models (Henseler, Ringle, & Sinkovics, 2009).

Reliability and Validity of the Proposed Model

The reliability of the questionnaire was measured using Cronbach's alpha (\(\alpha\)), the most common indicator for internal consistency, an \(\alpha\) value greater than 0.70 indicating good reliability (Hair et al., 2006). The data analysis revealed that the Cronbach's alpha for the items in the questionnaire was between 0.70 and 0.915, reflecting its high reliability.

Analysis of validity was then conducted using PLS-SEM analysis. Validity refers to the capability of the measurement items to effectively measure the intended constructs (Hair, Black, Babin, & Anderson, 2010). In this study, validity was measured in two stages: (1) analysis of the measurement model, and (2) analysis of the structural model (Hair, Ringle, & Sarstedt, 2011). The findings of these analyses are presented in the next section.

FINDINGS

Analysis of the Measurement Model

In the first stage, analysis of the measurement model was conducted by evaluating convergent and discriminant validity. Three indices were used to test convergent validity. First, by assessing factor loading, each item loading of the construct should be greater than 0.50 to achieve convergent validity (Hair et al., 2006). Second, the value of Average Variance Extracted (AVE) that should exceed 0.50 was tested. Third, the value of composite reliability (CR) of each item, that should be greater than 0.7, was examined (Hair, Hult, Ringle, & Sarstedt, 2014). The results of convergent validity determination for the questionnaire items are displayed in Table 1.
Table 1. The convergent validity results

<table>
<thead>
<tr>
<th>Construct</th>
<th>Items Measurement variables</th>
<th>Loadings</th>
<th>CR</th>
<th>AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attitude</strong></td>
<td>AT1  I feel confident in using MOOC.</td>
<td>0.800</td>
<td>0.934</td>
<td>0.639</td>
</tr>
<tr>
<td></td>
<td>AT2  I enjoy using MOOC for my studies.</td>
<td>0.818</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AT3  I believe that MOOC gives me the opportunity to acquire new knowledge.</td>
<td>0.778</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AT4  I believe that MOOC enhances my learning experience.</td>
<td>0.817</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AT5  I believe that convenience is an important feature of MOOC.</td>
<td>0.760</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AT6  I believe that MOOC increases the quality of learning because it integrates all forms of media.</td>
<td>0.775</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AT7  I believe that adopting MOOC allows for increased student satisfaction.</td>
<td>0.797</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AT8  I believe that studying courses that use MOOC is interesting.</td>
<td>0.812</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AT9  In my MOOC learning experiences, the courses content is up-to-date.</td>
<td>0.641</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Course quality</strong></td>
<td>CQ1  In my MOOC learning experiences, learning outcomes for the course are summarized in clearly written, straightforward statements.</td>
<td>0.791</td>
<td>0.863</td>
<td>0.678</td>
</tr>
<tr>
<td></td>
<td>CQ2  In my MOOC learning experiences, courses are designed to encourage learners to work together utilizing problem-solving activities to develop topic understanding.</td>
<td>0.833</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CQ3  In my MOOC learning experiences, the course content is communicated well.</td>
<td>0.846</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Information quality</strong></td>
<td>IQ1  I believe that MOOC system provides me with the outputs that I need.</td>
<td>0.783</td>
<td>0.881</td>
<td>0.649</td>
</tr>
<tr>
<td></td>
<td>IQ2  I believe that information (i.e. learning materials) from the MOOC system is in a form that is readily usable.</td>
<td>0.822</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>IQ3  I believe that, MOOC system provides information (i.e. learning materials) that is easy to understand.</td>
<td>0.809</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>IQ4  I believe that information (i.e. learning materials) from the MOOC system is concise.</td>
<td>0.808</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>System quality</strong></td>
<td>SQ1  For me, the MOOC system is easy to use.</td>
<td>0.799</td>
<td>0.894</td>
<td>0.629</td>
</tr>
<tr>
<td></td>
<td>SQ2  For me, the MOOC system is easy to manage.</td>
<td>0.806</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SQ3  For me, MOOC system meets my expectations.</td>
<td>0.840</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SQ4  For me, MOOC system includes necessary features and functions for my study.</td>
<td>0.812</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SQ5  For me, all data within MOOC system is fully integrated and consistent.</td>
<td>0.701</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Service quality</strong></td>
<td>SRQ1  In my MOOC learning experiences, the instructors are good to learners.</td>
<td>0.844</td>
<td>0.875</td>
<td>0.639</td>
</tr>
<tr>
<td></td>
<td>SRQ2  In my MOOC learning experiences, the instructors are friendly to learners.</td>
<td>0.841</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SRQ3  In my MOOC learning experiences, the instructors are knowledgeable enough about the content.</td>
<td>0.807</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SRQ4  In my MOOC learning experiences, the instructors are available via e-mail, phone or fax.</td>
<td>0.696</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Self-Regulated Learning</strong></td>
<td>SR1  I know what I am going to achieve in this MOOC course.</td>
<td>0.712</td>
<td>0.914</td>
<td>0.57</td>
</tr>
<tr>
<td></td>
<td>SR2  I have set aside time to study the MOOC course.</td>
<td>0.727</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SR3  I have high standards for my work on this MOOC course.</td>
<td>0.788</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SR4  I have set targets for all I want to achieve in this MOOC course.</td>
<td>0.772</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SR5  I have written down the goals I plan to achieve by the end of this MOOC course.</td>
<td>0.744</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SR6  I work strategically to prioritize tasks to help me achieve my learning goals in MOOC course.</td>
<td>0.773</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SR7  I am prepared to tackle any challenging aspects of the work in this MOOC course.</td>
<td>0.738</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SR8  I have planned ahead in order to devote the necessary time to my online studies.</td>
<td>0.782</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SR9  I find a good time to study when I won’t be distracted.</td>
<td>0.774</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SR10 I choose my study location in order to avoid distractions.</td>
<td>0.824</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SR11 I find a comfortable place to study.</td>
<td>0.851</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SR12 I choose an appropriate place to work in order to study effectively.</td>
<td>0.793</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SR13 I plan to use the interactive communication channels provided to gain support from peers and tutors.</td>
<td>0.760</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SR14 I plan to participate in the course discussion forums in order to get the most out of the course.</td>
<td>0.813</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SR15 While engaging in this course, I will reflect on my study in each module.</td>
<td>0.849</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SR16 I will be proactive in engaging and reviewing progress in the learning path I select.</td>
<td>0.808</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
As shown in Table 1, the factor loadings for all factors were all higher than 0.6, and the AVE values were also above 0.5. The composite reliability (CR) for the factors were 0.8 and higher, suggesting good convergent validity.

Next, the discriminant validity of the model factors was established. Discriminant validity is the degree to which measurement items of a specific factor reflect that factor instead of other factors in the same model (Hulland, 1999). In this study, the new HTMT criteria using PLS was conducted to check for lack of discriminant validity. HTMT discriminant validity between two constructs is established when the HTMT 0.85 value is less than 0.85 (Kline, 2011), or HTMT 0.90 value is less than 0.90 (Gold, Malhotra, & Segars, 2001) when the confidence interval has a value of one (Henseler, Ringle, & Sarstedt, 2015). The Heterotrait-Monotrait (HTMT) Analysis is shown in Table 2.

### Table 2. The Heterotrait-Monotrait (HTMT) Analysis

<table>
<thead>
<tr>
<th></th>
<th>AT</th>
<th>CQ</th>
<th>IQ</th>
<th>SRL</th>
<th>SRQ</th>
<th>SQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CQ</td>
<td>0.836</td>
<td>Cl.90 (0.786, 0.883)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IQ</td>
<td>0.800</td>
<td>Cl.90 (0.748, 0.894)</td>
<td>Cl.90 (0.724, 0.862)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SRL</td>
<td>0.715</td>
<td>Cl.90 (0.662, 0.770)</td>
<td>Cl.90 (0.693, 0.821)</td>
<td>Cl.90 (0.575, 0.717)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SRQ</td>
<td>0.650</td>
<td>Cl.90 (0.572, 0.723)</td>
<td>Cl.90 (0.682, 0.831)</td>
<td>Cl.90 (0.684, 0.811)</td>
<td>Cl.90 (0.583, 0.712)</td>
<td></td>
</tr>
<tr>
<td>SQ</td>
<td>0.769</td>
<td>Cl.90 (0.704, 0.822)</td>
<td>Cl.90 (0.709, 0.837)</td>
<td>Cl.90 (0.820, 0.922)</td>
<td>Cl.90 (0.534, 0.676)</td>
<td>Cl.90 (0.653, 0.783)</td>
</tr>
</tbody>
</table>

Note: SQ: AT: attitude; CQ: course quality; IQ: information quality; SRL: self-regulated learning; SRQ: service quality; system quality.

The findings of the analysis revealed that there is no value of 1 for the confidence interval of the factors and all values passed the HTMT value of 0.90 tests. This result therefore showed no discriminant validity issues.

### Analysis of the Structural Model

The purpose of this analysis is to confirm or reject the proposed hypotheses. Hair, Anderson, Tatham & Black (1998) noted that the structural model must involve set of relationships between factors of the hypothesized model. The structural model was evaluated according to the following criteria:

#### Coefficient of Determination ($R^2$) and Predictive Relevance ($Q^2$)

The R-square value ($R^2$) indicates the amount of variance corresponding to the dependent variables while the quality of the structural model is evaluated using ($Q^2$) to examine the predictive relevance for the structural model (Tenenhaus, Vinzi, Chatelin, & Lauro, 2005). Table 3 displays the values of $R^2$ and $Q^2$. 

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8
According to Table 3 the R2 value is 0.563, meaning that all five factors (system quality, information quality, service quality, attitude, and course quality) explain 56.3% of the variance in self-regulated learning. Since the value of R2 = 0.563 was between 0.67 and 0.33, a moderate model is suggested (Chin, 1998).

The Q2 analysis applies to the endogenous constructs that represent reflective measurement (Hair et al., 2014). Hair et al. (2014) noted that a Q2 value greater than zero showed that the model has sufficient predictive relevance for the endogenous construct. Table (3) showed that the model has adequate predictive relevance because the Q2 values for SRL (Q2=0.220) > 0 and also displayed medium predictive relevance where SRL (0.220 > 0.15) (Hair et al., 2014).

Path Coefficients

Path coefficients indicate the strength of a relationship between two variables in the structural model (Cohen, 1988). In this section, a Bootstrapping technique with 5,000 resamples was used to obtain a resulting beta (β) value and t-values and to evaluate the significance of the hypotheses of the study as recommended by Chin, Marcolin, and Newsted (2003). Table 4 displays the bootstrapping results.

Referring to Table 4, the predictors of self-regulated learning: service quality (β = 0.168), attitude (β = 0.328), and course quality (β = 0.205) were all significantly associated with SRL (p < 0.01), so H3, H4, H5 were supported. System quality (β = -0.094) and information quality (β = 0.078) were not significant (p > 0.05), so H1 and H2 were not supported.

Effect Sizes (f²)

Effect size (f²) is used to assess a change in the R2 when a particular factor is removed from the model. The cutoff values of effect size are: 0.02 small effect, 0.15 medium effect, and 0.35 large effect (Cohen, 1988; Henseler et al., 2009). The results for f² are shown in Table 5.
Table 5. Results of the $f^2$ effect sizes

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Relationship</th>
<th>Effect Size ($f^2$)</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>SystemQ -&gt; SRL</td>
<td>0.007</td>
<td>No effect</td>
</tr>
<tr>
<td>H2</td>
<td>InfoQ -&gt; SRL</td>
<td>0.005</td>
<td>No effect</td>
</tr>
<tr>
<td>H3</td>
<td>ServiceQ -&gt; SRL</td>
<td>0.024</td>
<td>Small</td>
</tr>
<tr>
<td>H4</td>
<td>Attitude -&gt; SRL</td>
<td>0.080</td>
<td>Small</td>
</tr>
<tr>
<td>H5</td>
<td>CourseQ -&gt; SRL</td>
<td>0.040</td>
<td>Small</td>
</tr>
</tbody>
</table>

With reference to Table 5, the effect sizes of H3 were: Service quality -> SRL ($f^2 = 0.024$), H4: Attitude -> SRL ($f^2 = 0.080$), and H5: Course quality -> SRL ($f^2 = 0.040$), all relationships exhibited small effect sizes. However, the effect sizes for H1: (System quality -> SRL), and H2: (Information quality Q -> SRL) had no effect sizes.

In summary, the results for the research model used showed that all factors satisfied the criteria of both the measurement and the structural model, so the proposed model is reliable and demonstrates adequate validity.

**DISCUSSION**

**The Relationship between System Quality and Self-Regulated Learning in MOOC**

Contrary to other researchers (e.g. Liaw & Huang, 2013; Zhao, 2016), the result of testing (H1) showed that the influence of system quality on SRL was not supported, indicating that the quality of system features such as ease of use, ease in learning, user expectation of the system, system features, and integration does not influence students’ SRL skills.

A possible explanation may be related to students’ limited experiences with MOOC, since it is a relatively new field in Malaysia context (Nordin, Norman, & Embi, 2015). Analyses of demographic data indicated that 41.3% of the respondents were new to the MOOC environment compared to other e-learning systems. Its features and the way it is conducted may have seemed quite complicated to novice MOOC students, and as novice users they might have experienced problems in navigating the content, activities, and assessments in MOOC.

It therefore seems that not all MOOC students may have the skills necessary to use all MOOC features and participants may also have had confidence issues in using this new technology. Since students new to MOOC tend have obstacles in management of MOOC resources (Kop, 2011), it is suggested that MOOC lectures should provide university training for students to help them acquire the essential skills they need during the MOOC learning and teaching processes.

**The Relationship between Information Quality and Self-Regulated Learning in MOOC**

The findings of the study concluded that the hypothesis regarding influence of information quality on SRL (H2) was not supported, and result from testing the hypothesis indicated that more availability and understandability of MOOC information would not increase the level of students’ self-regulated learning skills in MOOC. The result of this hypothesis testing was not consistent with some other studies conducted in the e-learning system field (e.g. Liaw & Huang, 2013; Zhao, 2016).

One possible justification for the non-significant result of this hypothesis is that students have had problems dealing with the volume of information delivered to them via MOOC. This information includes course content, resources, materials, learning activities, and assessments. If these large bundles of information were not well designed, students may become overloaded with information and be unsure as to which should be prioritized.

Rai and Chunrao (2016) provide an example describing the amount of homework required for a MOOC course entitled Introduction to Computing with Java course offered on edX by Hong Kong University of Science and Technology. The course included 6 lab exercises, 26 problem sets, a final project, and a final exam. The feedback from students indicated that the collective course content and activities were too much for them and overburdened them as MOOC learners.
Consequently, to increase students’ self-regulation toward learning via MOOC, it is important for instructors to provide support in terms of guidance and help in navigating the learning content, activities and assessments (Lee & Lee, 2008). It also is best to deliver highly relevant information to the students and align it with the learning objectives of the course to enhance their ability to organize and regulate their learning processes in MOOC.

The Relationship between Service Quality and Self-Regulated Learning in MOOC

The results of this study showed that the influence of service quality on SRL (H3) is supported. This indicated that MOOC service quality, including quality of both instructor support and institutional support, can affect students’ SRL skills and improve their effectiveness in MOOC participation and their ultimate success in MOOC learning. For example, the reliability of the MOOC system with respect to answering students’ enquiries, and the ability of MOOC in delivering lectures, materials, and feedback to students within a reasonable timeframe, can enhance the students’ SRL skills and improve their learning using a MOOC system.

Since several researchers (e.g. Liaw & Huang, 2013; Zhao, 2016) shared similar findings, it is recommended that instructor and institutional support must be considered as key factors for improving self-regulated learning among MOOC students.

The Relationship between Attitude and Self-Regulated Learning in MOOC

The findings of the study concluded that the influence of attitude on SRL (H4) was significant. In other words, a positive student attitude towards MOOC contributes to an improvement in SRL skills, thereby impacting learning success.

A possible explanation for this finding might be that the positive impression of students toward MOOC activities, such as feeling confidence, enjoyment, and interest in using MOOC, may lead to improvements in their self-regulated learning skills. These skills would include the ability to independently organize and plan the learning process, to set learning goals, and to identify effective ways to learn.

The results from hypothesis (H4) are consistent with studies conducted by Kramarski and Gutman (2006), and Zimmerman and Schunk (2001) who found that student attitudes influence their self-regulated learning in e-learning. Researchers such as Presley and Presley (2009), and Hammoud (2010) indicated that student attitudes contribute significantly to successful e-learning implementation.

The Relationship between Course Quality and Self-Regulated Learning in MOOC

Testing hypothesis H5 showed that the influence of course quality on SRL was significant. This finding provided evidence that aspects of quality content such as design, appropriateness of outputs, and ease of understanding of course materials played important roles in supporting SRL skills in a MOOC learning environment.

The significant relationship between course quality and SRL indicated that success in MOOC depends on high-quality course design, its content, and ease of understanding the learning materials. The finding of this hypothesis is supported by studies such as those by Hassanzadeh et al. (2012); Owens and Price (2010); and Sun, Tasi, Finger, and Chen (2008), who indicated that content quality factor has a direct impact on the success of learning in online environments.

The quality of course content is one of the most crucial elements motivating learners around the world to join and engage in MOOC platforms (Yousef, Chatti, Schroeder, & Wosnitza, 2014). An excellent course design will contribute to make students more independent in organizing and planning their learning process and encouraging them to set learning goals, identify effective ways to learn, and achieve success in MOOC learning. Lin, Lin, and Hung (2015) argue that the perceptions of learners toward the quality and richness of MOOC course content have a significant influence on accepting the knowledge.

It is therefore suggested that MOOC developers and instructors should ensure that MOOC materials are easy to understand, and that only high-quality content is to be presented in high-quality format to establish real opportunities for students to become more responsible learners via MOOC.
CONCLUSION

Several studies have highlighted the vital role of self-regulation skills in MOOC (Hood et al., 2015; Kizilcec et al., 2016; Littlejohn et al., 2016; Onah & Sinclair, 2017). Since learners with a higher degree of self-regulated learning are more likely to succeed, developing self-regulated learning abilities in MOOC is a key factor in achieving successful learning in a MOOC environment. While online courses have been found to be favorably regarded by students who have acquired self-regulated learning skills (You & Kang, 2014), research studies related to supporting students to enhance their self-regulated learning skills while learning in a MOOC environment are quite limited. This study, therefore, contributed to closing the gap in the current literature by examining six main factors that influence students’ self-regulated learning skills in MOOC environments, and the findings add insight on how to create a successful MOOC environment to support self-regulated learning.

Based on the study’s results, the empirical findings indicate that improvement of service quality, attitude, and course quality is very important for promoting self-regulated learning in MOOC environments. In other words, creating self-regulated MOOC environments should build effective interactive learning environments in which these three factors would be carefully considered.

The results of this study are supported by several MOOC study findings that showed the effectiveness of SRL on MOOC (Magen-Nagar & Cohen, 2016). For instance, the result of study by Littlejohn et al. (2016) found that MOOC learners who reported high-level of SRL skills were apt to have more flexibility in their approach to learning and determined their learning paths by themselves.

In sum, this study has investigated the influence of five factors – system quality, information quality, service quality, student attitude and course quality – on students’ self-regulated learning skills in a MOOC environment. Thus, this paper extends existing research on SRL to a newer form of learning – MOOC. Future study is hoped to explore the influence of other factors especially psychological aspect on students’ SRL in MOOC. It is also suggested that future study to expand the scope of such research into cross-country and culture comparison to better understand how best to support learning in a MOOC environment.

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REFERENCES


WHATSAPP AS A TOOL FOR SUSTAINABLE GLOCAL LINGUISTIC, SOCIAL AND CULTURAL INTERACTION

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ABSTRACT
As a popular social media application, WhatsApp has become an integral part of daily lives of many people on earth. Researchers have investigated the individual, social and pedagogical benefits of the tool. However, the possible contributions of WhatsApp as a platform for cultural interaction in the glocal sense has not been examined yet. To call attention to this dimension of the tool, this case study aims to investigate the role of WhatsApp in maintaining glocal linguistic, social and cultural interaction among a group of foreign learners of Turkish. The participants had a three-week summer school experience in Turkey where they formed a WhatsApp group for communication. After returning back to their home countries, these participants continued their interaction with their friends through the WhatsApp group. The data for this study were collected through open-ended questions. The results of the content analysis revealed that WhatsApp was an effective application to promote the maintenance of glocal cultural interaction among the participants with its personal, social and linguistic contributions. The participants could have the chance to exchange ideas and increase their perspectives and knowledge as global citizens while preserving their cultural and national identities as local citizens. Their interactional experiences through WhatsApp can be said to have helped the participants increase their awareness and expand their intercultural knowledge from the glocal stance.

Keywords: WhatsApp, glocal interaction, cultural interaction, foreign learners of Turkish.

INTRODUCTION
Stunning developments in technology have exerted their influence on different areas of human life including education. As technology has become an integral part of daily life with a growing number of users, it has become inevitable to see the profound effects of technology in the educational arena. Especially considering the recent student profiles whom Prensky (2006) defines as “digital natives” (p.9), teachers have become more willing to benefit from technology in different forms more than ever. Since technological devices, computers and mobile phones in particular, are increasingly utilized as educational tools, the concepts CALL (Computer Assisted Language Learning) and MALL (Mobile Assisted Language Learning) have been introduced in educational field. Within this context, mobile technology is frequently preferred and integrated in the process of education, also covering language education, because of discernible benefits it brings along with itself. Stockwell and Hubbard (2013) point at three main areas of advantage in mobile technology integration: physical advantage referring to the portable nature of mobile devices; pedagogical advantage which is about the dynamic educational interaction between teachers and learners and psycho-social advantage which supports the personal and social interactions of users. In this sense, the social media applications available through smartphones can also be said to offer the above mentioned benefits.

Social media applications, which are defined as “a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0 and that allow the creation and exchange of user-generated content” (Kaplan & Haenlin, 2010, p.63), have become popular, especially in the last decade, as tools used among the world citizens for different purposes ranging from social or personal interaction to education. There are various applications with regular users like Facebook, Twitter, Instagram, Blogs, Wikis and WhatsApp. The foremost benefit coming along with these applications is the advantage of skipping time and place limitations (Berge & Muilenburg, 2013; Ishtawaiwa, 2014; Sundgren, 2017). In other words, these applications enable users to go beyond temporal and contextual boundaries. Regarding mobility and interaction...
as other benefits, Li (2008) comments that these tools center on “the mobility of the learning practice, and emphasizes the interaction between the learner and the learning content, peers or the instructors” (p.694).

As these tools have become an integral part of education, researchers have focused on diverse issues of investigation regarding the integration of these tools in education: experiences with mobile learning (Harpur, 2017; Menkhoff & Bengtsson, 2012); factors affecting social media use for pedagogical purposes (Aifan, 2015; Gyamfi, 2017; Ma & Chan, 2014); the effects of social media on educators (Al-Aufi & Fulton, 2015; Carpenter & Green, 2017); attitudes of teachers and students towards social media use (Al-Emran, Elsherif & Shaalan, 2016); attitudes of teachers towards integrating social media in education (Rezaei & Meshkatian, 2017); the effects on social media on teacher-student relationship (Gan & Balakrishnan, 2017) and review studies on the integration of social media (Aydın, 2012; Kukulska-Hulme & Viberg, 2018). Literature also presents studies conducted specifically on WhatsApp as a frequently-used social media tool. These studies have examined the integration of WhatsApp for academic purposes (Gallardo, Marqués & Bullen, 2015; So, 2016); WhatsApp as a supporting tool for parents of children with Autism (Cole, Kharwa, Khumalo, Reinle & Karrim, 2017) and WhatsApp for assessment in language education (Guler, 2017; Samaie, Nejad & Qarachooloo, 2018).

As understood from the contents of the above-mentioned studies, the integration of different social media applications in personal, social and educational arena reveal the interest of individuals to benefit from the convenience technological developments provide. However, literature lacks research on the use of social media, WhatsApp in particular as a popular internet-based communication tool supporting texting as well as audio and video messages for cultural interaction in the glocal sense. There is no study, known to the researcher examining the adoption of WhatsApp to maintain glocal cultural interaction among language learners. As the world is becoming a global village, it has become a necessity for world citizens to interact with each other through cultural sharing. This need is also felt by language learners who are expected to learn not only the target language but also its culture while still maintaining their national cultural identities. Therefore, this study aims to present a different perspective by examining the maintenance of glocal linguistic, social and cultural interaction of a group of foreign learners of Turkish through WhatsApp as an application that was commonly used by all the participants in the study.

THEORETICAL FRAMEWORK

This section presents the theoretical background of the adoption of WhatsApp for intercultural interaction in glocal scale.

Social Constructivism: Vygotsky's sociocultural theory of learning suggests that people learn with the help of their engagement in social experiences and interaction. According to Vygotsky (1978), learning is a social activity occurring through social interaction. The rationale in this theory is that cognitive change can be stimulated through social interaction. Therefore, knowledge sharing through reciprocal interactions is considered to play a key role in promoting social knowledge and developing cognition. As Bandura (1977) states, “behavior and complex learning must be explained in terms of a continuous reciprocal interaction of personal environmental determinants” (p. 11). Sharing similar perspectives with Bandura, Vygotsky (1978) proposes that higher levels of functioning are based on interaction between an individual and others and explains:

Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (interpsychological) and then inside the child (intrapsychological). This applies equally to voluntary attention, to logical memory, and to the formation of concepts. All the higher functions originate as actual relationships between individuals (p. 57).

The objective of social constructivism can be summarized as a form of knowledge sharing which relates “individual and social knowledge to form a potential team knowledge” (Chou, 2005, p.271). Therefore, constructivism can be said to underline the essential nature of collaboration.

Collaborative Learning: Within the concept of Zone of Proximal Development, Vygotsky (1978) proposes that a learning environment promoting collaboration is essential for constructive learning. In this sense, collaborative learning can be considered as a way to meet the demand for social help which is necessary for the transmission of knowledge in a dynamic and constructive process. This type of learning brings the unique characteristics of each learner and centers on their contributions to the process. Swain (1995) notes
that this form of collaboration promotes natural learning. Collaborative learning encourages learners to share their knowledge and ideas to foster further internalization and creativity. In such a context, learners can be more encouraged to contribute to the process to learn more.

**Technology Acceptance Model:** Developed by Davis (1989), this model is about how users accept and adopt computer-based technology. The model explains that there are different factors influencing users to decide whether to use the technology or not. Two foremost factors of the model are the Perceived Usefulness, which is the perception of the user regarding the benefits of using the system, and Perceived Ease of Use, which is about easiness of using the system without experiencing physical and cognitive burden (Davis, 1989). This model also holds the view that the attitudes of users towards new systems affect their acceptance of the model.

Based on the above-mentioned theoretical framework, several conclusions can be reached concerning the adoption of WhatsApp in maintaining glocal cultural interaction. From the social-constructivist stance, WhatsApp can be said to offer chances for social interaction to its users through which they can share ideas and experiences in reciprocal relations. Taking collaborative learning into account, users of this application can provide help and scaffold each other in a natural context of interaction. Based on the Technology Acceptance Model, one can observe the huge number of WhatsApp users worldwide and the increase in number day by day.

**LITERATURE REVIEW**

Coming along with the constant developments in technology, the integration of social networks in the field of education has attracted growing attention. Therefore, researchers have focused on this aspect from different dimensions. Dividing them according to their focus, this section presents studies on social media applications integrated in education.

The factors affecting social media use for social and pedagogical purposes have been one of the areas of interest among researchers (Asiedu & Badu, 2018; Briz-Ponce, Pereira, Carvalho, Juanes-Mendez & García-Penalvo, 2017; Gyamfi, 2017; Ma & Chan, 2014). Ma and Chan (2014) aimed to examine the factors influencing the online knowledge sharing behaviors of 299 high school students in Hong Kong. The results of the survey revealed that the perceived online attachment motivation and online relationship commitment positively influenced the participants’ knowledge sharing decisions. Working with 160 medical students in Portugal, Briz-Ponce, et al. (2017) found that the participants had positive views towards the adoption of mobile technology for educational purposes and the ease of integration was the main effective factor. In Ghanaian context, Gyamfi (2017), as a result of questionnaires, concluded that perceived usefulness and technological complexity were the main factors influencing 254 geography student teachers’ acceptance of Web 2.0 technologies. Asiedu and Badu (2018) reported that the factor affecting 204 sociology students’ attitudes were chances for keeping in touch and maintaining distance relationships.

Research has also focused on the attitudes and experiences of students and teachers towards the integration of mobile technologies and social media tools (Al-Emran, et al., 2016; Gallardo, et al., 2015; Menkhoff & Bengtsson, 2012; Rezaei & Meshkatian, 2017). In a case study design, Menkhoff & Bengtsson (2012) investigated the pedagogical effects of mobile learning tools in undergraduate courses in China and Singapore. The results showed that communication technologies and social media platforms add pedagogical contributions as they enhanced educational process. Collecting data from 383 students and 54 instructors in five universities in Oman and United Arab Emirates through questionnaires, Al-Emran, et al. (2016) concluded that while the participants held positive attitudes towards mobile technologies; gender, age, smartphone ownership and level of study were the general factors affecting their attitudes. Rezaei and Meshkatian (2017) examined the perceptions of 46 Iranian ELT teachers regarding social media in teaching. The results of the survey pointed at the positive attitudes of the participants and their awareness of the pedagogical benefits of social media in teaching.

Another focus in research was on the effects of social networking tools on the professional practices of teachers (Al-Aufi & Fulton, 2015; Carpenter & Green, 2017). In a cross-institutional study, Al-Aufi and Fulton (2015) sent an online questionnaire to 382 academicians in Ireland and Oman. The analysis pointed mainly at the scholarly informal communication as the benefit of networking tools. Reaching 240 teachers from nine countries through an online survey, Carpenter and Green (2017) found that they adopted Voxer, a messaging tool, for professional learning and benefitted from it as educators.
Literature also presents studies specifically focusing on WhatsApp as a social media application (Aburezeq & Ishtaiwa, 2013; Malhotra & Bansal, 2017; Rambe & Bere, 2013; So, 2016). Investigating the perceptions of pre-service language teachers regarding the effect of WhatsApp on their instructional interaction in the United Arab Emirates, Aburezeq and Ishtaiwa (2013) concluded, from the analysis of interviews and WhatsApp posts, that WhatsApp positively affected teacher-student and student-student relationship and enriched instructional content. Conducting in-depth interviews with 20 university students in Catalonia, Gallardo, et al. (2015) examined the digital technology adoption in their social and academic lives. The results revealed that WhatsApp was the most frequently used tool as it enabled the participants to have easy contact and communication and share social and pedagogical interests with others. Conducting a case study with 95 undergraduates in a South African university, Rambe and Bere (2013) reported that WhatsApp had the potential to promote education offering chances for student collaboration. In an experimental study with 61 undergraduate students in Hong Kong, So (2016) investigated the use of WhatsApp to support education. The intervention of WhatsApp in offering additional materials and further teacher-student interaction was observed to positively affect the perceptions of the participants and their learning. Examining the level of adoption of WhatsApp for academic purposes by 100 post-graduate and 100 undergraduate students in India, Malhotra and Bansal (2017) concluded from the results of the questionnaire that post-graduate students were using the application for academic purposes more than the undergraduate students. Examining the benefits of WhatsApp from a different perspective, Cole, et al. (2017) carried out a phenomenological study with parents of children with Autism. The results of the interviews with six participants revealed the additional support for these parents provided through their WhatsApp groups.

WhatsApp was examined also as a source of assessment in education (Guler, 2017; Samaie, et al., 2018). Working with two groups of undergraduates in Turkish context, Guler (2017) aimed to examine WhatsApp as a tool for peer assessment. The researcher noted that WhatsApp was a valid tool for peer assessment and the participants had positive attitudes towards the application. Samaie, et al. (2018) collected data through think-aloud protocols, questionnaire and interviews to investigate the adoption of WhatsApp as a tool for self and peer assessment by 30 Iranian learners of English. Unlike the ones in Guler’s (2017) study, the results pointed at the negative attitudes of the participants towards WhatsApp as an assessment tool.

There are also some studies, though not many in number, evaluating the social network tools in terms of intercultural communication. Researchers considering Second Life as a virtual learning environment stated that this application can foster intercultural literacy and increase the cultural awareness and competence of users (Diehl, 2008; Wang, Song, Stone & Yan, 2011). As Internet based tools, blogs were also referred to contribute to intercultural competence and enhance intercultural interaction (Hauck & Youngs, 2008; Lee, 2011, 2012).

In the light of these studies, it can be concluded that social networks have attracted attention as personal, social and pedagogical tools as they offer opportunities for easy access, communication and sharing. Though literature presents studies on the contributions of these networks in terms of providing interactional and intercultural communication, there is a gap in literature regarding research on the adoption of these networks for intercultural interaction from glocal perspective. Therefore, this study is purposed to offer a new perspective focusing on the maintenance of glocal interaction through WhatsApp.

GLOCAL INTERACTION

In the modern world, globalization holds a significant place in the discussion of many issues ranging from economy to international trade, from politics to tourism and from science to education. In this context, the underlying reason for the essential place of globalization can be said to be the interdependence of all world nations. Especially with the help of technological advancements, the world has become a global village in which world citizens can have closer ties in economic, social, cultural and educational arena (Juergensmeyer, 2013). Yet, a closer examination of this global interconnectedness reveals that there is an unbreakable unity between what is global and local. In this sense, the concept glocal has been introduced to refer to the unity of local with global which can be considered as a combination of locals because it naturally includes what is local, regional and national (You, Kim & Lim, 2016). Therefore, in glocal context, people with different backgrounds are expected to share their local values to contribute to the richness of the global whole, which is called glocalization. Glocalization appeared as a concept related to local localization, local conditions and farming techniques in Japan (Robertson, 1995). In time it has started to gain relevance in other fields of human life. When education is the case, it entails the conceptualization of the learning environment to include a sociocultural
framework representing the co-existence of individuals from different nations, cultures, religions and ways of life. Formal education can be seen as becoming increasingly glocalized (Willems & Bossu, 2012) with the internationalization of higher education in certain countries of the world. In countries where glocalization in higher education is taken seriously, universities have begun to be seen as spearheads of glocalization (Ross & Lou, 2005). Glocalization is also examined in language and education (Joseph & Ramani, 2012).

Educational settings, especially universities hosting international students coming from different countries, are ideal spaces for glocal sharing and interaction. Students following their undergraduate or graduate studies in these institutions are forming a glocal atmosphere in which they can learn about different cultures, develop their linguistic knowledge and develop themselves as social beings. The glocal stance enables them to share an international environment while preserving their national, linguistic and cultural identities. When educational institutions are considered through glocal sense, the importance of the cultural dimension becomes more apparent (Khondker, 2013).

METHODOLOGY

This study adopted exploratory case study design (Yin, 2014) with an aim to examine the effectiveness of WhatsApp for the maintenance of glocal cultural interaction. This design promoted an in-depth understanding of participants’ experiences (Bogdan & Biklen, 2007) and it served for the purposes of further investigation on the issue under discussion. Therefore, through exploratory case study design, this research was intended to examine glocal linguistic, social and cultural interaction through WhatsApp as the medium of glocal interaction in this study because it was the particular social media tool that was commonly used by all participants.

Participants and Research Context

The participants were twelve foreign learners of Turkish from five different countries (Iran, Kosovo, Azerbaijan, Algeria and Egypt). These participants had a three-week summer school experience in Turkey and were engaged with the target culture and the cultures of other participating friends while continuing their language education. In such a context, they had the chance to be exposed to the target culture and to the cultures of the other participants and to introduce their own culture at the same time. In this way, they contributed to the formation and maintenance of glocal interaction.

During the period these participants were in the host city, a WhatsApp group was formed to maintain contact between the guest students and the host institution. The group involved the students, the instructors giving language lessons in the summer school, the director and the vice director of the institution (who was also the researcher). When the guest students turned back to their home countries, the WhatsApp group still remained active for future interaction among the students and the instructors in the host country. The interactions through the WhatsApp were based on the daily dialogues initiated either by the students or the instructors or on some instances of remembering the memories collected in their visit to the host country. Therefore, this study is based on the experiences of the participants regarding glocal cultural interaction through WhatsApp.

Data Collection Tool

The data in this study were obtained through the participants’ written answers to open-ended questions. The questions were formed by the researcher in light of the casual conversations with the participants through WhatsApp. The open-ended questions were as follows:

1. What are the contributions of the interaction through the WhatsApp group to your language development?
2. What are the contributions of the interaction through the WhatsApp group to your personal development?
3. What are the contributions of the interaction through the WhatsApp group to your social development?
4. What are the contributions of the interaction through the WhatsApp group to your intercultural knowledge and development?
5. What are the contributions of the interaction through the WhatsApp group to your glocal interaction?
These questions were prepared in Turkish as it is the target language for the participants. Two field experts (one language expert and one expert on teaching Turkish as a foreign language) were consulted in this process to increase the clarity and understandability of the questions to ensure the reliability of the instrument.

Data Collection and Analysis
Before data collection, informed consent was obtained from all individual participants included in the study. After sending their consent forms to the researcher, the participants received the open-ended questions again through their mails. As all were at C1 level of language proficiency in Turkish, they were asked to provide answers in the target language, Turkish. Since they were regularly and actively using the WhatsApp group for almost nine months, they were expected to reflect their perceptions regarding their experiences in this period. Because the answers to the open-ended questions were in Turkish, the researcher translated the comments into English. To increase the reliability of the data, a native speaker did the proofreading of the translations. Content analysis was adopted to analyze the data. Recurring codes were identified out of the comments of each participant. These codes were cross-checked among all participants’ answers in order to ensure the reliability of the analysis, revealing similar codes for each participant. Again to increase reliability of the analysis through interrater reliability, a second rater was also consulted to conduct content analysis. The Internal Rate of Return (IRR) was 82.5% for exact, 14.5% for similar and 3% for different coding, increasing the reliability of the analysis process.

RESULTS
This section presents the results obtained from the participants’ written answers to open-ended questions. The results are presented based on the open-ended questions: the contributions of the WhatsApp group to linguistic development; the contributions of the WhatsApp group to personal and social development; the contributions of the WhatsApp group to intercultural development and the contributions of the WhatsApp group to glocal interaction

The Contributions of the WhatsApp Group to Linguistic Development
There was a consensus among the written answers of the participants regarding the linguistic gains they obtained through their interactions in the WhatsApp group. They favored the maintenance of the interaction with the help of this application in terms of their language practice. As they were living in different countries in which Turkish is not the native language, they appreciated the available chances for being exposed to the language through the writings and sharing of their group friends as expressed in the below quote:

“I really like this WhatsApp group. As we are using Turkish as the medium of communication in the group, this is an enjoyable way of being exposed to the target language.”

The participants also considered the opportunities for practicing the language in the written version as an advantage for their language development. A participant stated that it was like hitting two birds with one stone; they could keep in touch with each other while practicing the language at the same time:

“This group has two main advantages, I think. We can communicate with each other and we can practice the language simultaneously. So, with single effort, we have two gains.”

The Contributions of the WhatsApp Group to Personal and Social Development
The sense of belonging was the underlying reason why all the participants considered the WhatsApp group as contributory. They expressed that they were feeling themselves more comfortable because they knew they had friends around the world with whom they could share their joy and sadness as put forward in the below comment:

“I know that I have friends from Kosovo, Azerbaijan, Algeria and Egypt. Though I may not see them in person in my future life, I believe that we can be in contact throughout our lives with the help of this WhatsApp group. Being part of this group makes me feel contended.”
The sense of belonging and sharing was also reported to increase the confidence of the participants. More than half of the participants noted that they had more confidence in themselves seeing that they could be a part of the group about whom other group members cared. The sense of being valued increased the self-confidence of the participants as social beings:

“There is an observable increase in my self-confidence with this group. I have realized that I am an important member of the group and that my friends care for me. This really makes me happy and increases my confidence.”

**The Contributions of the WhatsApp Group to Intercultural Development**

As the participants were in constant contact with each other in the group, they were sharing cultural aspects besides their personal experiences. They were, for example, sharing some events taking place on their national days, some occasions peculiar to their culture and history or sometimes important social or political developments in their countries. All these sharings were reported to contribute to the intercultural knowledge and understanding of the participants. The lack of chance to have face-to-face contact with each other did not block the participants from receiving news about each other and the events in their countries. This chance of social and intercultural contact increased the awareness and knowledge base from the intercultural perspective as reflected by a participant:

“In this WhatsApp group, there are many things we talk about including events peculiar to our own cultures. In this way, I can obtain more detailed knowledge of the cultural or national aspects in my friends’ countries. I think this is a great chance for us because the cultural information is directly coming to us without much effort to search for it.”

The chance of sharing one's cultural aspects was also regarded as an activity favored by the participants. The group provided the participants with the chance to share their own culture as well as learning about the others’. While increasing their intercultural knowledge, the participants could also reflect their national, historical and cultural peculiarities preserving their national and cultural identities. This was reported to increase the motivation of the participants in contributing to the group interaction:

“The WhatsApp group helps us in two ways: we can learn about other cultures and we can share our culture with them. To me, this is an easy and effective way to develop our intercultural knowledge while maintaining our cultural identity at the same time. I believe this is the exact way of intercultural sharing.”

**The Contributions of the WhatsApp Group to Glocal Interaction**

As also reflected in the above-mentioned comments, the WhatsApp group enabled the participants to have social and cultural sharings with each other without imposing them the social lives and cultures of other nations. The participants experienced the sense of glocal interaction in a relaxing and motivating atmosphere in which they could increase their intercultural repertoire and could preserve their own cultural identities as stated in the below quote:

“I enjoy this group because of two main reasons. First, it offers us easy contact with our friends and we learn about their national and cultural values through regular sharings. Second, while being aware of intercultural information, we can still be ourselves keeping and sharing our own national and cultural characteristics. We are not forced to change; instead, we are encouraged to develop our intercultural knowledge while maintaining our own cultural identity.”

In these group interactions, the participants were not just exposed to the information coming from their peers, which can be considered as a source of global information; they were also contributing to discussions, which is a source of local information. Therefore, the WhatsApp group offered a combination of global and local sharing, promoting glocal interaction among the participants. Appreciating the combination of two knowledge sources, a participant expressed that the content of the group sharings were motivating her to learn more about her own culture to share particulars of her culture with her friends:

“Personal, social and cultural issues constitute a large part of the content of the group sharings. As regards cultural sharing, I really want to participate in the interaction and reflect elements in my local and national culture. So, I sometimes find myself searching for the details of my own culture. I can say that this WhatsApp group increases not just my intercultural knowledge but my knowledge regarding my own culture.”
Besides communicating with their friends from different countries, the participants were also in touch with their instructors in Turkey. Being in contact with the instructors in Turkey provided the participants with the chance to receive and learn information about the target culture as well. As they were learners of Turkish, increasing their knowledge of Turkish culture was also a significant aim for these participants. Considering group interactions from this perspective, a participant expressed his thoughts with the following words:

“I believe, as learners of Turkish, we should also know about the target culture. The WhatsApp group helps us to learn more about the target culture because we are still in contact with the instructors in the host country and this is an opportunity for us not only to develop our language but to expand our cultural knowledge as well.”

All in all, these interactions actualized through WhatsApp can be said to be a source of maintaining glocal cultural interaction among the participants. In this atmosphere, the participants experienced the advantage of being in constant contact with their friends. This group helped them share both a social environment with their friends and the possibility to be aware of intercultural events. They also had the chance of sharing their cultural peculiarities, which increased their motivation to participate in group interactions. In this way, the participants could reach increased levels of awareness regarding their own culture, target culture and cultures of other nations and enhance their intercultural knowledge through their glocal cultural interactions in WhatsApp.

**DISCUSSION AND CONCLUSION**

Several conclusions can be drawn from the maintenance of glocal linguistic, social and cultural interaction through WhatsApp. These conclusions relate with the linguistic, personal and social development of the participants and the available chances they contribute to the glocal interaction to occur through this Internet tool.

The first conclusion is about the linguistic benefits of the group interactions. As language learning is a dynamic process requiring constant exposure and practice, the WhatsApp group, with its easy access, can be said to offer the participants ample chances of exposure and practice in the target language. Living in foreign contexts in which practice in the target language may not be so available (Lee, 2016), the participants could still continue practicing the target language through this tool. Considered from the social-constructivist and collaborative learning stance, there seems a connection between the linguistic development of the participants in this study and their interactions through WhatsApp. The more they interacted with each other, the more frequently they needed to use the target language. In this case, while they developed their own knowledge and competence in the target language, they also contributed to each other’s knowledge and competence.

The second conclusion is related to the personal and social development of the participants. They referred to a sense of belonging experienced through their membership in the WhatsApp group. This sense of belonging was observed to increase the self-confidence of the participants as precious individuals and to increase their motivation as they wanted to contribute to the group more with their experiences and knowledge. Similar results were also reported by Kaliisa and Picard (2017) and Samaie, et al. (2018) noting that communication among students and instructors increased the participants’ willingness to participate and engage in the interactions with increased sense of emotional and social presence. Setting out from this perspective, social connectivity (Klopfer, Squire & Jenkins, 2002) and perceived relationship commitment (Ma & Chan, 2014) can be evaluated as factors affecting the sense of belonging to such interactional groups. This social connectivity and perceived relationship can also be concluded to be a reflection of the social constructivist mind in that social constructivism suggests the interaction of people to promote learning.

The third conclusion has to do with intercultural development through the WhatsApp group. As the participants were from different countries, they had different linguistic, historical, social and cultural values shaping their beliefs and life styles. WhatsApp was appreciated as a tool for intercultural development as it enabled the participants to learn new things about the cultures of their friends along with the target culture. With the help of easy access to interaction, the participants could go beyond the limits of physical constraints and time limitations, which were reported as advantages also in previous studies (Miller & Doering, 2014). The participants in this study increased their cultural awareness and competence through intercultural interaction as those participants in previous studies did (Diehl, 2008; Lee, 2011, 2012; Wang, et al., 2011). Since the WhatsApp group provided them with the chance to communicate with their new friends, express
their ideas and exchange knowledge (Aburezeq & Ishtaiwa, 2013), the participants could benefit from the advantages of this platform that facilitated glocal interaction. Seo (2013) and Rambe and Bere (2013) also noted that participating in these groups can help people increase their cultural awareness and expand their knowledge through collaborative learning. This intercultural interaction among the participants was also in line with the social constructivist perspective and glocal viewpoint since they were engaged themselves in a collaborative atmosphere in which they helped each other develop their cultural understanding in the global sense while preserving their cultural identities with increasing world knowledge in the local sense.

Taking into account the fact that the participants could share their cultural peculiarities with their friends and learn about their cultural aspects, it can be concluded that the WhatsApp group served as a platform for socializing with the world. The participants were able to reflect their individual, social and cultural presence in this interactive atmosphere. They expanded their knowledge regarding cultural issues in different parts of the world as global citizens and preserved and reflected their national and cultural values as local citizens.

To conclude, citizens in the modern world are expected to keep pace with the constantly developing technologies and to integrate technological tools into their daily lives. As the world is continuously evolving and improving, people should leave the old way behind (Palvik, 2015) and follow what is modern to maintain their glocal presence. Therefore, considering the present case also from the Technology Acceptance Model, it can be suggested that WhatsApp, as a commonly used popular application, can be utilized as a platform for glocal linguistic, social and cultural interaction. As this tool offers its users the chance for time and context-free interaction with worldwide access, world citizens can make use of this application as a way to have contact with other people from different nations. In this way, people can have social and cultural exchanges with each other while keeping their national and cultural values and their identities. Such intercultural interactions can promote the maintenance of glocalization with the presence of local identities having a global mindset.

This study is not out of limitations, the number of the participants ranking first. Another limitation is related to the data collection tool. The data in this study were collected through open-ended questions. For data triangulation, future studies can adopt different data collection instruments and work with more participants.

Setting out from the conclusions of this exploratory case study, future research on the adoption of WhatsApp as a tool for glocal interaction on a linguistic, social and cultural stance can be conducted with different learner groups. This study was conducted with foreign learners of Turkish. Future research can investigate the possible contributions of WhatsApp interactions among learners of different languages. In addition, developing a survey to examine the adoption of social media with a focus on glocal interaction can contribute to the literature.

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SHOULD I STAY, OR SHOULD I GO?
REVISITING STUDENT RETENTION MODELS
IN DISTANCE EDUCATION

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ABSTRACT
Supporters of distance education highlight the many advantages of online learning as compared to face-to-face education, such as greater openness, diversity of teaching materials, adjustment to student learning styles, the speed of learning, and more. Despite the advantages, the growing number of programs, and the increased acceptance of distance education in national strategies worldwide, distance learning providers are faced with the problem of dropouts. Studies have shown that the dropout rate in distance educational programs is higher than the dropout rate in traditional programs. Understanding of the reasons and determinants behind dropping out of an educational program is a challenging task for educators, researchers, and policymakers. In this paper, we describe the main characteristics of distance education, and analyze the models that try to describe and prevent students from dropping out of these programs. Our analysis suggests that the circumstances that affect the dropout rate should be considered in the planning and implementation of distance education programs.

Keywords: Distance education, dropout, retention models, information and communication technologies in education.

INTRODUCTION
Distance education is becoming an increasingly important part of education. It deals with a growing number of educational institutions, especially those that exercise methods of training employees in companies, public administrations, and other organizations. Tait and Mills (1999) argue that distance learning has flourished so much because of the rapid economic, social, and political change, mainly due to the rapid development of information technology. The need to adapt to changes in these areas has resulted in high demand for further education. Thus, the educational institutions allow more students (or participants) to enroll into their programs; even businesses and other organizations have an easier and cheaper way to train their staff.

In the last few decades, distance education became most established in the United States, where online learning is, primarily, a first-class business opportunity that brings high profits. The US distance education market is estimated at $27 billion (Docebo, 2018, p. 4), representing a 16% share in the global market. It is also becoming a model for education, expanding in the form of so-called “corporate universities”—training enterprises, set up by large corporations, that provide training by following the educational needs of these organizations (Liu, Huang, & Wosinski, 2017).

Distance education is also finding a prominent place in the strategic documents of the European Union. The European Commission has already highlighted the potential of Information and communications technology (ICT) in reaching the EU’s basic strategic goal, namely to become the most competitive, knowledge-based society in the Lisbon Strategy (Commission of the European Communities, 2000). The role of ICTs, and ways to use them to achieve the underlying strategic goals that were later outlined in several documents: the eEurope, 2002, and eEurope, 2005, Action Plans, continued by the i2010 Strategy Paper—European Information Society, 2010. In 2009, an “Education and Training 2020” work program (ET2020)
was adapted, which should serve as a forum for the exchange of best practices, information, and advice on political reforms between Member States, the Commission, and educational institutions. The “ET 2020 Strategic Framework” covers all forms of learning at all levels of lifelong learning, and it highlights education as the main drive for smart, sustainable, and inclusive growth. This initiative puts forward an open and competitive digital economy, highlighting ICT as the key facilitator of social inclusion and quality of life.

As has already been found in many studies, the dropout rate from education is a serious problem, both on a systemic and personal level. The financial aspect is certainly linked to an investment in higher education, which is mostly publicly funded in the EU (OECD, 2017). Of course, we must emphasize that financial costs are only part of all “costs” of the dropout rate. More important, and often more persistent, are the emotional/affective consequences of discontinuing education. These are more difficult to measure, but they are more important from the point of view of the individual.

Our emphasis in the article will be that dropping out is a multi-dimensional phenomenon, and that before introducing various measures it is necessary to, first, adequately define it, and then to analyze the causes that lead to the interruption of education. One of the most important authors who first presented the complexity of this phenomenon is Vincent Tinto (1975). Tinto emphasizes the importance of creating a good definition of drop-out, which he considers important in determining the reasons that led to it. Lee and Choi (2011), who reviewed the research in the field of dropout, also concluded that authors focus primarily on the analysis of the causes, and less on the definition of the concept itself.

Reducing student drop outs is not only important for the university leaders but, according to Tinto (2006), it is one of the most studied areas in higher education. Despite several decades of research in this area (Spady, 1971; Bean & Metzner, 1985; Carr, 2000; Simpson, 2003; Herbert, 2006), no significant progress has been made. It certainly means that it is a topic that needs to be explored further. Van Ameijde, Weller, and Cross (2016) made a step forward in this regard. The ICEBERG model, based on the analysis of empirical research, is composed of seven main principles that can help reduce early school leaving.

**GENERATIONS OF DISTANCE EDUCATION**

Online learning is the last stage of distance education development. We find the first rudiments of distance education in the early 18th century; at that time, the development of postal services and printed material allowed independent, self-directed learning for people in remote places, such as some in North America. Distance learning meant that students didn’t have to attend classical, geographically-distant educational institutions. On a larger scale, the distance education started to expand in the second half of the nineteenth century when, in the United States, Canada, Australia, Sweden, Germany, and the UK, the system of so-called correspondence education began to prosper. Methods and ways of learning were, of course, dependent on the level of education and technology development. In general, it can be said that from the very beginnings of distance education, the format developed and enforced the use of new pedagogical approaches and strategies. From the pedagogical point of view, it can be argued that distance education is mainly based on the needs of the individual learner. It emphasizes greater flexibility regarding speed, space, content, and study time. Teachers’ roles in such situations are of an advisory and guiding nature (Makovec, 2018; Simonson, Smaldino, & Zvacek, 2015).

- In distance learning, the following are particularly emphasized:
- An active and central role of the student in the learning process;
- The important role of study aids in the learning process;
- The use of different (active) teaching and learning methods;
- Communication takes place primarily in discussion forums, blogs, wikis, and e-mails.

The basic characteristics of distance education, therefore, mean that it is an educational process in which the teacher and student are spatially separated. Teaching is a process that happens remotely from the student. This removes some of the inhibiting factors imposed by traditional education, such as compulsory participation in classroom classes at a precise time, etc. This also changes the teacher’s role, primarily by providing knowledge to participants indirectly, with the help of learning aids, such as printed materials, multimedia materials, computer and web applications, and the like. At the same time, this also changes the
role of an educational institution, which has to devote more time and effort than before to the planning and production of teaching materials and to providing various forms of assistance to the participants.

Perhaps even more important than the free choice of teaching materials its advantage is to motivate students to be able to choose their way of learning. Marland (1997) believes that the active participation of students in education encourages interest in learning and, thus, contributes to a better evaluation of knowledge. In psychological theories of motivation, this principle is well known. When we speak of free choice of learning mode, we mean freedom to select different resources, time, and speed of learning, in which the participant wins a piece of true knowledge. Some have a better memory of when they hear information, some when they read aloud; still others need to sketch, get a rough overview, and later acquire knowledge. All in all, the modes of learning that are most appropriate for different individuals are countless. It is true that everyone finds their own learning style, one that allows them to make learning more efficient.

Some authors believe that the concept of distance learning can be developed only with the notion of “open” education, which will allow students to have more influence and autonomy in learning (Lee, Pate, & Cozart, 2015). Flexibility in the selection of the place of learning, the possibility of choosing the method of study, greater diversity of learning materials, dialogue, and a move towards more individual learning are also stressed (Peters, 2001). In face-to-face education, we do not have many options to choose from that guide the way we learn because the teacher must adapt to various factors (student, study requirements, the context in which learning takes place, etc.). This is precisely the advantage of distance learning; it enables the use of a wide range of methods, according to the participant's choice.

DROPOUT RATES FROM DISTANCE EDUCATION

Despite the growing number of distance education programs, and substantial interest among potential students to learn online, distance education providers are also faced with the problem of dropouts, which is one of the major concerns of organizations that provide this type of education. Studies show that the dropout rate in education programs conducted in the form of online learning, is higher than in traditional programs (Bawa, 2016; Carr, 2000; Diaz, 2002; Flood, 2002; Parker, 1999; Simpson, 2004, 2013), and studies show that they are an even more severe problem in MOOCs – Massive Open Online Courses (Gomez-Zermeno & Aleman de La Garza, 2016). High dropout rates in distance education can be seen as a weakness, but also as a special feature which should be considered in the planning and implementation of educational programs that are running in e-classrooms. Diaz (2002) believes that there are multiple factors that influence students to drop their classes, e.g. student characteristics (i.e., demographics), the quality of the class or its instruction, the course discipline, socioeconomic factors, apathy, etc. Some reasons are difficult for institutions to address (such as a lack of finance), while others that occur on a more personal level (motivation, digital skills, etc.) are within institutions' reaches and should certainly be addressed.

The issue of dropout rates and successful completion of education has been an important topic for a long time. In recent years, with the expansion of distance education, this issue gained momentum and context within studies—to understand the circumstances that lead to interruptions in education processes. Information regarding dropouts is very different. Some argue that, in some programs that are carried out as distance education, the dropout rate is around 70% to 80% (Flood, 2002). Parker (1999) states that the dropout rate is higher than 40%, Diaz (2002) believes it to be 20% to 50%, Carr (2000) that the dropout rate in education programs at a distance are 10% to 20% higher in comparison to traditional classes (Herbert, 2006). Similarly, Simpson (2013) reports that in a program that has both a distance and a face-to-face mode, graduation rates are four time higher in the face-to-face mode (Simpson, 2013, p. 106). As noted in Bawa's (2016) review of previous studies, "online courses have several social, technological, and motivational issues existing from both the learners' and the faculty's perspectives" (Bawa, 2016, p. 1).

Until recently, it was believed that the dropout rate was mainly a result of the social and economic conditions in which students live. But in recent years, there is a growing conviction that the dropout rate is also a problem of educational institutions, and that it depends on preventive measures to reduce the dropout rate. The dropout rate is ultimately also an economic problem, not just an educational one. When calculating the cost of educational and financial structures, the number of program participants is considered. If the latter is drastically reduced, the program cannot be implemented.
MODELS OF STUDENT RETENTION

In continuation, some theories and theoretical models that have dealt with the issues of dropouts will be presented. Among the most influential are Tinto's integrative model (1975), Bean-Metzner's model of student dropout (1985), Kember (1989), Rovai (2003), and Park (2007).

The “mother of all retention models” is Tinto's (1975) “Student Integration Model.” Tinto's model is based on the strategies by which institutions can increase and sustain participation in the study. Tinto (1975) points out that dropout from education is a long-lasting process, which is mainly characterized by the interaction and the congruency between an individual and the institution (where the individual gets education, sets personal goals, develops aspirations etc.), and subsequently leads to a decision to continue or abandon education. Tinto is convinced that the decisive factor that affects the progression of an individual's education is correlated with emotional connections to other students and the educational institution in which they are studying.

Despite its importance, however, Tinto’s model for the study of dropouts from distance education is not the most appropriate, since his model is designed especially with respect to the regular (face-to-face) students under 25 years of age who are living in the campus. The impact of institutional integration is less important for older participants, who are not staying in the school and, therefore, don't spend time together, or find themselves less connected to the institution. His model does not consider the impact of various external factors that are important for understanding the persistence of exceptional students in distance learning (Bean & Metzner, 1985; Rovai, 2003). Even Tinto himself has pointed out that the model should be modified when applied to part-time students (Tinto, 1975).

From the standpoint of compliance with the characteristics of adult learners, Bean and Metzner (1985) have made a step forward. They developed a conceptual model with which they tried to explain the dropouts of adult (“non-traditional”) students.
Bean & Metzner argued that the structure of support of this population is different from populations in which full-time students are involved, and that it is less linked to factors in the institutions and more to factors outside of the school environment; for example, to friends, family, or employers (Bean & Metzner, 1985). In their model, Bean and Metzner foresaw that successful completion or failure of education is caused, particularly, by factors related to previous academic achievements, as well as demographic, cultural, and socio-economic characteristics of the individual.

Despite the adaptation of this model to adult learners, Kember (1989, 1995) notes that the difference between adults who are trained in the traditional way, and adults who are learning at a distance, is too big to apply to his model of distance education. Kember (1989) complemented Tinto’s model with a new design, which is specially adapted to the conditions in which certain education takes place at a distance.
Kember (1989) proposed a longitudinal approach to examining dropout rates in distance learning. It highlights the complexity of interactions between factors like family, personal motivation, and capabilities available to complete the program, along with previous achievements and experiences in education and institutional support. Kember assumed that the participants in distance education were employed adults with families. Among the situational factors that affect their schooling, it is particularly important for a participant to take care of their family, work, and study commitments (Kember, 1989), which is a much smaller, if existent, factor for full-time students. Kember also believes that family circumstances, such as age or number of children at school age, housing conditions, or obligations arising out of the profession significantly influence decisions concerning the suspension of each study participant or participants.

Rovai (2003) proposed a “Composite Persistence Model” that builds on Tinto’s (1975) “Student Integration Model” and Bean and Metzner’s (1985) “Student Attrition Model.” His aim was to specifically address the understanding of retention in the context of distance learning, and he claims that distance education students are qualitatively different from face-to-face students in several respects, which need to be considered when trying to understand student retention in a distance education context. Rovai’s model differentiates between relevant factors prior to admission and relevant factors after admission, which influence a student’s decision about whether to persist or withdraw from study. Relevant factors prior to admission are divided into student characteristics (e.g. gender, age, level of intellectual development, previous academic achievements) and student skills (e.g. Internet skills, time management, and communication), while factors after admission are divided into external factors (e.g. money, obligations at work, family responsibilities) and internal factors (e.g. self-esteem, learning habits, school, and social cohesion).

![Figure 4. Composite Persistence Model (Rovai, 2003)](image)

More recently, Park (2007) proposed a model to serve as an upgrade to the previous ones, especially the model envisaged by Rovai (2003). She notes that the adequacy of earlier models was verified with very different research approaches, and suggests it changes depending on the empirically observed importance of various factors. In the model, she relativizes the importance of the student’s skills and divides the dimensions to those that occur “before” and “during” education (Figure 5).
Park and Choi (2009) note that despite a large number of conceptual models, there has not been much research done to empirically confirm the impact of a particular factor in the actual dropout rate from distance education. Park and Choi (2009) conducted a study in which they covered the 147 participants who had completed the training or dropped out from education in one of the programs in the Midwestern college. They have found statistically significant differences between dropout students and successful ones in how they perceived support from family and/or employer, as well as differences in satisfaction and usefulness of the program they attended (Park & Choi, 2009). The importance of factors in the theoretical model developed by Park (2007) were also tested using logistic regression. It was discovered that the included variables satisfactorily predict a greater or lesser probability of dropout from education (Park & Choi, 2009).

DISCUSSION

In the issue of drop outs, educators have two main concerns: how to identify students who drop out from education and which factors will influence drop outs. As we saw from the review of different retention models, these two questions can be answered with two main interpretations. They dictate the specific actions with which teacher or educational institutions can reduce this problem. The first explanation is more sociological, and focuses on trying to identify “objective,” situational characteristics, for example previous education, gender, age, income, social status, year of studies, assessments, etc. (e.g. Carroll, Ng, & Birch, 2013). The second explanation is concerned with more personal –psychological– characteristics that may affect persistence in the program. In his later work, Tinto (2010) distinguished between “retention” and “persistence.” The first term is limited to the perspective of the institution, and its measures to retain students in education. On the other hand, “persistence” is tied to an individual student and his or her motivation to persist in education. As it is obvious from the previous chapters, all presented models are, at their core, interactive—they include both perspectives and the strategies to reduce drop outs and increase retention. This is also confirmed by empirical research (Brewer & Yucedag-Ozcan, 2013; Yukselturk & Inan, 2006).

Related to these criteria, Yorke (2004, pp. 23–25) list the following as important determinants of student persistence:

- beliefs about self-efficacy and locus of control;
- targeting;
- practical and emotional intelligence;
- a sense of belonging to a group and educational institutions;
- attitudes;
- ability to effectively manage time and the area of study.

Various factors influence student retention, including perception of learning experiences and relationships. Although many of these factors and models are equally represented, institutions can somewhat control them.
Tyler-Smith (2006) notes that in the dropout rate of non-traditional students, for first time participants in the program of distance education, influences include sociological, psychological, technical, and cognitive factors. Cognitive load of the participant and the participant’s ability to cope are the most important. Students in distance education firstly needs to master the technology, learning environment, a new application, and a new way of communication (Tyler-Smith, 2006, p. 78). Educational organizations sometimes too quickly attribute drop outs to disruption of education, lack of motivation, or skills of the participants. Highly motivated and able participants will learn even under unfavorable conditions. Despite having access to enough suitable teaching materials, most participants will need some support in learning.

In a review of research, we found that the dropout rate in e-learning programs is of greatest importance at the beginning of the program, once the participants have just become acquainted with the virtual learning environment, teachers’ requirements, and each other. Gilly Salmon (2004) provides much useful and practical advice in connection with the introduction of the participants to distance education program. She emphasizes the need to limit the information and activities related to the content in the initial stages of the educational program. Instead, teachers should focus on activities that promote the creation of an individual’s online identity, design, and integration of learning groups, group setting rules and standards, in order to establish expectations and an understanding of rules relating to online discussions (Salmon, 2004, p. 197). She also recommends the greatest possible simplification of the initial virtual learning environment and the gradual introduction of complexity, which takes place together with the increasing use of the possibilities offered by a single (virtual) learning environment. This can be an effective way to reduce the congestion of the participants in the first stages of learning in the virtual classroom.

Several authors also suggest that the careful preparation of introductory activities in distance education is beneficial for the retention of students (Brewer & Yucedag-Ozcan, 2013; Gregori, Martínez, & Moyano-Fernández, 2018; Salmon, 2004; Van Ameijde et al., 2016). Introductory workshops, in which the students of distance education encounter a teacher face-to-face, have a very positive effect on the initial readiness and expectations of the participants, which will have all training carried out in the online class. The value of face-to-face meetings with other participants, teachers, and authors of the material is significant, as well as introductory activities taking place in the online classroom—e.g., personal presentation, a salutation, a preliminary discussion on the topic, etc. Thus, the participant is introduced progressively into more complex activities and tasks to be carried out as part of the program in which he/she participates, thereby eliminating the initial negative stereotypes or obstacles that could lead to premature abandonment of the program. Online ice-breakers are also an effective method to promote communication between course participants in a nonthreatening manner (Conrad & Donaldson, 2011).

The results also show that the reduction in the dropout rate can happen by detecting how much education is useful for the participant. Organizations that are able to motivate participants, develop exciting and stimulating materials, and improve the quality of social interaction between participants and teachers are likely to perform better in reducing dropout rates than institutions that do not put enough effort into high-quality pedagogical support. An important factor is also educational support that is given to the participant during the program (Park & Choi, 2009). The dropout rate can be reduced by appropriate counseling before inclusion in the program (identification of needs and the adequacy of program participants), and by providing adequate, prompt, and efficient counseling during the program. It is also important to create a learning atmosphere that encourages participants to seek professional help and advice from teachers and advisors, and to talk to each other. Taken together, these circumstances create a climate of support, encourage ongoing participation in the learning group, and thus maintain motivation and interest.

One recent publication that lists ten strategies to retain students is authored by Van Ameijde et al. (2016). They recognize that student retention is a complex, multifaceted issue that is the result of many contextual and/or subjective factors. However, they stress that many at-risk students could be motivated to stay the course with design-related aspects. In their model, they focus on aspects of module design that can influence retention. In their view, student retention results from a careful curriculum design that pays attention to Integration, Collaboration, Engagement, Balance, Economics, Reflection, and Gradualism (hence its name, ICEBERG).
RECOMMENDATIONS FOR FUTURE RESEARCH

The findings of our article improve our understanding of the factors that contribute to academic failures or success in distance education. As evidenced by the reviews of existing models, the drop-out factors in distance education are many, and although some progress has been made in providing feasible solutions to this issue, this phenomenon needs to be analyzed much more deeply. Wider studies should be carried out to gain a better understanding of ways to resolve issues in the field of distance education and an improvement of online classes and curricula that will benefit both pupils and teachers. Therefore, researchers are strongly encouraged to take part in scientific research in which they can study the problem of student retention more closely, using different research methodologies and larger, more diverse study programs patterns.

CONCLUSION

The research on dropouts from distance education programs is a field that is still evolving. Previous studies and reviews in this area have shown that the models which have studied dropouts in traditional (face-to-face) classes are rather deficient and inadequate. Distance education has some distinctiveness that brings new obstacles and new strategies to the fore, which can allow teachers and other educational personnel to promote learning in e-classrooms. Studies show that the measures most important for reducing student dropout rates must be enforced at the beginning of the learning process. A significant amount of new information, new online tools, and hidden features of the virtual learning environment often contribute to high dropout rates in the first few weeks of the program. Support for participants in e-education programs is crucial. Participation in distance education usually requires more motivation and effort from a student, in comparison to the self-motivation required in a face-to-face education. Skills for independent learning are also an essential requirement, but participants have often not developed them throughout the course of their previous education.

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AN EVALUATION OF CONTENT CREATION FOR PERSONALISED LEARNING USING DIGITAL ICT LITERACY MODULE AMONG ABORIGINAL STUDENTS (MLICT-OA)

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ABSTRACT

ICT in the Malaysian education system serves as a tool to accomplish the National Education Blueprint 2015-2025. Under this blueprint, privileged groups such as the aborigines or Malaysian aboriginals will be given equal opportunity in education. However, a specific classroom teaching method is required to maintain the aboriginal students’ focus and attention on their learning experiences due to their unique paradigm of learning. This study used the Partial Least Square (PLS) and Structural Equation Modelling (SEM) tool to examine the factors influencing personalised learning and digital self-learning ICT literacy module. It also measured the impact of personalised learning and digital ICT literacy module among secondary aboriginal students. This study involved 92 aboriginal students who participated in a transferable skills and ICT programme held in a public university in Malaysia. Results show that personalised learning positively supported the use of a digital ICT literacy module as a teaching and learning approach. Therefore, this study suggests that the digital ICT literacy module is an adaptive educational resource for personalised learning to meet the learning needs of aboriginal students.

Keywords: Aboriginal, Personalised Learning, ICT Module, Learning Style, digital self-learning module.
INTRODUCTION

In 1990, the Education for All (EFA) movement was initially launched by UNESCO, UNICEF, UNDP, and World Bank at the World Conference on Education For All. This global movement comprises six internationally agreed education goals to meet the learning needs; one of them is to provide equal access and opportunity to those who are unlucky, isolated, marginalised groups, and those belonging to ethnic minorities. The launch of EFA is seen as a paragon to minimise the educational inequality for aboriginal students in Malaysia. Aborigines, which literally means aboriginal people or also known as Orang Asli (Arman, 2007), is said to be Malaysia’s aboriginal inhabitants or the first native people who inhabited the Malay Peninsula before the establishments of the Malay sultanes (Mason et al., 2013). They have a variety of cultures, traditions, beliefs, and languages. The aboriginal people of Peninsular Malaysia are separated into three main tribal groups, namely Semang (Negrito), Senoi and Proton Malay (Aboriginal Malay), and consist of 19 ethnic groups (Bellwood, 1997; Nicholas, 2000; JHEOA, 2002; Nicholas, 2005; Tarmiji et al., 2013), which make up only 0.6% of the total Malaysian population (Figure 1). The zones are based on the differences in origin, speech language, and also their physical forms (Department of Statistics Malaysia, 2010).

![Figure 1. Categories of Aboriginal People ethnic groups in Peninsular Malaysia](image)

The Malaysian government has provided assistance in developing aboriginal students' education by providing educational assistance to inculcate their interest in the school system. However, there are some of them who are uncertain and refuse to continue schooling. Unlike other mainstream students, this study will also determine whether in such a situation, these communities will still be able to receive lifelong education (Hamilton, 2015) through personalised learning.

The latest developments in information and communication technology (ICT) have played an important role in education as in other areas of life (Sahin & Kisla, 2016). Similar to other communities located across the globe, issues related to the use of ICT in education are also found in aboriginal students (Wan Amir 2011; Kutay & Mooney, 2008; Eady, 2008). Innovation and transformation in any education system can only take place if practitioners and students are empowered to move beyond the confines of the traditional classroom paradigm (Boudreau, 2011). In the context of aboriginal students, the issues are related to the extent of their engagement in ICT exploration and application. Sufficient engagement is necessary for a smooth process of education transformation, which is believed to contribute to higher family income via the entrepreneurship programmes and tourism sectors developed by the government. In this context, the government has been upgrading and expanding the communication infrastructure to improve the accessibility of information for aboriginal communities (Heidi Norman, 2014; Wee et al., 2013; Kutay & Mooney, 2008; Eady, 2008).
Although facilities such as computer laboratories, the additional subject of ICT education and the provision
of ICT centres are provided; due to insufficient training, unclear explanation and promotion of ICT offered
by the centres, these facilities and services seem incapable to meet the learning needs of the aboriginal
students and support a pathway for them to attain a higher family income.

In addition, previous studies suggested that the methods and concepts taught in classrooms were incompatible
with the culture, traditions, way of life, beliefs, as well as language of the aboriginal students (Zanariah &
Fadzilah, 2011; Roman et al., 2011). It was found that most aboriginal students still had potential to drop out
from school due to boredom and lack of interest. The students became uninterested in the school curriculum
due to their own experience, as well as their parents’ and extended family’s experience which showed that
the education experience did not address their needs. Such negative education experience resulted in apathy
and lack of interest in education among the aboriginal students while their family members also did not
value the experience. Aboriginal students and their family members believed that they can still make a living
by extracting forest products for their own use and to trade (Zanariah & Fadzilah, 2011). Following the
unique characteristics and problems faced by aboriginal students, personalised learning may provide learning
experiences with more choices on how they are going to learn a lesson. It may also assist the student’s
exploration and application of ICT in education.

The next section of this paper discusses the research context and conceptual model in relation to the existing
literature on personalised learning and relational constructs such as access, delivery media, engagement,
learning environment, and reflection. For the usefulness of digital self-learning, there are three relational
constructs which are flexible learning, learning content, and assessment. This is followed by an explanation
of the research method used, an assessment of goodness of measures, the construct validity, convergent
validity, discriminant validity, and reliability of the constructs. The subsequent sections deal with data
analysis, path analysis, and hypotheses testing. The last section is on discussion and conclusion as well as
several suggestions for future researches.

RESEARCH CONTEXT AND RESEARCH MODEL

This paper constitutes the part of a larger research which examines personalised learning environment and
determines the usefulness of digital self-learning ICT literacy module for aboriginal students in Peninsular
Malaysia.

Personalised Learning

Personalised Learning (PL) has been described from multiple perspectives with various definitions and design
directions (Zhou, 2013; Henri & Charlier, 2010). PL is defined as a portable and ubiquitous learning space
that allows students to learn and connect with multidisciplinary viewpoints, engage in critical and creative
practices, as well as nurture and develop their learning identity (Che Ku Nuraini et al., 2014). According
to Grant and Basye (2014), personalised learning is a comprehensive management system that facilitates
communication, online delivery, curriculum mapping, examination, and student traffic monitoring all
inside a secure workspace that seamlessly interfaces with an institution’s administrative information system.
This is in conjunction with Boudreau (2011) who defined PL as serving flexible facilities which support
the learning community with a network of associated shared workspaces, resources, communication tools,
and specific PLs. It is expected that personalised teaching and learning will address the needs of the learners
more efficiently (Che Ku Nuraini et al., 2014; Henri & Charlier, 2010). Nowadays, students prefer more
customisable and interactive systems for their learning as highlighted by McLoughlin and Lee (2010),
who argued that digital age students wish for an active learning experience that is social, participatory, and
supported by rich media. The researchers used a grounded theory approach to uncover some core dimensions
of PLs which included subject, rules, objects, delivery media or tools, learning environment, engagement
community, and reflection. Under this subject, they identified key concepts such as access, literacy, autonomy,
and empowerment. The details of the dimensions are as mentioned below.
Access

Access dimension is about how aboriginal students access and process information. Therefore, it is also an individual’s right to obtain and use the information collected or generated by others. The aboriginal students will transform the information into useable knowledge. Here, we enclosed some access definitions by teachers, facilitators, and educators. When we asked them a question about the definition of access, their answers were all different. Some told us that the aboriginal students needed pictures illustrated with text or written step-by-step instructions. Some said they needed to do their own research online. Nowadays, learners will take place to derive their own learning and they know the best access to information which suit their learning preferences.

Delivery Media

Nowadays, educators deliver instruction through multiple forms of media. Technology has made personalised learning more approachable and challenging, forcing schools to draw a clear line about where to separate good pedagogy from tools that facilitate it (FitzGerald, 2017; Wong, 2008). If instructional materials have really become individualised to the extent that the video describes, there will be a need for someone to be present to help students navigate the technical aspects of performing the work as demanded by the system (Jordan & Duckett, 2018). Additionally, the instructor will have a role in keeping students on task and in providing support when learners fail to reach the standards pre-programmed into the adaptive learning system. There may also be an increased role in making sure that each student is completing their own work, rather than the work of peers (Sarrab et. al, 2016). Technology tools can offer a personalised learning environment in which students collaborate, interact with software and digital modules, create products, conduct research as well as communicate with others outside their schools (Moeller & Reitzes, 2011).

Learning Environment

Learning environment refers to the whole range of components and activities within the learning process. The learning environment relies on computer-supported systems such as learning management system; a combination of various educational technologies like communication module (Good & Lavigne, 2017). Besides that, a learning environment is the place where teaching and learning take place in the most effective and productive manner. With personalised learning, comes a focus on helping each student progress through a given curriculum at their own pace (Gu et al., 2017). At its best, personalised learning can shift the measure of academic progress from time spent in a classroom to competencies mastered. Differentiating instruction often means setting up students to work alone or in groups (Orlich et al., 2016).

A diverse situation may exist in the classroom at any given time. Students differ in abilities and interests, therefore teachers are most likely to employ different strategies. Teachers must be sensitive to positive or negative interactions and ought to immediately undertake an instant revision or adjustment in methodology when necessary. Overall, this PL concept refers to individual perspective to achieve learning outcomes through a conducive learning environment perspective. The smoothness of Personalised Learning (PL) in a learning domain requires the application of the correct and effective PL concept (Hwang et al., 2012; Zhang et al., 2003).

Engagement

Active students are encouraged to adapt to a personal learning environment and community. The students have different ways when it comes to how they are comfortable engaging with the content. Some teachers told their students that the best learning is by doing hands-on activities. Others stated that the students learned best by working alone and reflecting on their learning. The rest of the students expressed their need to collaborate with others. Because of these situations, a classroom proceeding also accommodates different types of learners. For instance, students who are visual learners can excel in a classroom setting where theatrical presentations, storytelling or movies contribute to the lessons. Hands-on learners may also do well in classrooms and other places (Harasim, 2017; Mike, 2014).
Reflection

A teacher provides various methods of discussion to pique students’ interest and maintain their engagement with the lesson content. For example, teachers can carry out peer discussion activities. The lesson plan is universally designed to meet the needs of diverse students to obtain meaningful learning (Council for Exceptional Children 2011; Casper & Leuchovius 2005; CAST 2009). After the learning process, the students expressed what they knew and understood. Some students felt better writing down what they learned. Others felt better creating and building things that demonstrated what they learned. The rest stated that they felt more comfortable presenting in front of others. All in all, students knew the best way to express what they understood in their learning process (Harasim, 2017).

Conclusion for Personalised Learning

The Personalised Learning concept measures five dimensions which are access, learning environment, delivery media, engagement, and reflection. Personalised learning is a term used to describe classrooms where engagement and purpose are a part of the fabric of the classroom. The different learning needs of the students are met by accommodating and personalising their education. Technology is often used to facilitate the personalisation of the student’s learning environment.

E-learning is the use of Internet technologies to enhance knowledge and performance. The e-learning technology that was developed for this research is a digital module of ICT for the Aborigines (mLICT-OA) which offers learners’ control over content, learning sequence, pace of learning, time, and often media, allowing them to tailor their experiences to meet their personal learning objectives. In diverse ICT education contexts, a digital module appears to be at least as effective as traditional instructor-led methods such as lectures.

The Use of Digital Self-Learning ICT Literacy Module

Nowadays, students choose to read and respond to their learning using digital media such as reading notes using a digital module on chat lines, Facebook, Instagram, and texting. Therefore, they acquire considerable prior knowledge and expertise in the subject matter, placing their engagement and comprehension at a high level. The tricks to being a good reader, regardless of the medium, are to engage with suitable tools, and have a flexible learning environment. The use of a digital ICT literacy module was found to be helpful for students (Alias et al., 2011). They should learn and think of ingenious ways to learn which are accessible to them. To concur with the prominence of the proficiency in using and managing digital technologies, its assessment has become the component for monitoring students’ skills and knowledge development (OECD, 2004). The assessment incorporates three aspects as mentioned below.

Flexible Learning

Flexible learning is a principle of practice in formal education, concerned with increasing flexibility in the requirements, time and location of study, teaching, assessment as well as certification (Pinter, 2017; Harasim, 2017). Offering students choices in how, what, when, and where they learn; the pace, place, and mode of delivery is steered towards flexible learning. It focuses on four areas where flexibility can be enhanced (i) Technology enhanced learning: including mobile learning, learning spaces, digital literacy, and learning analytics, (ii) Employment: including work-based and work-placed learning, flexible working, and the global context, (iii) Institutional systems and structures: including administrative, financial, and support systems, as well as academic regulations and processes and (iv) Pedagogical approaches: including learning, teaching, and assessment methods (Sarietjie & Corene, 2017; Higher Education Academy, 2017).

Learning Content

Good learning material engages learners by catering to their physical location. That means leveraging, not fighting against their consumption habits; fitting into their busy schedules; and, above all, being effective
Assessment

Educational assessment is the systematic process of documenting and using empirical data on the knowledge, skill, attitudes, and beliefs to refine programmes and improve students’ learning. Assessing students’ performance can involve assessments which are formal, low stakes, individual or collective. The key points of carrying out assessments are the teachers should set meaningful goals in their teaching and learning process where their students feel prepared to learn new material from the textbook, without classroom review, and the students’ reactions to various teaching methods, materials, and assignments.

Relationship Personalised Learning (PL) and Digital Self-Learning ICT Literacy Module (mLICT)

PL functions as an approach to develop digital self-learning modules and technologies which comprises all different tools used in everyday life for learning (Attwell, 2007). A digital self-learning module allows learners to engage in learning interactions through activities such as sharing, searching, and reflecting their peers. By selecting applications which support their personal needs, learners may potentially turn the understanding and ideas of ICT literacy into personal needs, active, and collaborative learning experience. The analysis of learning interactions also considers the learning needs which emerge during the learning process, the tools and applications that are used to support those needs, the types of learning activities, and the contexts in which the activities take place.

PURPOSE OF THE STUDY

This study aims to develop and evaluate a digital self-learning ICT literacy module for aboriginal students (mLICT-OA) in order to improve their experience and empower them through their own exercise of choice by means of personalised learning.

OBJECTIVE OF THE STUDY

The study aims to evaluate the following objectives:

i. Identifying whether personalised learning (PL) is influenced by the five attributes of access, learning environment, delivery media, engagement, and reflection.

ii. Identifying whether a digital ICT literacy module for the aborigines (mLICT-OA) is influenced by the three attributes of enrichment assessment, flexible learning and learning content.

iii. Identifying whether personalised learning (PL) is influenced by the digital ICT literacy modules for the aborigines (mLICT-OA).

To conclude, this study aims to answer the following hypotheses:

i. The Personalised Learning concept in measuring five attributes which are access, learning environment, delivery media, engagement, and reflection.

ii. The use of mLICT-OA in measuring three attributes which are enrichment assessment, flexible learning, and learning content.

iii. Personalised learning (PL) has a direct positive effect on the use of digital ICT literacy modules for the aborigines (mLICT-OA).
METHODOLOGY

The methodology contains three main elements which involves the method of data collection, instrument, sampling, and data analysis.

Data Collection

Data collection is known as the scales of measurements in research. In the levels of measurements there are types of validity which are construct, face and creation. For the purposes of this paper, data collection began in 2015 after finished the pilot study, rely on structured data collection instruments that fit diverse experiences into predetermined response categories. They produce results that are easy to summarize, compare, and generalize. This research is using questionnaire to get the data. Paper-pencil-questionnaires can be sent to a large number of respondents and saves the researcher time and money. Respondents are more truthful while responding to the questionnaires regarding controversial issues in particular due to the fact that their responses are anonymous. Questionnaire often use rating scale. A rating scale is more useful when a behavior needs to be evaluated on a continuum. They are also known as Likert scales (Leedy & Ormrod, 2001).

Instruments

Instruments are tools for collecting data. We used questionnaires to collect data. Using the questionnaire technique, we can get answers through written answers. This instruments contains three parts:

Part A - Demographic (Respondent Information) which requires respondents to identify themselves as gender, age, race, ethnicity, frequency of computer technology, program of study and student participation in the program and the use of ICT literacy. Respondents are required to provide answers related to themselves by checking the boxes provided. These are questions in the form of categories. Each item in this section is measured at the nominal level and no scoring is provided.

Part B – This questionnaire contains of 30 questions on personalized learning contains five constructs measured namely access, learning environments, delivery media, engagement and student reflection. This questionnaire was adapted from the rubric by Buchem, Attwell & Torres, 2011, p 10-11). The items are based on the theories found in Clements & Douglas (2008) and Shelton & Hedley (2002).

Part C – This part contains of 25 questions about the usability of learning modules for different students in terms of learning style. These items were developed and adapted from Mat Salleh et al. (2015). There are three attributes involved in this questionnaire: flexible learning, learning content and enrichment assessment.

The questionnaire was administered to all participants. Students were asked to respond to these items on a five-point Likert Scale ranging from “strongly disagree”, “disagree”, “little bit agree”, “agree”, and “strongly agree”.

Sampling

92 students were selected for this study among 352 aboriginal students from Kampung Orang Asli Batu 12, Gombak. The students chosen for the study had been selected by JAKOA Gombak’s secretary, based on their personality and their parents’ consent of allowing their children to attend the transferable skills programme known as ‘Program Pemindahan Ilmu Pendidikan & ICT’ which was held on March 18 and 19, 2015 in Universiti Kebangsaan Malaysia (UKM). The selection was based on the various parts of the Proto-Malays.

Data Analysis

The data from the questionnaires were analysed using the Statistical Package for the Social Science (SPSS) version 17.0. Data analysis using SPSS involves descriptive statistics. Descriptive statistics is used to demonstrate the frequency of describing respondents’ backgrounds, respondents learning styles and ICT skills. Furthermore, data analysis using Winsteps software which is a Rasch measurement model was used to ensure the validity and reliability of the built-in instrument is legitimate.
The Smart PLS 3.0 (Ringle, Wende, & Will, 2015) software is used to test the hypotheses of the relevance and impact of hypotheses (Hair et al., 2014) on personalized learning environments and self-directed learning module. In addition, PLS’s approach was a modeling technique that does not require normal scattered data (Chin & Newsted, 1999). In order to get the map of relationships among the variables, the structural equation modeling (SEM) method was applied using the Smart PLS 3.0 software. Due to the fact that the result of the multivariate test on the variable was non-normally distributed, a bootstrapping method was applied and a resample was set to 5000. The first step in SEM techniques, PLS have the ability to take into account the errors of constructs and to examine the importance of simultaneous structural models. The second step, PLS was appropriate for testing and measuring complex models. The relationship between constructs and sub-constructs were checked individually (Wold, 1982).

**FINDINGS**

**Evaluation of ICT Literacy Module and Personalised Learning Approach**

The first step in the analysis of the Partial Least Square (PLS) technique was to analyse the measurement model and to determine the extent of the indicators (specific questions) on the theoretical load which produced constructs (Joreskog & Yang, 1996). An inspection measurement model was made to ensure the items measured the designed constructs, thus ensuring that the instrument can be trusted.

**Measures and Assessment of Goodness of Measures**

A questionnaire using a five-point Likert scale was used to gather data for each construct of the research model. All instruments were adapted from previous literatures and were modified to measure the performance.

**Goodness of Measures**

The two main criteria used for testing goodness of measures are validity and reliability. Reliability is a test of how consistently a measuring instrument measures whatever concept it is measuring whereas validity is a test of how well an instrument that is developed measures the particular concept it intends to measure (Ramayah et al., 2011; Sekaran and Bougie, 2010). We used Cronbach’s alpha coefficient to assess the inter item consistency of our measurement items. Table 5 summarises the loadings and alpha values. As seen from Table 1, all alpha values are above 0.6 as suggested by Nunnally and Berstein (1994).

<table>
<thead>
<tr>
<th>Model construct</th>
<th>Measurement items</th>
<th>Cronbach Alpha</th>
<th>Loading range</th>
<th>Number of item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>AA1,AA2,AA4</td>
<td>0.600</td>
<td>0.721-0.778</td>
<td>3 (6)</td>
</tr>
<tr>
<td>Learning environment</td>
<td>AB10,AB7,AB9</td>
<td>0.725</td>
<td>0.760-0.830</td>
<td>3 (6)</td>
</tr>
<tr>
<td>Delivery Media</td>
<td>AC11,AC12,AC13,AC15,AC16</td>
<td>0.817</td>
<td>0.709-0.832</td>
<td>4 (6)</td>
</tr>
<tr>
<td>Engagement</td>
<td>AD17,AD18,AD20,AD21</td>
<td>0.787</td>
<td>0.732-0.808</td>
<td>3 (6)</td>
</tr>
<tr>
<td>Reflection</td>
<td>AE22,AE23,AE24,AE26</td>
<td>0.818</td>
<td>0.662-0.885</td>
<td>3 (6)</td>
</tr>
<tr>
<td>Flexible Learning</td>
<td>BA4,BA5,BA6,BA7</td>
<td>0.826</td>
<td>0.778-0.864</td>
<td>5 (9)</td>
</tr>
<tr>
<td>Learning content</td>
<td>BB10,BB11,BB12,BB14</td>
<td>0.828</td>
<td>0.754-0.863</td>
<td>4 (5)</td>
</tr>
<tr>
<td>Enrichment assessment</td>
<td>BC16,BC18,BC20</td>
<td>0.732</td>
<td>0.791-0.882</td>
<td>5 (9)</td>
</tr>
</tbody>
</table>

**Construct Validity**

Construct validity testifies to how well the results obtained from the use of the measure fit the theories on how the test is designed (Sekaran and Bougie, 2010). This can be assessed through convergent and discriminant validity. First, the researchers looked at the respective loadings and cross loadings from Table 1 to assess if there are problems with any particular item. The researchers then used a cut off value for loadings at 0.5 as significant (Hair et al., 2010). If any item has a loading of higher than 0.5 on two or more factors,
it will be deemed to have significant cross loadings. From Table 2, it can be observed that all the items measuring a particular construct load highly on that construct and load lower on the other constructs, thus confirming construct validity.

Table 2. Loadings and cross loadings

<table>
<thead>
<tr>
<th>Items</th>
<th>Access</th>
<th>Environment</th>
<th>Media</th>
<th>Engagement</th>
<th>Reflection</th>
<th>Flexible</th>
<th>Content</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA1</td>
<td>0.778</td>
<td>0.456</td>
<td>0.498</td>
<td>0.367</td>
<td>0.415</td>
<td>0.332</td>
<td>0.392</td>
<td>0.499</td>
</tr>
<tr>
<td>AA2</td>
<td>0.735</td>
<td>0.276</td>
<td>0.519</td>
<td>0.446</td>
<td>0.392</td>
<td>0.321</td>
<td>0.344</td>
<td>0.362</td>
</tr>
<tr>
<td>AA4</td>
<td>0.721</td>
<td>0.309</td>
<td>0.539</td>
<td>0.437</td>
<td>0.438</td>
<td>0.375</td>
<td>0.306</td>
<td>0.424</td>
</tr>
<tr>
<td>AB10</td>
<td>0.408</td>
<td>0.830</td>
<td>0.574</td>
<td>0.689</td>
<td>0.618</td>
<td>0.584</td>
<td>0.578</td>
<td>0.537</td>
</tr>
<tr>
<td>AB7</td>
<td>0.315</td>
<td>0.819</td>
<td>0.446</td>
<td>0.492</td>
<td>0.565</td>
<td>0.446</td>
<td>0.551</td>
<td>0.602</td>
</tr>
<tr>
<td>AB9</td>
<td>0.399</td>
<td>0.760</td>
<td>0.544</td>
<td>0.432</td>
<td>0.581</td>
<td>0.464</td>
<td>0.465</td>
<td>0.523</td>
</tr>
<tr>
<td>AC11</td>
<td>0.597</td>
<td>0.631</td>
<td>0.805</td>
<td>0.597</td>
<td>0.673</td>
<td>0.561</td>
<td>0.591</td>
<td>0.609</td>
</tr>
<tr>
<td>AC12</td>
<td>0.509</td>
<td>0.518</td>
<td>0.832</td>
<td>0.470</td>
<td>0.510</td>
<td>0.418</td>
<td>0.445</td>
<td>0.484</td>
</tr>
<tr>
<td>AC13</td>
<td>0.519</td>
<td>0.514</td>
<td>0.790</td>
<td>0.518</td>
<td>0.578</td>
<td>0.450</td>
<td>0.430</td>
<td>0.489</td>
</tr>
<tr>
<td>AC15</td>
<td>0.648</td>
<td>0.354</td>
<td>0.662</td>
<td>0.430</td>
<td>0.455</td>
<td>0.470</td>
<td>0.397</td>
<td>0.372</td>
</tr>
<tr>
<td>AC16</td>
<td>0.381</td>
<td>0.428</td>
<td>0.709</td>
<td>0.447</td>
<td>0.560</td>
<td>0.481</td>
<td>0.498</td>
<td>0.525</td>
</tr>
<tr>
<td>AD17</td>
<td>0.367</td>
<td>0.429</td>
<td>0.386</td>
<td>0.732</td>
<td>0.455</td>
<td>0.467</td>
<td>0.540</td>
<td>0.415</td>
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<tr>
<td>AD18</td>
<td>0.492</td>
<td>0.561</td>
<td>0.605</td>
<td>0.808</td>
<td>0.669</td>
<td>0.589</td>
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<td>AD20</td>
<td>0.479</td>
<td>0.511</td>
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<td>0.785</td>
<td>0.594</td>
<td>0.531</td>
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<tr>
<td>AD21</td>
<td>0.400</td>
<td>0.598</td>
<td>0.520</td>
<td>0.797</td>
<td>0.647</td>
<td>0.603</td>
<td>0.586</td>
<td>0.574</td>
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<tr>
<td>AE22</td>
<td>0.446</td>
<td>0.683</td>
<td>0.649</td>
<td>0.650</td>
<td>0.823</td>
<td>0.703</td>
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<tr>
<td>AE23</td>
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<td>0.600</td>
<td>0.670</td>
<td>0.632</td>
<td>0.885</td>
<td>0.614</td>
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<td>AE24</td>
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<td>0.613</td>
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<td>0.614</td>
<td>0.844</td>
<td>0.586</td>
<td>0.567</td>
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<td>AE26</td>
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<td>0.467</td>
<td>0.576</td>
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<td>0.491</td>
<td>0.482</td>
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<tr>
<td>BA4</td>
<td>0.321</td>
<td>0.520</td>
<td>0.439</td>
<td>0.536</td>
<td>0.549</td>
<td>0.781</td>
<td>0.520</td>
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<td>BA5</td>
<td>0.425</td>
<td>0.579</td>
<td>0.575</td>
<td>0.658</td>
<td>0.659</td>
<td>0.864</td>
<td>0.691</td>
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<td>BA6</td>
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<td>0.470</td>
<td>0.494</td>
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<td>0.778</td>
<td>0.568</td>
<td>0.437</td>
</tr>
<tr>
<td>BA7</td>
<td>0.331</td>
<td>0.556</td>
<td>0.538</td>
<td>0.588</td>
<td>0.662</td>
<td>0.818</td>
<td>0.653</td>
<td>0.446</td>
</tr>
<tr>
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<td>0.618</td>
<td>0.610</td>
<td>0.646</td>
<td>0.863</td>
<td>0.583</td>
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<tr>
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<td>0.399</td>
<td>0.484</td>
<td>0.476</td>
<td>0.592</td>
<td>0.590</td>
<td>0.660</td>
<td>0.810</td>
<td>0.568</td>
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<tr>
<td>BB12</td>
<td>0.204</td>
<td>0.562</td>
<td>0.424</td>
<td>0.453</td>
<td>0.546</td>
<td>0.549</td>
<td>0.754</td>
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<td>BB14</td>
<td>0.510</td>
<td>0.503</td>
<td>0.586</td>
<td>0.651</td>
<td>0.542</td>
<td>0.589</td>
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<td>BC16</td>
<td>0.536</td>
<td>0.589</td>
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<td>0.574</td>
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<tr>
<td>BC18</td>
<td>0.533</td>
<td>0.611</td>
<td>0.625</td>
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<td>0.478</td>
<td>0.571</td>
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<tr>
<td>BC20</td>
<td>0.323</td>
<td>0.466</td>
<td>0.366</td>
<td>0.411</td>
<td>0.402</td>
<td>0.355</td>
<td>0.600</td>
<td>0.791</td>
</tr>
<tr>
<td>BC20</td>
<td>0.323</td>
<td>0.466</td>
<td>0.366</td>
<td>0.411</td>
<td>0.402</td>
<td>0.355</td>
<td>0.600</td>
<td>0.791</td>
</tr>
</tbody>
</table>

Note: Highlight values are loadings for items which are above the recommended value of 0.5

Convergent Validity

Next, the researchers tested the convergent validity which is the degree to which multiple items measuring the same concept are in agreement (Ramayah et al., 2011). As suggested by Hair et al. (2010), the researchers used the factors of loadings, composite reliability, and average variance extracted to assess convergence validity. The loadings for all items exceeded the recommended value of 0.5 (Hair et al., 2010). Composite reliability values (Table 3 and Table 4) depicted the degree to which the construct indicators indicated the latent, construct ranged from 0.789-0.891, which exceeded the recommended value of 0.7 (Hair et al., 2010). The average variance extracted (AVE) measures the variance captured by the indicators relative to measurement error and it should be greater than 0.5 to justify the use of a construct (Barclay et al., 1995). The average variance extracted was in the range of 0.555-0.681 (Table 3 and Table 4).
The results of the measurement model show that all the eight constructs; access, learning environment, delivery media, engagement, reflection, flexible learning, learning content, and enrichment assessment are all valid measures of their respective constructs based on their parameter estimates and statistical significance (Chow & Chan, 2008).

Table 3. Results of the measurement model for Personalised Learning

<table>
<thead>
<tr>
<th>Model construct</th>
<th>Measurement Item</th>
<th>Loadings</th>
<th>AVE(^a)</th>
<th>CR(^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
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<td>0.778</td>
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<td>0.721</td>
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<td></td>
<td>AB10</td>
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<td>0.646</td>
<td>0.845</td>
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<td>AB7</td>
<td>0.819</td>
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<tr>
<td></td>
<td>AB9</td>
<td>0.760</td>
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<tr>
<td>Learning Environment</td>
<td>AB10</td>
<td>0.830</td>
<td>0.646</td>
<td>0.845</td>
</tr>
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<tr>
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<td>AB9</td>
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<tr>
<td>Delivery Media</td>
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<td>AC13</td>
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<td>AC16</td>
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<td>AD21</td>
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<td>Reflection</td>
<td>AE22</td>
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<td>0.653</td>
<td>0.881</td>
</tr>
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<td></td>
<td>AE23</td>
<td>0.885</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AE24</td>
<td>0.844</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>AE26</td>
<td>0.662</td>
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Table 4. Results of measurement model for Use of mLICT-OA

<table>
<thead>
<tr>
<th>Model construct</th>
<th>Measurement Item</th>
<th>Loadings</th>
<th>AVE(^a)</th>
<th>CR(^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexible Learning</td>
<td>BA4</td>
<td>0.781</td>
<td>0.658</td>
<td>0.885</td>
</tr>
<tr>
<td></td>
<td>BA5</td>
<td>0.864</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BA6</td>
<td>0.778</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BA7</td>
<td>0.818</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning Content</td>
<td>BB10</td>
<td>0.863</td>
<td>0.660</td>
<td>0.886</td>
</tr>
<tr>
<td></td>
<td>BB11</td>
<td>0.810</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BB12</td>
<td>0.754</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>BB14</td>
<td>0.820</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enrichment Assessment</td>
<td>BC16</td>
<td>0.822</td>
<td>0.651</td>
<td>0.848</td>
</tr>
<tr>
<td></td>
<td>BC18</td>
<td>0.807</td>
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<tr>
<td></td>
<td>BC20</td>
<td>0.791</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Average variance extracted (AVE) = (summation of the square of the factor loadings)/{(summation of the square of the factor loadings) + (summation of the error variances)}
b. Composite reliability (CR) = (square of the summation of the factor loadings)/{(square of the summation of the factor loadings)+(square of the summation of the error variances)}
Discriminant Validity

The next step was to test the discriminant validity. The discriminant validity was used to analyse and find out the construct which is independent of the other constructs (Chin & Newsted, 1999). The discriminant validity of the measures (the degree to which items differentiate among constructs or measure distinct concepts) was assessed by examining the correlations between the measures of potentially overlapping constructs (Ramayah et al., 2011). Items should load more strongly on their own constructs in the model and the average variance shared between each construct and its measures should be greater than the variance shared between the construct and other constructs (Compeau et al., 1999).

According to Fornell & Larcker (1981), discriminant validity fulfils the conditions if the square root of each value AVE for each construct is greater than any of the other constructs. For the discriminant based on the validity of this study, it was found that all the constructs are in the highest and every item that exists in this study can be applied to the actual study. In this study, the AVE is greater than the value of the underlying correlation and discriminant validity has fulfilled the conditions. Overall, the discriminant validity can be accepted for this study and so does the support level of discrimination between the constructs of personalised learning modules and usability among the aboriginal students. In other words, the external model is acceptable.

Hypotheses Testing

The researchers proceeded with the path analysis to test the three hypotheses generated. The results are presented in Figure 2 and Table 5. The $R^2$ value was 0.738, suggesting that 73.8% of the variance in personalised learning can be explained by the use of the module. Based on the reports in Table 5, it is shown that the first hypothesis (H1) is supported by the five dimensions of personalised learning. This personalised learning approach is defined as a concept that involves learning with the access to knowledge, environment, delivery media/tools, students’ engagement, and reflection. Thus, H1 of this study is supported. Next, Figure 2 shows the construct of the usability of module that is supported by three dimensions, which are enrichment assessment, flexible learning, and learning content. Thus, H2 is supported. It pertains to the usability of the module application of cognitive load theory and minimalism theory. Next, looking at the third hypothesis (H3), it is shown that the hypothesis is accepted in which the personalised learning approach (PL) positively affects the use of the ICT literacy module among the aborigines (mLICT-OA) ($\beta = 0.859, p<0.01$). Thus, H3 of this study is also supported. Overall, in this study it is found that reflection is the most significant dimension of personalised learning while flexible learning (based on cognitive load theory) is the most important dimension in the usability of mLICT-OA.

<table>
<thead>
<tr>
<th>No</th>
<th>Hypothesis</th>
<th>Std Beta, $\beta$</th>
<th>Std Error</th>
<th>T-Value</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>PLE -&gt;Delivery Media</td>
<td>0.841</td>
<td>0.051</td>
<td>16.558</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>PLE -&gt;Access</td>
<td>0.715</td>
<td>0.062</td>
<td>11.502</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>PLE -&gt;Engagement</td>
<td>0.863</td>
<td>0.027</td>
<td>32.217</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>PLE -&gt;Learning Environment</td>
<td>0.831</td>
<td>0.042</td>
<td>19.927</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>PLE -&gt; Reflection</td>
<td>0.895</td>
<td>0.026</td>
<td>34.806</td>
<td>Supported</td>
</tr>
<tr>
<td>H2</td>
<td>Module -&gt;Flexible Learning</td>
<td>0.907</td>
<td>0.020</td>
<td>46.327</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>Module -&gt;Learning Content</td>
<td>0.852</td>
<td>0.029</td>
<td>29.144</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>Module -&gt;Assessment</td>
<td>0.821</td>
<td>0.031</td>
<td>26.901</td>
<td>Supported</td>
</tr>
<tr>
<td>H3</td>
<td>PLE -&gt;ICT Module</td>
<td>0.859</td>
<td>0.031</td>
<td>27.624**</td>
<td>Supported</td>
</tr>
</tbody>
</table>

Note: **$p<0.01$ (2.33), *$p<0.05$ (1.645)
DISCUSSIONS

This study supports conventional views of the influence of independent variables of personalised learning with five attributes on the perceived extent of usefulness of digital self-learning for ICT module among the aboriginal students in Peninsular Malaysia using the partial least square (PLS) technique in testing hypotheses. This paper also examines the goodness of measure which is assessed by looking at the validity and reliability of the measures carried out using the PLS approach. The result shows that the measures used exhibit both convergent and discriminant validity. Next, to assess the reliability of the measures, Cronbach alpha values and composite repaper are looked at to examine the goodness of measure which is assessed by looking at the validity and reliability of the measures carried out using the PLS approach. The results show that the measures used exhibit both convergent and discriminant validity. Meanwhile, to assess the reliability of the measures, Cronbach alpha values and composite reliability values are studied. Both Cronbach alpha values and composite reliability values are at par with the criteria set up by other established researchers. In summary, the measures in the model are shown to be reliable.

The findings of this paper confirm the views that personalised learning has five core dimensions which include access, delivery media, learning environment, engagement, and reflection. While the study demonstrated that personalised learning is used purely for the purpose of workflow efficiency, it is also the best way to achieve high-level personalization among aboriginal students. This corroborates with the findings from Anderson (2006), Downes (2007), Buchem, Attwell & Torres (2011), Che Ku Nuraini et al. (2014). Overall, this personalised learning concept refers to the individual perspective to achieve learning outcomes through a conducive learning environment perspective. The effectiveness of a teaching and learning domain requires the application of the correct and effective teaching and learning concept.

The extent of personalised learning among the Aboriginal students has a significant impact on the digital self-learning ICT module. The findings are consistent with the concept postulated by Buchem (2012) about ‘Antecedents-Consequences-Model (ACM)’, that a personalised learning approach is essential to overcome as a tool to document and reflect on their learning. The digital self-learning ICT literacy module, coupled with personalised learning, would allow aboriginal students to demonstrate their capabilities as a reflective professional to practice and promote learning as a lifelong pursuit. The authors also believe that a personalised learning approach is useful in predicting personalised learning environments for aboriginal students. The concept of learning is compatible with their diverse lifestyle. The use of a digital self-learning module (mLICT-OA) for ICT learning has the potential to provide opportunities and experience to these aboriginal students to gain meaningful knowledge and practise ICT usage in their daily lives. The practical suitability and project work are based on individual needs to guide them towards entrepreneurship in parallel with the concept of personalised learning. The use of mLICT-OA would open their minds to achieve transferable skills through ICT experience.

In this context, the aboriginal students assume that the use of ICT literacy module can improve the quality of their learning and enable them to choose their own learning styles. By following the personalised learning approach, these students are able to control their personal learning environment wherever they are. One of the ways is to use the module as a self-learning media in accommodating them with diverse learning styles. Apart from the different cognitive styles, the formation of mental models is also likely to be influenced.
by students’ learning styles. This is because students’ learning styles have been formed at the early stages of childhood and they subsequently form their own learning styles until adulthood (Razak & Ali, 2016). Pertaining to Table 5, the reflection attribute (responses or feedback) received by students towards learning is of paramount importance. Students believed that the concept of personalised learning becomes stronger when the involvement of students, teachers, and communities are seen as positively contributed, followed by teaching aids such as media presentation, a comfortable learning environment, and also information access.

The Cognitive Load theory and Minimalist theory were used during the development module. These theories explain how learning materials can help students to use them according to their respective situations and needs. More specifically, past study discussions in comparing the development of this modular material demonstrates that mLICT-OA benefits the aboriginal students as it facilitates the acquisition of the scheme and reduces students’ cognitive burden. Findings in Table 5 show that the application of cognitive load theory is very imperative and it is the most important element in developing the modules. This cognitive load theory is compatible with the aboriginal students’ brain capacity as they are not able to receive a lot of things at one time. They also argued that the overall usability is important to ensure the use of the LICT-OA module (mLICT-OA) is able to meet the needs of students, followed by the application of the current minimalist theory in the development module. In short, students’ high satisfaction in using the mLICT-OA would really impact the probability of a student to acknowledge a self-learning module. The introduction of the module illustrates the process and the different tasks focused on a task: searching for information, writing a document, doing an oral presentation, and e-portfolio. Thus, the adequate design approach of text and narration usage in the learning module should have a maximum impact on students’ learning. This will assist them in the formation of accurate mental models and then formation of perfect schemas in the long-term memory. The overall learning goal of this self-directed learning module is the development of a personal approach for each student in building his or her personal PLE. Students can decide which tasks they want to deepen their knowledge of and how they wish to do so: either through a self-directed learning module using the documentation or via face-to-face workshops.

Finally, in line with the need for consideration of socio-cultural and equity issues in the aborigines’ education, modification of the current computer module in schools is needed to suit the cultural condition of the students. Aboriginal students are introduced to the computer concept from basic fundamentals to more difficult concepts. In addition, the contents of the study materials are designed to suit the learning needs of the students; for example, segmentation of the materials, examples of layouts, headings and fonts as well as illustrations. Therefore, by identifying the most dominant learning style, a more accurate result in the construction of effective instructional strategies, curriculum, and pedagogy development can be delivered.

CONCLUSION

This study provides direct implications for literacy modules (mLICT-OA), which are attractive to aboriginal students in implementing their actual lifestyles into the tasks given. Therefore, this module has potential to promote aboriginal students’ presence and to improve their ICT literacy skills using personalised ICT literacy learning. This digital module is also designed to demonstrate how their learning styles are different from other mainstream students. The discrepancy is apparent in the language preferences and the use of colours in their task completion. In summary, it is found that the use of the self-learning module as an ad hoc personal learning environment has contributed to a shift in the relationship between learners and the objective of learning while exploring the ICT literacy. The mLICT-OA has contributed to an increased sense of control over the surrounding construct knowledge by functioning as a powerful ad hoc personalised learning. The mLICT-OA is not only served as an on-demand personal learning environment but also an ad hoc PLE for the literacy. Personalised learning is to revolve around disciplines and areas which are relevant not only to informal, but also formal learning objectives. This learning environment proves that PLE as several Internet-based applications which are built on the ideological and scientific foundations of Blogging platforms 2.0, allows the creation and exchange of user-generated content (Kaplan & Haenlein, 2010). In conclusion, each teaching and learning activity has motivated students to increase their learning interest without boredom and are constantly monitored by coaches and facilitators. They are also assisted from time to time to be able to build and maintain their own hometown website for the purpose of marketing their forest products, handicraft, and their heritage. Therefore, this modular learning method contributes to the importance of the learning environment so that the aboriginal students are able to build a positive and relaxed learning environment.
Acknowledgements: We gratefully acknowledge the support and generosity of Personalised Learning Research Group and have received helpful input from Akzo Nobel (Malaysia) Sdn. Bhd. and Department of Aboriginal Development (JAKOA), Gombak and JAKOA headquarters, Kuala Lumpur. In developing the ideas presented here, we also thank Associate Prof Dr. Sazali Khalid from Seameo Recsam for his assistance in comments, reviews, and data collection. This research is funded by Universiti Pendidikan Sultan Idris Research Grants (2017-0298-107-01).

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COMPETITIVENESS IN ODL FROM STAKEHOLDERS’ PERSPECTIVE: A REVIEW AND RESEARCH AGENDA

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ABSTRACT
Open and Distance Learning (ODL) in higher education has gained momentum in previous decades. ODL institutions too require competitiveness in the market place of educational products/services through their capabilities and core competencies by adopting cost and/or differentiation strategy, especially due to the increasing competition arising from the existence of large number of institutions with similar objectives. The competition has further increased due to Liberalization, Privatization and Globalization, virtually collapsing the boundaries to access education being offered from any other country; technological developments; changes in demographics, societal & economic structures; and most importantly emergence of online institutions with different nomenclatures. ODL institutions in India are in dire need of making strategic efforts to create and maintain sustainability in competitiveness by reaching out to larger sections of different stakeholders to satisfy their needs/expectations in view of the huge untapped potential in India and abroad. All stakeholders are not equally important and influential and their identification is a critical step in selecting appropriate strategy for achieving competitiveness. This study sets the research agenda on the topic of competitiveness in ODL in higher education from the perspective of the relevant stakeholders and not learners only, with the help of Systematic Literature Review (SLR), showcasing the findings to provide the future research framework with a deeper understanding of ODL, Competitiveness, stakeholders and their interrelations in the Indian context.

Keywords: Competitiveness, open distance learning, stakeholders, stakeholders’ perspective.

INTRODUCTION
Learning through Open and Distance mode has gained momentum in last few decades in the higher education sector in India along with its tremendous growth and expansion at global level. Institutions imparting education through Open and Distance Learning (ODL) mode have been incessantly trying to gain competitiveness through development of their capabilities, especially with the increasing competition due to increase in the number of institutions with similar objectives. ODL institutions in India are in dire need of making strategic efforts to create and maintain sustainability in competitive advantage by harnessing the resources available in the market of ODL through their core competencies using them in various locations, impactful usage of ICT, suitable marketing strategy, creditable reputation, differentiated study materials, creativity, innovations, relevant research etc. reaching out to larger sections of stakeholders to satisfy their needs and expectations efficiently, instead of paying attention to the expectations and needs of learners only. In recent times, there have been growing concerns regarding quality and credibility of the ODL system with the negative perceptions created amongst the stakeholders by information received through negative media articles, court decisions, employers’ reluctance and easier entry of non serious players, which require these institutions to make extra efforts to live up to the ever increasing expectations of the various stakeholders, keeping in view the huge untapped potential in India and international level in the field.

There has been constant growth on the number of ODL institutions in higher education in India and at international level, while higher education institutions in conventional mode have also been thriving through
course-offerings in ODL mode. The competition has ever increased due to Liberalization, Privatization and Globalization of education virtually collapsing the borders to access education being offered from any other country; relevant technological developments; new wave of economies; changes in demographics, society and family structures; and most importantly emergence of online institutions. Collectively, these transformations pose an unavoidable threat to the very existence and sustainability of the ODL institutions in India. The situation calls for a sincere attention towards study of stakeholders of ODL in India with focus on their strengths, weaknesses, opportunities and threats to respond to these changes more proactively in order to consolidate the institutions’ position tapping the potentials in the markets of educational products and services. While at the ground level, the ODL system is facing stiff challenges with its quality, flexibility and sustainability to its learners, it needs to make sincere efforts to meet the expectations of various stakeholders as a promising alternative to the conventional system of education.

The previous studies have failed to contextualize and conceptualize the issue of competitiveness in ODL in higher education from the perspective of its various stakeholders in Indian circumstances. This study aims to set the research agenda for future research on the topic of competitiveness in ODL in higher education from the perspective of the relevant stakeholders and not learners only, with the help of Systematic Literature Review (SLR) and its steps of planning, conducting and reporting. The study also tends to showcase the findings in such a manner that it provides the framework or background for the future research with a deeper understanding of ODL, Competitiveness, stakeholders and their interrelations in the Indian context.

METHODS AND MATERIALS

The research method of Systematic Literature review (SLR) was found to be suitable for undertaking this study in its research design, which showcases a systematic plan or procedure based on selected assumptions to find the answer to the research questions (Creswell, 2009), which are : (a) Is there a need to identify indicators of competitiveness in ODL in Indian higher education in order to create and sustain competitive advantage for its survival?, (b) Is there a requirement to examine and evaluate the perceptions of all other important and influential stakeholders than learners only?, (c) Is there an urgency to test the validity of the distinction among the different key stakeholders of ODL in Indian higher education amongst primary and secondary stakeholders?

SLR employs the strategies of planning, conducting and reporting the review, as a form of Secondary Study, to summarize by identifying gaps in existing literature to set the research agenda for further research, through purposeful employment of identifying, evaluating and interpreting the previous studies and their findings in the relevant research areas, topics or interests. It requires more rigorous efforts than conventional reviews (Kitchenham, 2004). The process begun with the methods of screening, gathering and collating existing significantly relevant literature, to answer the research questions through primary studies, by weeding out non-relevant articles/papers for further consideration and analyzing/evaluating shortlisted literature through critical analysis only to select, connect, compare, and explain important information with respect to theories, opinions, outcomes and suggestions for future research, in the form of reporting of the review to present the findings of the review in such a manner that it proposes the research agenda to provide the framework or background for the future research with a deeper understanding of ODL, Competitiveness, stakeholders and their interrelations in the Indian context, being presented in the following sections.

The SLR explored research literature with the approach of undertaking comprehensive searches of relevant electronic Journals, databases and search engines such as ScienceDirect, Scopus, SpringerLink, Web of Science, CiteSeer, EBSCO, JSTOR, Elsevier, Google Scholar etc. accessible through the authors’ university e-resource platform to ensure that maximum of the relevant literature on ODL, competitiveness and stakeholders were identified. The focus was maintained on the literature with highest relevance to the research questions.

The inclusion criteria for the search was employed as the studies in English and published in peer-reviewed journal only. The search string was constructed after deriving the major terms, checking the keywords from the studies already analyzed, identifying the synonymous terms and using Booleans OR and AND for joining major terms such as ODL, Open Distance Learning, Open Distance Education, Competitiveness, Competitive advantage, Stakeholder. The search strings were employed without any restriction of period
of publication. Consequently, 214 studies (Research Papers/Articles=162, Thesis=3, Conference/Workshop Papers=17, Reports/Books=32) were identified excluding the studies which were stored/ published in more than one database/source. Number of articles thus retrieved were recorded after excluding them. But, they included studies not addressing adequately the research questions also, which needed to be excluded. Subsequently in the next stage, the articles without any focus on the interrelations amongst above components in their abstracts, main body, results and discussions were excluded for further consideration. The remaining relevant literature were found to be helpful in including additional articles in the final list with the help of their references/bibliographies, also. Finally, a list of 77 studies (Research Papers/Articles=57, Thesis=1, Conference/Workshop Papers=2, Reports/Books=17) was filtered after the application of the above inclusion/exclusion criteria. The studies were assessed on the basis of their quality with respect to publications, aims, discussions, contextual information, findings and their presentation, citations by others etc., followed by data extraction and data synthesis in order to summarize through reporting of the relevant results from the analysis of the identified studies. This phase was completed with the strategy of finding answers to the research questions through consultation of the extracted data, looking out for additional findings beyond the research questions and identifying the gaps in the extant literature to develop research agenda in the form of recommendations for the future research.

MEANINGS & DEFINITIONS

Open & Distance Learning (ODL)
The concept of Open and Distance Learning (ODL) emanates from the combination of ‘Open Learning’ which is a philosophy and ‘Distance Learning’ which is a mode of delivery, complementing each other. While ‘Distance Learning’ encompasses all the teaching-learning arrangements between learners and teachers existing in a space and time separated set-up; ‘Open learning’ an array of innovations and reforms advocating flexibility to the learner in terms of entry, exit, pace, place, methods, choice, course combinations, assessment and completion of the course. The ODL system attempts to eradicate inequality by offering opportunities to larger sections of the society (UGC, n.d.-b). More inclusively and expressively, UNESCO (2002) defines ODL as an educational process, where all or most of the teaching and communication take place with the help of artificial medium such as print or electronic medium, as the teachers and learners are removed from each other in space and/or time. As an effective educational method, ODL has been found to be most potent tool to battle the educational problems in developing countries, which has emerged as a new teaching model which helps people teach and learn anytime and anywhere, using multimedia and technology advancement (Faridi & Ouseph, 2014). ODL follows an institution based formal educational process resulting from the association of educational technology and communication connecting learners, teachers and other resources, where these groups are separated from one other. With the growing needs of education and training in developing countries, ODL is seen as an important tool to reach young and adult prospective learners to meet their needs, which largely remain unmet because of constraints related to financial, geographical and other reasons (UNESCO, 1997), and is an effective instrument of supporting and supplementing conventional mode of education. ODL, with constructive support of ICT, has tremendous potential to address the problem of access and make available a new alternative form of capacity building as a viable option (McQuaide, 2009), which has become, over the time, an indispensable part of the global educational system, both in developing countries as well as developed countries, aiming to address the problems related to quality, equity and access, in view of the technological advancement and growing needs of skill up gradation through training and retraining (UNESCO, 2002).

Competitiveness
Studies and research related to competitive advantage have been at the centre of the discipline of strategic management, especially after the publication of Porter’s landmark model of “Five Forces of Competitive Position” which conceptualized a widely accepted perspective for the assessment/ analysis of the competitive position and strength of an organization. It gave birth to the five forces of competitive position that are Threat of new market entrants, Threat of substitute products, Buyers’ bargaining power, Suppliers’ bargaining power, and Rivalry
amongst the present competitors (Porter, 1980). He argues that competitive advantage comes out of discovery and implementation of unique and distinctive ways of competing that can be sustained over the time, further recommending three generic strategies of competitive advantage viz. Cost leadership, Differentiation and Focus. Cost leadership is achieved through the products/services at the lowest cost supported with high volumes and uncompromised quality; Differentiation through becoming market leader with the help of products/services different from rivals; and Focus through gaining leadership position in a niche market segment either through the cost leadership or through differentiation strategy. Further, The Resource-based View attempts to identify the organizational internal factors that may help it gain competitive advantage, suggesting that business methods, means, skills, and resources’ capabilities enable an organization to outperform its present and future competitors, leading to competitive advantage (Barney, 2001), which an organization harnesses for developing and implementing strategies through its own rare, valuable, non-imitable, and organized resources, supporting to improve its overall effectiveness and efficiency (Barney, 1991). Teece, Pisano, & Shuen (1997) argue that the ability of the organization to combine its resources effectively may help it achieve competitive advantage. While Grant (1991) emphasizes that maintaining sustainability of competitive advantage is dependant on idiosyncratic, not easily transferable or replicable resources; Prahalad & Hamel (1990) argue that the basic capabilities inherent in an organization’s competitive advantage which can be deployed across several product markets, referred to as core competencies, create sustainability of competitive advantage. Competitive advantage is assumed to be the result of suitable strategy execution, speed, agility, and resource implementation better than competitors (Barney, 1991; Bharadwaj, 2000). Kaur (2017) has attempted to showcase the ten common outcomes of competitiveness on the basis of her interpretations in extant literature, which are displayed in Figure 1.

Figure 1. Ten common outcomes of Competitive advantage (Kaur, 2017)

Competitiveness is the organizational ability to compete in the markets with a strategy for favorable consequences to create and maintain a competitive advantage for gaining better performance than their competitors (Porter, 1985, 1998). But, competitiveness measurement is a complex activity (Crouch & Ritchie, 1999). There have been efforts to measure it in previous studies either with the help of financial measures (Barrett, Davidson, Prabhu, & Vargo, 2015; Krell & Matook, 2009; Prescott, 2014; Sigalas, Economou, & Georgopoulos, 2013) or non financial measure such as creative process of product/service development, Product/service quality, customer responsiveness reflected through customer retention/attraction, cost saving/effectiveness, market differentiation, strategic planning, core competence, and social responsibility (Agha, Alrubaiee, & Jamhour, 2012; Al-alak & Tarabieh, 2011; Barrett et al., 2015; Diab, 2014; Epetimehin, 2011; Heywood & Kenley, 2008; Kuettner & Schubert, 2012; Majeed, 2011; Matikiti, Afolabi, & Smith, 2012; Prescott, 2014; Schatz & Bashroush, 2016; Sigalas et al., 2013; Vahid et al., 2013; Kasasbeh, Harada, & Noor, 2017), which need to be identified in the specific context for better understanding to the researchers and practitioners, in future.
Stakeholders

Researchers and Practitioners have continuously been focusing on the expansion and elaboration of the significance of Stakeholders after the seminal book "Strategic Management: a stakeholder approach" by Freeman (1984) came into existence, which defines stakeholder as a group/individual which gets affected by/can affect the achievements of objectives and policies of the organization (Freeman, 1984). Stakeholders’ pressure has ever increased in the form of demand of meeting their respective expectations to force organizations to integrate them with their decision making process and strategies (Hart, 1995; Kassinis & Vafeas, 2006). Pursuant to a strategic approach, Stakeholder analysis has been used, in recent times, for designing, implementing and evaluating a proposal, undertaken through –List preparation of stakeholders, Selection of their relevant interests, evaluation of their importance/ influence/ implications/ cooperation amongst selected stakeholders and determining when, how and which of them to participate (ODA, 1995). Stakeholders are categorized as primary and secondary stakeholders based on their relationships with the organizations, the primary stakeholders engaging in formal transactions with the organizations, and the secondary stakeholders not engaging in formal transactions with them (Clarkson, 1995). Further, Mitchell & Wood (1997) classify stakeholders on the basis of the three attributes viz. power, legitimacy, and urgency, which force organizations to take different measures for different stakeholders. The ‘Stakeholder Theory’ (Freeman, 1984) argues that an organization has multiple stakeholders such as customers, communities, workers, shareholders, suppliers, managers, unions etc., who can influence the organizational performance. Organizations need to satisfy all the stakeholders through appropriate strategies, instead of making efforts to satisfy the expectations of any particular stakeholder only. Stakeholders may seek different levels/types of strategy on account of the difference in their interests (Rueda-Manzanares, Aragón-Correa, & Sharma, 2008), making awareness of the relevance of the stakeholders, significant for organizations (Freeman, 1984). In such situations, identification of relevant stakeholders which may influence and are important for the achievements of organizational policies and objectives have drawn enough attention of Researchers and Practitioners, in recent times (Figure 2).

<table>
<thead>
<tr>
<th>Importance</th>
<th>Influence</th>
<th>Stakeholder Type</th>
<th>Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>High</td>
<td>B</td>
<td>Need to construct good working relationships with them, to ensure an effective coalition of support</td>
</tr>
<tr>
<td>Low</td>
<td>Low</td>
<td>C</td>
<td>Source of significant risk, and hence need careful monitoring and management</td>
</tr>
<tr>
<td>Low</td>
<td>High</td>
<td>A</td>
<td>Require special initiatives if their interests are to be protected</td>
</tr>
<tr>
<td>High</td>
<td>Low</td>
<td>D</td>
<td>Require limited monitoring or evaluation, being of low priority for activities or management</td>
</tr>
</tbody>
</table>

Figure 2. Stakeholders’ Identification Matrix (Adapted from ODA, 1995)

Salience of the stakeholders in the organizational perceptions, is found to be positively related to the cumulative effect of the stakeholders’ internal attributes i.e. power (will imposing ability), legitimacy (socially accepted right-wrong conducts) and urgency (immediacy in terms of attention to be paid), compelling organizations to decide priorities to their respective demands (Mitchell & Wood, 1997). There have been several attempts by previous studies to classify stakeholders based on their mutual dependence on the organizations also, known as the influence of the respective stakeholders, resulting into adoption of different strategies (Sharma & Henriques, 2005), which have highlighted that identification of salient stakeholders is critical in formulation of strategy, emphasizing that all the stakeholders are not equally important for a strategy formulation, and their importance is relative, which changes with issues and time (Mitchell & Wood, 1997).
Organizational Positioning with the salient stakeholders may happen through creating positive perception of the prospective employees, the customers, the investors & lenders and other stakeholders, who may show willingness to the products/services as more differentiated than competitors to pay premium prices, to have more loyalty etc. (Barnett, 2007; Peloza, Loock, Cerruti, & Muyot, 2012). Organization commitment towards a specific strategy is dependent on their own perceptions (Hahn & Scheermesser, 2006; Hou, Al-Tabbaa, Chen, & Mamic, 2014), which have been prominently used by majority of previous studies as an influential determinant of stakeholder salience. The stakeholders’ perceptions are the outcomes of the pieces of information that they receive (Hou, 2016), and are not only useful to extract relevant constructs to examine organizational behavior but also can disclose the stakeholders’ capabilities and willingness for adoption of the strategies by the organizations (Delmas & Toffel, 2004; Freeman, 1984; Garvare & Johansson, 2010). Stakeholders and commercial considerations existing in separate spatial, temporal and organizational scales, result into difference in opinions and perceptions towards consequences, which is further widened by the difference in their background, objectives and interests (Frooman, 1999; Sullivan, Sullivan, & Buffton, 2001). The divergence in their perceptions exists because of varying organizational objectives, access to information, and self-perception (Hou, 2016). Performing opinion polls globally by asking the stakeholders themselves of their views/opinions proposes a suitable reply to the concerns shown in several studies regarding construct validity of measuring the perceptions of stakeholders by asking them to express their own views/opinion (Bryman & Bell, 2007), which further gets strengthened by the participatory approach of stakeholder analysis, used to facilitate negotiations with/differe dialogue amongst the stakeholders, through the analysis of stakeholders’ perceptions, knowledge, interests, relationship and experience by the stakeholders themselves, acknowledging their better understanding of their interest/values/views and tentative solutions to their problems or collective future actions (ODA, 1995).

OPEN AND DISTANCE LEARNING (ODL): INDIAN LANDSCAPE

The ODL system, with its more flexible and interactive experiences of learning, has become a significant policy choice in Higher education for most of the Governments in the Asia and the Pacific (AP) region, in the transitional education markets. The AP region, with at least seven mega universities (Institutions with more than 0.1 million active degree-level enrolments), has tremendous potential to live up to expectations of different stakeholders because of huge population of prospective learners (Jung, 2005b), and India is no exception. ODL has contributed immensely in the higher education system in India by democratizing the higher education by reaching the unreach; meeting lifelong learning demands and in increasing the Gross Enrollment Ratio (GER). The emergence of ODL system in higher education in India occurred about five decades ago when policy-makers realized its imperative need to expand the higher education base, in view of the expanding base of the elementary and secondary education in the country. With the establishment of first university in ODL in 1982 as BRAOU in Hyderabad at state level, and IGNOU at the national level, other many states followed the trend which gave birth to more ODL universities in the period of 1987 onwards. While initially, the promotion and coordination responsibilities for ODL in Indian higher education was taken care of by Distance Education Council (DEC) at IGNOU instead of the UGC, an Indian Government Regulatory and Funding body for Higher Education, to reach the disadvantaged Indian learners in empowering them having access to higher education promoting quality and equality, later the Indian Government transferred the regulatory authority of DEC from IGNOU to UGC in 2013 (UGC, n.d.-b). Buttressed by the strength of about 11000 study centers and 70000 academic counselors supporting the learning needs of Indian learners, the 17 OUs with presence through out India are offering a wide array of programs including general, professional, vocational, and technical also (UGC, n.d.-a).

The key results of the All India Survey on Higher Education (2015-16) informs that there are 1 Central OUs, 13 State OUs and 1 State Private OU along with 118 Dual Mode Universities operating in India, offering education through ODL system in comparison to the total 799 Universities, 39071 colleges and 11923 Stand-alone Institutions, catering to the total enrolment of 34.6 million learners with 18.6 million boys and 16 million girls, with ODL system accounting for about 11.05% of the total GER of 24.5% in higher education in India. It further informs that the Central University is a university which is established/ incorporated by a Central Government Act, the State University is a university established/incorporated by a Provincial/state Act, and the Open University is a University imparting education through distance education only (MHRD, 2016).
Six key elements of ODL have been specified as teacher-learner separation, educational organizations influence, linkage of teacher-learner using media, two way communicational exchange, emphasis on learners as individuals instead of groups, and industrialized form of education (Keegan, 1996). ICT has proved to be an essential tool to solve a number of educational problems, although it can not be considered as a panacea for all the problems. With the advancement of ICT, ODL has become one of the most challenging professions with emergence of diverse options and new learning concepts. The growth of ODL has helped it achieve prominent goals such as taking higher educations to every corner of the developing countries, training for economic growth, offering curriculum enrichment in non conventional educational set-up, for which ICT has been used effectively in a variety of ways (Wolcott, 2003).

Like all other organizations, where five competitive forces determine their survival in the market place, the attractiveness of the ODL institutions is determined by the same five competitive forces i.e. Threat of new market entrants, Threat of substitute products, Buyers’ bargaining power, Suppliers’ bargaining power, and Rivalry amongst the present competitors (Porter, 1980). The most important aspect of ICT for an ODL institution in order to achieve competitive advantage is its capability to increase access and enrolments which may result into cost leadership with the help of scale economies. There has been empirical evidence that despite fixed costs being higher than conventional system, it may taste ultimately cost leadership by harnessing the positive effects of enhanced enrollments and access, reduced staff, reuse or sharing of digital contents, economy of scale, and collaborations, which may also help them gain competitive advantage through differentiation strategy with the help of products or services with better quality than their competitors, in addition to other benefits (Jung, 2005a).

The findings of a study in Zimbabwe suggests that the ODL institution ZOU, in order to gain competitiveness, took advantage of the competencies such as ability of producing study materials, deployment in different geographical areas, competency of HR, strong ICT strategy, marketing and communication effectiveness, effective student support services, effective resource mobilization, reputable programs, sound industries-institutions and learners-institutions relationships, vibrant alumni and advisory boards, and sound corporate governance (Ndudzo & Zinyama, 2014); all of them either helping it gain cost leadership or differentiation, the important strategies for competitive advantage and highlighting the significance of the stakeholders and their perceptions. In order to fulfill the needs and expectations of its different stakeholders, ODL plays a supplementary role to the conventional system, with the help of its flexible and liberal approach without compromising the quality. The transformation in ODL in order to gain competitiveness is driven not only by the technological advancement and its adoption but by the politico-economical factors also, in view of its potential effects on different stakeholders (Carter, 2009). The general tendency of stakeholders, to show resistance, changes along with the change in their perception that their problems are being solved. It further changes positively to encourage such behaviors as they find themselves more convinced of the advantages of policies (Steg & Gifford, 2005). In such situations, organization must make sincere efforts to know the perceptions of relevant stakeholders for identifying their needs (Freeman, 1984).

Higher education creates physical as well as social capital which, in their appropriate quantity and quality, tend to help it meet the stakeholders’ satisfaction. But in recent past, its social function has been compromised due to lack of attention by the institutions towards the needs and expectations of its stakeholders (Khan, 2008). There has been lesser emphasis on other stakeholders and their relations with competitiveness of the ODL than the learners which has been central to the previous studies and researches. There appears a dire need of relevant studies to be undertaken keeping in view the access, enrolment, quality etc. of ODL by giving due emphasis to the needs and expectations of relevant stakeholders other than learners only as the future of ODL rests on principles of sustainable stakeholder management, sensing which the ZOU uses a vibrant ICT directorate to modernize communication means with its stakeholders (Chrispen, 2016). Sensitization and orientation could be effective tools to improve the perceptions and attitude of stakeholders (Chrispen, 2011) with the clarity in communication of expectations between them (Abel, 2005).

Some unique attributes of ODL include but are not limited to huge population of learners, the collective efforts of Government and institutions, increasing use of ICT and globalization of some of these institutions, which have contributed immensely to the expansion of the ODL system. Obtaining accreditations from international organizations, collaborative partnerships with national and international players, enhanced uses of ICT expansion and quality improvement, preparing to meet emerging needs, gender specific concerns, digital divide, equity and
human rights are some of the important issues that ODL system in Indian higher education needs to address by being proactive for converting risks into opportunities and challenges into potential, instead of being merely reactive by acting according to the existing regulations, policies and standards only (Jung, 2005b). ODL can harness unique advantage of its ability to reach out to every level of society, tackling geographical challenges through education but there is a need to promote ODL among stakeholders for their awareness and creation of positive perceptions, also.

In ODL, there are many stakeholders engaged in the process of education, such as Learners, Faculty, Editors, Course Coordinators, Technical and Academic Experts, Research & Development Staff, Librarians, Publishers, Relevant authoring tools providers, Examination observers and Invigilators, Administrative Staff, Student Services’ Staff, Portal Integrators, Quality Control/Assurance Personnel, Employers, Management/Policy Makers, Distributing and Delivery Partners, Governments, other Institutions in higher education etc., working in different units and locations along with inter and intra-departmental, and other types of interconnections, towards effective and efficient accomplishment of activities (Dambudzo, 2013). ODL system in India needs to get rid of its inadequacies to accept new models such as MOOC, OER etc. to meet the ever growing needs and expectations, which are being implemented by conventional institutions also, such as IITs (Gaba & Li, 2015). Conventional institutes have even started to develop ODL, challenging the dominance of established ODL institutions, finds a Chinese study (LI, Yao, & Chen, 2014). There is an immediate need for Indian ODL institutions to keep updating quality-wise their products and services in order to lead transformation and sustained development and remain competitive, also (Siaciwena & Lubinda, 2008). There has been a visible shift in learning paradigms from ‘teaching’ to ‘learning facilitation’ and finally to ‘facilitated and supported enquiry’ (Brown, 2006). Which has further enhanced the chances of ODL institutions to be a viable solution in the situation where the conventional higher education institutions have been finding it difficult to make available education of good quality in their over crowded classrooms (Ural, 2007). The inherent problem with the universities is that they have tendency to internally determine their own quality and excellence and assume the needs and expectations of the stakeholders in the educational market by themselves (Lomas, 2007; Maguad, 2007), and by doing so, they tend to feel proud of themselves that they are offering the educational products and services with best quality and highest standards (Anderson, 2006). That is why, ODL system has been questioned for its quality in imparting education in the higher educational arena in spite of all its achievements and popularity, which suggests that there is divergence in the perceptions of various stakeholders of current system of ODL. ODL in higher education has, in last three decades, also witnessed globalization as another feature with a remarkable growth in the import and export of educational services. E-learning is the manifestations of a new trend, which has steadily gaining ground (Jung, 2005b). These transformations have only added another set of stakeholders in national and international arena which necessitates serious studies to identify relevant stakeholders in terms of importance and influence for the achievement of competitiveness by an ODL institution in Indian higher education.

The perceptions of the stakeholders are influenced by their beliefs about the benefits arising out of their association with ODL system/institutions as learners, teachers, employers, educational planners etc., who, benefiting from a program in satisfying their needs, will not have a positive perception only but will tend to display an enhanced performance in future also (Cavanaugh, 2005; Gagne & Shepherd, 2001). Non-contagious communication and availability at anytime and anywhere are characteristics that make ODL attractive to adult individuals with their varied social and professional commitments (Holmberg, 1989). ODL provides to the government a means of enhancing access to learning, skilling, and cost-effectiveness of learning resources with high quality and wide variety for enhancement and consolidation of capacity; to the learners enhanced freedom of access and opportunities and a less costly alternative to conventional educational system; and to employers enhanced possibility of learning and professional development activities at the workplace in a more flexible and cost effective way. But, there are plenty of negative perceptions amongst stakeholders like educational planners and policy makers, who remain skeptical of the quality and legitimacy of the ODL system. The ODL institutions need to create positive perceptions amongst all the relevant stakeholders in order to ensure greater acceptance of ODL, who are important for and can influence the achievements of the objectives and policies of ODL institutions, as acceptance of ODL by them can determine the success of the system. Questionnaire is a popular and fundamental tool to acquire information on public knowledge and perception, which can provide precious information (Bird, 2009) to assess their perceptions. Hence, these efforts may be undertaken with the help of appropriate questionnaire.
These key stakeholders may be Learners, Faculty, Civil Society, Parents, Decision or Policy makers, Civic Organizations, Community-Based Organizations, Formal and Non-formal Educators, Employers, Professional Associations, Career-Counselors, Faith-Based Organizations, Trade Unions, Governments, Educational NGOs, Inter-Governmental Organizations (IGOs), Donors/Funders, Other types of Educational Institutions, Educators and Support Staff (SADC, 2009). The most common negative perceptions about ODL system, generally found in the relevant stakeholders are displayed in Table 1.

The perceptions of different stakeholders of ODL are found to be different from one another and their perceptions influence the perceptions of others as well. The negative perceptions of the stakeholders are one of the major problems faced by ODL, which need to be assessed and redressed by ODL institutions in order to achieve competitiveness as positive image and reputation are known to be significant factors of competitiveness (Seyoum, 2007). There has been apparent hesitation of employers including government organizations in India, to recruit ODL learners (Gaba & Li, 2015). In order to meet the changing needs and expectations of the stakeholders, some of the ODL institutions have taken initiatives such as updating existing curriculum, quality assurance and enhancement measures, enhanced student services, international recognition and accreditations to improve market value, collaborative partnerships, enhanced usage of ICT for quality improvement and expansion of their services (Jung, 2005b). Giving utmost attention to the stakeholders, ODL institutions in higher education need to adopt strategy in order to attain competitive advantage by attempting to equip learners with optimum level of technological and employability skills, sensing the change of winds from coordination to cooperation to finally collaborative approach, highlighting the ever increasing stakeholders’ powers in meeting the strategic vision, mission, objectives and goals of the ODL institutions (Faridi & Ouseph, 2014). The practices that may lead an ODL institution to competitiveness are related to quality assurance, focused curriculum, updated policies and effective management, Individualized and interactive student services and tutoring, ICT Innovations, Cost saving and effectiveness and for-profit involvement (Jung, 2005b), which are highly relevant and essential to meet the needs and expectations of various stakeholders.

Table 1. Undesirable Perceptions of ODL Stakeholders (SADC, 2009)

<table>
<thead>
<tr>
<th>Target Group</th>
<th>Concerns / Misconceptions</th>
</tr>
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<tbody>
<tr>
<td>Potential ODL Learners</td>
<td>• Staying motivated while studying at a distance is difficult</td>
</tr>
<tr>
<td></td>
<td>• Will feel isolated / lonely during their studies</td>
</tr>
<tr>
<td></td>
<td>• Will struggle to balance demands of study with other aspects of life successfully</td>
</tr>
<tr>
<td>Current ODL Learners</td>
<td>• Given negative social perceptions, may be concerned that completion of their ODL programme may not yield expected personal benefits</td>
</tr>
<tr>
<td></td>
<td>• May be struggling to balance demands of study with other aspects of life successfully</td>
</tr>
<tr>
<td>Parents</td>
<td>• Available ODL programmes do not cater for learning needs of children</td>
</tr>
<tr>
<td>Employers and Professional Associations</td>
<td>• This group, may be unwilling to invest money in professional development programmes using ODL methods</td>
</tr>
<tr>
<td>Educators and Support Staff in ODL and Mixed Mode Institutions</td>
<td>• Lack of investment in design and ongoing improvement of programmes, courses and materials prevents attainment of necessary quality in ODL programmes</td>
</tr>
<tr>
<td></td>
<td>• Engagement in ODL activities does not contribute to career advancement in traditional educational systems, especially for academics</td>
</tr>
<tr>
<td>Decision-Makers in ODL and Mixed-Mode Institutions</td>
<td>• Average age of student enrolments is declining or will decline in face of growing demand for education that cannot be met by face-to-face education systems</td>
</tr>
<tr>
<td></td>
<td>• Key constituency for growing demand is young, full-time students and ODL may be unsuitable for such student</td>
</tr>
<tr>
<td></td>
<td>• Lack of investment in design and ongoing improvement of programmes, courses and materials prevents attainment of necessary quality in ODL programmes</td>
</tr>
<tr>
<td></td>
<td>• Engagement in ODL activities does not contribute to career advancement in traditional education system, especially for academics</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Decision-Makers, Educators and Career Counsellors in Face-to-Face Institutions/Programmes</th>
<th>ODL demands more rigorous assurance of quality than face-to-face programmes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Key constituency of growing is young, full-time students and ODL may be unsuitable for such students</td>
</tr>
<tr>
<td></td>
<td>ODL programmes may constitute a threat either to individuals’ jobs or to the institutions by which they are employed</td>
</tr>
<tr>
<td></td>
<td>Engagement in ODL activities does not contribute to career advancement in traditional education systems, especially for academics</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Government Decision-Makers</th>
<th>ODL demands more rigorous assurance of quality than face-to-face programmes</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Key constituency of growing demand is young, full-time student and ODL may be unsuitable for such students</td>
</tr>
<tr>
<td></td>
<td>Unregulated growth of ODL will strain national education budgets</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Political Leaders</th>
<th>Key constituency of growing demand is young, full-time student and ODL may be unsuitable for such students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unregulated growth of ODL will strain national education budgets</td>
</tr>
</tbody>
</table>

| Donors/Funders | Given all of above concerns and misperceptions (for all target audiences), may see ODL grants as a waste of money |

**CONCLUSIONS AND RESEARCH AGENDA**

This study has been attempted with the limited scope of proposing the research agenda for further research and studies related to competitiveness in ODL in higher education from stakeholders’ perspective in Indian context, by providing new insights to help researchers in getting some concrete guidance for undertaking their future research. The review arranges for a starting point for future studies by providing a deeper and better understanding of the divergence in the reality and the perceptions of the stakeholders. The significance of ODL system in higher education has increased manifold, over the time, not for learners only but for other stakeholders such as governments, organizations and societies in their different roles. The review of the existing literature showcases and highlights the different aspects of the concepts of ODL, competitiveness and stakeholders and their interrelations in the context of Indian higher education. This review reveals that such kind of studies and relevant literature, which can pay desired level of attention to the stakeholders’ perspective on the competitiveness of ODL in higher education have been few and far between; and there is an urgent requirement of undertaking such studies in order to create and sustain competiveness of ODL in higher education for its survival to be able to reap the rich harvest of the advantages attached to it for the benefits of the developing countries like India.

The review of literature proposes the following research agenda for future research. *First*, Serious efforts are required, to identify the indicators of competitiveness in ODL in Indian higher education in order to create and sustain competitive advantage for its survival in developing countries in general and India in particular, from the future researchers. *Second*, Majority of past studies have focused to examine and evaluate the perceptions of the learners as stakeholder of ODL in higher education in India but in the transformed scenario, greater emphasis needs to be given to the examination and evaluation of the perceptions of various relevant stakeholders to have a deeper understanding through views and opinions of important and influential stakeholders. *Third*, the validity of the distinction among the different key stakeholders identified, based on their importance and influence, needs to be able empirically tested amongst primary and secondary stakeholders.
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INFLUENCE OF AN INSTRUCTIONAL STRATEGY
ON THE ATTITUDES OF UNIVERSITY PROFESSORS
TOWARD DISTANCE EDUCATION

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ABSTRACT
The purpose of the study was to determine the influence of an instructional strategy for the use of DOKEOS, Course Management System (CMS) on the attitudes of professors toward distance education. The study was carried out in the Faculty of Accounting and Administration of a Mexican Public University. The research design was non-experimental with a group of twenty-five professors who were selected through purposive sampling. A questionnaire, which was an attitude scale toward the use of an administration system of online courses, was administered to participants before and after the implementation of an instructional strategy on the use of DOKEOS. Afterwards, usage statistics was examined between weeks three and six. Data analysis included calculation frequency, median, mode and standard deviation. The significant differences between the median of the pre-tests and post-tests were analysed, and then the t-test was administered. Results showed that the instructional strategy contributed to a more positive attitude of professors toward distance education.

Keywords: Vocational training, teacher attitudes, teacher effectiveness, distance education, classroom techniques, educational technology.

INTRODUCTION
The use of computers is one of the main changes that has taken place in the context of technology for the last 150 years. This technology, according to Lopez and Chavez (2013) have led to changes in the activities of the society as a whole, being education the area with the most notable changes and demands. In this respect, Karsenti & Lira (2011), pointed out that Information and Communication Technologies (ICT) are part of diverse study programs as an effective means to promote educational success, and that they represent a priority for the teaching and learning processes in several countries in America and Europe.

In the case of Mexican universities, Andion (as cited in Araiza, 2009) pointed out that the integration process of the ICT has been difficult and slow. In addition, there is resistance and little interest of professors
towards the use of this tool. According to Silva and Astudillo (2012), a major barrier is the attitude that the
teacher adopts with respect to ICT, which is related to teachers’ beliefs and experiences.

Also, Lopez y Chavez (2013), mentioned that international and national organizations have pointed out that
the use of ICT in education is a challenge for teaching and learning traditional approaches. In this respect,
UNESCO (2013) highlighted that professors are frequently considered as a major external influence for
classroom learning, as well as for education in general. This is mainly because of the essential role teachers
play in the implementation of ICT. Also UNESCO (2013) mentioned professors need to know how to teach
students to use the ICT effectively.

In this regard, Lopez and Chavez (2013) stated it is essential that departments and educational institutions
focus their efforts on the preparation of teachers in accordance with the guidelines of the emerging educational
models and training demands of the 21st century Students. The above, raises the question of the importance
of training higher education professors in the effective use of ICTs, which implies dealing with the resistance
to change that is often found due to the lack of comprehensive training projects.

In this vein, it can be said that professors’ resistance to the incorporation of distance education (EaD)
is considered an obstacle for the development of this type of educational programs in Higher education
institutions (Tejedor et al., 2009). In order to offer an online study program (EaD) in the Faculty of Accounting
and Administration (FCA) of a Mexican public university, it is central to consider the participation of
professors. Based on the current curricular model, professors at the FCA conduct their lectures in a presence-
based modality (Facultad de Contaduría y Administración, 2016) and they do not have experience in the
delivery and design of online educational contents.

On the other hand, the Course Management System (CMS) DOKEOS was introduced in 2007, with the
aim of having technological means to assist the institution’s educational processes. In addition, investments
were made in technological infrastructure, and the permanent training program for users of technological
resources of the FCA was created. However, the resistance problem toward the use of CMS DOKEOS at the
FCA still remains (Barajas, 2015a).

The professors’ opposition against the use of CMS DOKEOS was determined on the bases of the following
factors: (a) the usage statistics retrieved from CMS DOKEOS and (b) the results from the Diagnosis of
the Services offered through Information Technologies at the Faculty of Accounting and Administration
(Barajas, 2015a). The first factor was obtained from the usage statistics of CMS DOKEOS for the tools
administration module, which shows the frequency of access to CMS DOKEOS, used tools, connection
time, and the highest affluence hours into the system. Specifically, and based on the cohort of August/
December 2015, results show that 23% of 268 professors used one of the CMS DOKEOS tools for their
courses (Barajas, 2015b).

The second factor was retrieved from the results of the Diagnosis of the Services offered through Information
Technologies at the Faculty of Accounting and Administration (Barajas, 2015a), which is based on the
international model Control Objectives for Information and Related Technology (COBIT). The results of
this diagnosis showed the main obstacles to the adoption of EaD as follows: (a) the limited use of technological
infrastructure of the FCA; (b) the lack of skills for the use of multimedia rooms, laboratory practices; and (c)
the lack of effective training in the use of CMS DOKEOS. On this matter, 66% of the professors pointed
out the absence of training in the use of CMS DOKEOS (Barajas, 2015b).

On this basis, the research problem in this study is the absence of an effective training strategy to promote
positive attitude of professors toward distance education. This research problem is focused on higher
education institutions in Mexico and their tendency to promote distance education with the support of
academic staff effectively trained for this type of instruction (Amador, 2010).

THEORETICAL FRAMEWORK

Instructional Design

Some elements need to be considered in a training process, as well as the components and links between them.
This way the nature of such process can be determined. According to Sangra (2000), it is essential to analyse
the content of the course, the procedure that will facilitate learning, and also the necessary technological resources for the training progress.

In this respect, the concept of instructional design is presented as a process that specifies clearly all the elements that are part of the training and the link between them (Guardia, 2000). In addition, Gonzalez (2017), pointed out that the concept of instructional design is oriented towards the creation of learning environments that facilitate educational processes through the use of technological tools. According to this author, this concept links two dimensions: the technological and the pedagogical.

Based on the above, the definition of instructional design in this research is based on the one presented by Williams, Schrum, Sangra and Guardia (s/f), who pointed out that the instructional design describes a process divided into the following stages: (a) needs analysis of learning and the context where such needs occur, (b) definition of learning objectives (c) resources selection and/or appropriate technological means for the learning process, (d) development of contents and learning activities, and (e) assessment design.

Attitudes of Professors Toward the Use of Information and Communication Technologies (ICT)

According to Robbins and Judge (2009), attitudes are part of the human behaviour and they are learned from the different social groups in which the individual is involved. In this process, people adopt certain predispositions from other persons they admire, love or are afraid of. On the other hand, attitudes can be shaped based on the individual or group interest. Another important aspect of the attitudes is their influence on behaviour; hence, some look for congruence between attitudes and behaviour (Robbins and Judge, 2009).

For the purpose of this research, after the analysis of different concepts of attitude, the most pertinent definition was the one described by Eagly and Chaiken, as cited in Lopez (2004), who pointed out that an attitude is a psychological standpoint that occurs through the evaluation of a particular entity, with a determined approved or non-approved gradation.

In terms of professors’ attitudes and their use of ICT, according to Rodriguez (2012), one of the major concerns of professors is that the training they receive is effective. In this respect, Almekhlafi and Almekhlafy (2010) carried out a study about the attitude of professors toward the usefulness of on-line instruction; results revealed positive opinions and attitudes toward the usefulness of on-line instruction.

On the other hand, Banuelos, as cited in Lignan-Camarena (1999), found that most professors have moderate intentions to use ICT, and that attitude is the most important determinant in the behaviour intention and not the subjective norm. This shows that the intention of using ICT is based on self-control and not on social pressure.

Based on the foregoing, the objective of this study was to evaluate if the professors’ attitudes have improved due to their training in ICT as pointed out by Gilmore, as cited in Orellana, Almerich, Belloch, and Diaz (2004). In this case the aim is to determine the professors’ predisposition after participating in an instructional strategy for the use of CMS DOKEOS as a mean to offer EaD.

Course Management System (CMS)

The course management systems (CMS) are a type of technological platform. The technological platforms are a “wide range of software applications installed in a server whose role is to facilitate the creation, administration, management and distribution of courses via the internet” or to be a course repository (Sanchez, 2005, p. 19). According to Avila and Bosco (2001), the use of technological platforms proves to be very attractive in terms of training.

Within this framework, the main features of a technological platform are: (a) it allows to create virtual working spaces, (b) it does not require to be present in a classroom, (c) the teacher’s attendance is not necessary, (d) there is no need to establish specific timetables, and (e) it can be adapted to different needs, such as the availability of time (Avila y Bosco, 2001). These characteristics help users perform their activities without depending on others; also, they encourage users to look for additional information on their own (De Benito, 2000). In this vein, according to Graft and Albright (2007), a Course Management System (CMS) is defined as a type of technological platform that is part of a learning management system or an independent
system. These authors defined a CMS as a program that allows the development of a support structure to create and administer courses, mainly web pages.

On the other hand, according to Garcia and Castillo, (as cited in Sanchez, 2005), a CMS is a platform that has evolved rapidly in the training activities market over the internet. The CMS can be found in this group of platforms, which are distributed under the General Public License (GPL). This type of platforms offers the user some choices, apart from being free (Stallman, 2005). The CMS DOKEOS are found in this type of platforms.

CMS DOKEOS is a web application that contains a wide variety of tools for training and education. The course management in this CMS is done through three groups of tools: (a) tools for the contents development, which includes the creation of course, exercises, documents and links; (b) tools of interaction, consisting of the course timetable, forums, users, ads and tasks, and (c) the administration tools which include the course settings, maintenance and reports which allow the recovery of statistical information about the use of the course tools and the participation of those registered (Marquez, 2005).

**Distance Education (EaD)**

Distance education (EaD) is among the main trends in education modality, the objective is to assist the social demands in terms of training, quality and relevance are central in this type of education. Keegan, (as cited in Edel, Garcia and Tiburcio, 2008), defined the EaD as a teaching-learning scenario where the professor and the students are separated, they support each other with printed and electronic materials, and their main goal is to learn.

The EaD should not be defined as contrasting to the face-to-face or classroom-based education (Orozco, 2000). According to this author, it is necessary to conceptualize the EaD based on the use of media and ICT, which are the innovative references in the education process and also their support.

The organization: Espacio Comun de Educacion Superior a Distancia de Mexico, defines EaD as follows, cited in Lupion and Rama (2010):

An effort to strengthen the educational systems recovering spaces as well as educational processes globally and permanently, this way access to educational services different from the traditional classroom-based courses is open to those interested in them. This is then the purpose of the development of strategies to connect people who take part in educational processes, even if they do not coincide in place and time (p. 149).

Having analysed concepts of EaD, this type of education can be considered as formal schooling than can be distance in space and time, in part or permanently; and it is based, to a greater or lesser degree, on the management of learning experiences through ICT.

**PURPOSE OF THE STUDY**

To determine the influence of an instructional strategy for the use of CMS DOKEOS on the attitudes of professors toward distance education in the Faculty of Accounting and Administration of a Mexican Public University.

**Research Questions**

1. What is the attitude of professors toward EaD before their participation in an instructional strategy on the use of CMS DOKEOS, in the Faculty of Accounting and Administration of a Mexican Public University?
2. What is the influence of an instructional strategy on the use of CMS DOKEOS on the attitudes of the professors toward EaD, in the Faculty of Accounting and Administration of a Mexican Public University?
3. What is the percentage of use of the CMS DOKEOS tools by professors, after three and six weeks of participating in the instructional strategy on the use of this system, in the Faculty of Accounting and Administration of a Mexican Public University?
METHOD

The research design was non-experimental with a group of twenty-five professors who were selected through purposive sampling. The data to answer questions one and two were collected through a questionnaire named Attitude Scale toward the Use of a Course Management System on Line.

For question number three, descriptive statistics was examined and compared between weeks three and six, after the post-test on the use of CMS DOKEOS. Such statistics refers to the percentage of use of the system tools by 25 professors who participated in the study, thus showing the most and least used tools.

Participants

The characteristics of the professors who participated in this study are described as follows: (a) they were teaching at least one of the study programs of the BA degrees at the FCA, and (b) they had not used the CMS DOKEOS before the training proposed for this study. A purposive non-probabilistic sample was applied. The sample consisted of 25 participants out of a population of 127 professors, who met the requirements mentioned above. It is important to point out that the selection of professors for the sample of this study was anonymous. It is also relevant to mention that the reason of the 25 sample was because it was the highest number of professors who decided to take part in the course, besides they were available during the offered timetable.

Data Collection and Analysis

A questionnaire named Attitude Scale toward the Use of a Course Management System on Line was designed for the data collection. Such instrument was created based on the questionnaire administered in the study conducted by Lopez (2004). The instrument was structured as follows: objective, instructions and 30 closed-ended questions. The section of the closed-ended questions considers the following dimensions: (a) emotional level in the use of a management course system online (5, 7, 10, 12, 13, 14, 15, 16, 18, 19, 22, 24, 27, 28 y 29); (b) benefits of the use of a management course system online (1, 2, 3, 4, 6, 9, 20, 23, 25 y 26); and (c) self-learning in the use of a management course system online (8, 11, 17, 21 y 30). The answer choices of the questionnaire were: 1 (totally agree), 2 (agree), 3 (indecisive), 4 (disagree) y 5 (totally disagree). After the questionnaire design, two types of validation were carried out: (a) one based on content, and (b) a pilot test.

According to Nadelsticher (1983), content validity of the measurement instrument statements can be determined by competent judges and experts. In order to ensure the content validity of the questionnaire: Attitude Scale toward the Use of a Course Management System on Line, the 30 closed-ended questions were revised by two methodology and statistics experts, the aim was to know their opinion in terms of the content of these items. It is important to point out these experts have taken part in Distance education models supported by the use of CMS. They suggested to make some changes in the questionnaire items: four, seven, and thirteen. There was no need to remove questions.

For the second validation, a pilot test was administered to 15 professors who met the selection criteria but were not part of the defined sample for this study. Then, in order to validate the congruency of the 30 items of the instrument, the Alfa de Cronbach was applied. The general results of the validation were 0.779, which according to George and Mallery (2003), an alfa coefficient value higher to 0.7 is acceptable.

The data obtained from the questionnaire were processed through descriptive statistics. A matrix organization was used for the statistical processing of the questions. Frequencies, measures, and central tendency were calculated: mean, mode and the measure of variability: standard deviation, for each one of the 30 items. The Statistical Package for the Social Sciences (SPSS®), version 20.0. was used to process the information. Table 1 and 2 show the results of this analysis.

Also, an analysis of significant differences between the pre-test and post-test means of the three questionnaire dimensions was carried out; then the t test was administered. Pre-test and post-tests results were compared at two different times (Tables 3, 4 and 5). The degrees of freedom calculated for this study are gl= 48; which were obtained from the total of participants in both, the pre-test and the post-test minus 2. These degrees of freedom represent the number of ways in which the data can vary freely.
FINDINGS

The information from the pre-test administered to the 25 professors was analysed descriptively. The results are showed in the table 1:

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>Mean</th>
<th>Mode</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Using a CMS favours my perspective of distance education.</td>
<td>3.040</td>
<td>3</td>
<td>0.888</td>
</tr>
<tr>
<td>2</td>
<td>The use of a CMS encourages me to perform a more interesting and imaginative work while I am teaching the course.</td>
<td>2.720</td>
<td>3</td>
<td>1.137</td>
</tr>
<tr>
<td>3</td>
<td>A CMS encourages me to use my personal abilities.</td>
<td>3.200</td>
<td>3</td>
<td>1.154</td>
</tr>
<tr>
<td>4</td>
<td>A CMS makes higher education in Mexico progress.</td>
<td>2.680</td>
<td>3</td>
<td>1.107</td>
</tr>
<tr>
<td>5</td>
<td>If I had the chance to use a CMS, I would be afraid to damage the equipment somehow.</td>
<td>2.360</td>
<td>1</td>
<td>1.439</td>
</tr>
<tr>
<td>6</td>
<td>The use of a CMS allows me to do a more interesting and imaginative work while teaching a course.</td>
<td>2.880</td>
<td>3</td>
<td>0.927</td>
</tr>
<tr>
<td>7</td>
<td>The use of a CMS prevents me from doing a more interesting and imaginative work while teaching a course.</td>
<td>2.440</td>
<td>2</td>
<td>1.083</td>
</tr>
<tr>
<td>8</td>
<td>It is important to have an instruction manual to learn how to use a CMS.</td>
<td>3.560</td>
<td>3</td>
<td>1.157</td>
</tr>
<tr>
<td>9</td>
<td>A CMS is a major contribution to higher education in Mexico.</td>
<td>2.880</td>
<td>3</td>
<td>1.129</td>
</tr>
<tr>
<td>10</td>
<td>Using a CMS makes me feel uncomfortable.</td>
<td>2.360</td>
<td>2</td>
<td>1.150</td>
</tr>
<tr>
<td>11</td>
<td>I need someone to tell me what the best way to use a CMS is during the course.</td>
<td>2.960</td>
<td>4</td>
<td>1.337</td>
</tr>
<tr>
<td>12</td>
<td>The use of a CMS limits the teaching practice.</td>
<td>2.520</td>
<td>3</td>
<td>1.045</td>
</tr>
<tr>
<td>13</td>
<td>Using a CMS is irrelevant in my teaching practice.</td>
<td>2.480</td>
<td>2</td>
<td>1.228</td>
</tr>
<tr>
<td>14</td>
<td>The use of CMS is a passing trend.</td>
<td>2.320</td>
<td>2</td>
<td>1.215</td>
</tr>
<tr>
<td>15</td>
<td>I think using a CMS is a waste of time.</td>
<td>2.080</td>
<td>1</td>
<td>1.187</td>
</tr>
<tr>
<td>16</td>
<td>It is difficult for me to learn how to use a CMS properly.</td>
<td>2.440</td>
<td>3</td>
<td>1.003</td>
</tr>
<tr>
<td>17</td>
<td>In one way or another, I can solve the problems I have when I use a CMS.</td>
<td>2.520</td>
<td>3</td>
<td>0.918</td>
</tr>
<tr>
<td>18</td>
<td>In order to look less inexpert (a) I would prefer to stop using a CMS.</td>
<td>2.200</td>
<td>2</td>
<td>0.912</td>
</tr>
<tr>
<td>19</td>
<td>I am bored by the idea of using a CMS in my teaching practice.</td>
<td>2.120</td>
<td>1</td>
<td>1.166</td>
</tr>
<tr>
<td>20</td>
<td>I could spend a lot of time using a CMS.</td>
<td>3.040</td>
<td>3</td>
<td>1.019</td>
</tr>
<tr>
<td>21</td>
<td>Every time I take a course in the use of a CMS it is necessary for me to be close to a person with more experience in using the tool.</td>
<td>3.160</td>
<td>4</td>
<td>1.178</td>
</tr>
<tr>
<td>22</td>
<td>Using a CMS inhibits my teaching practice.</td>
<td>2.720</td>
<td>3</td>
<td>1.275</td>
</tr>
<tr>
<td>23</td>
<td>Using a CMS favors the educational process.</td>
<td>3.120</td>
<td>4</td>
<td>1.363</td>
</tr>
<tr>
<td>24</td>
<td>The use of CMS impedes the way of learning.</td>
<td>2.120</td>
<td>2</td>
<td>0.781</td>
</tr>
<tr>
<td>25</td>
<td>The use of a CMS encourages me to keep going.</td>
<td>2.760</td>
<td>3</td>
<td>0.879</td>
</tr>
<tr>
<td>26</td>
<td>The CMS cause changes in the higher education system in Mexico.</td>
<td>3.200</td>
<td>3</td>
<td>1.118</td>
</tr>
<tr>
<td>27</td>
<td>Using CMS makes me feel insecure in what I am doing.</td>
<td>2.360</td>
<td>2</td>
<td>1.220</td>
</tr>
<tr>
<td>28</td>
<td>Working with a CMS makes me nervous.</td>
<td>2.440</td>
<td>3</td>
<td>1.121</td>
</tr>
<tr>
<td>29</td>
<td>Learning to use a CMS seems complicated to me.</td>
<td>2.160</td>
<td>2</td>
<td>0.9865</td>
</tr>
<tr>
<td>30</td>
<td>I could use a CMS independently without asking help from others.</td>
<td>2.840</td>
<td>3</td>
<td>1.106</td>
</tr>
</tbody>
</table>

Source: Own elaboration

In addition, the information from the post-test administered to the 25 professors was analysed descriptively. Results are shown in the table 2.
### Table 2. Central and tendency measures and dispersion of the post-test questionnaire

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>Mean</th>
<th>Mode</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Using a CMS favors my perspective of distance education.</td>
<td>4.240</td>
<td>4</td>
<td>0.723</td>
</tr>
<tr>
<td>2</td>
<td>The use of a CMS encourages me to perform a more interesting and imaginative work while I am teaching the course.</td>
<td>4.200</td>
<td>4</td>
<td>0.816</td>
</tr>
<tr>
<td>3</td>
<td>A CMS encourages me to use my personal abilities.</td>
<td>4.480</td>
<td>5</td>
<td>0.585</td>
</tr>
<tr>
<td>4</td>
<td>A CMS makes higher education in Mexico progress.</td>
<td>4.240</td>
<td>5</td>
<td>0.969</td>
</tr>
<tr>
<td>5</td>
<td>If I had the chance to use a CMS, I would be afraid to damage the equipment somehow.</td>
<td>2.840</td>
<td>1</td>
<td>1.518</td>
</tr>
<tr>
<td>6</td>
<td>The use of a CMS allows me to do a more interesting and imaginative work while teaching a course.</td>
<td>4.320</td>
<td>4</td>
<td>0.627</td>
</tr>
<tr>
<td>7</td>
<td>The use of a CMS prevents me from doing a more interesting and imaginative work while teaching a course.</td>
<td>3.120</td>
<td>4</td>
<td>1.332</td>
</tr>
<tr>
<td>8</td>
<td>It is important to have an instruction manual to learn how to use a CMS.</td>
<td>3.960</td>
<td>4</td>
<td>1.098</td>
</tr>
<tr>
<td>9</td>
<td>A CMS is a major contribution to higher education in Mexico.</td>
<td>4.240</td>
<td>5</td>
<td>0.830</td>
</tr>
<tr>
<td>10</td>
<td>Using a CMS makes me feel uncomfortable.</td>
<td>2.600</td>
<td>2</td>
<td>1.443</td>
</tr>
<tr>
<td>11</td>
<td>I need someone to tell me what the best way to use a CMS is during the course.</td>
<td>3.680</td>
<td>4</td>
<td>1.144</td>
</tr>
<tr>
<td>12</td>
<td>The use of a CMS limits the teaching practice.</td>
<td>2.480</td>
<td>2</td>
<td>1.228</td>
</tr>
<tr>
<td>13</td>
<td>Using a CMS is irrelevant in my teaching practice.</td>
<td>2.160</td>
<td>2</td>
<td>0.986</td>
</tr>
<tr>
<td>14</td>
<td>The use of CMS is a passing trend.</td>
<td>2.560</td>
<td>2</td>
<td>1.356</td>
</tr>
<tr>
<td>15</td>
<td>I think using a CMS is a waste of time.</td>
<td>2.200</td>
<td>1</td>
<td>1.118</td>
</tr>
<tr>
<td>16</td>
<td>It is difficult for me to learn how to use a CMS properly.</td>
<td>2.680</td>
<td>2</td>
<td>1.107</td>
</tr>
<tr>
<td>17</td>
<td>In one way or another, I can solve the problems I have when I use a CMS.</td>
<td>4.240</td>
<td>4</td>
<td>0.925</td>
</tr>
<tr>
<td>18</td>
<td>In order to look less inexpert (a) I would prefer to stop using a CMS.</td>
<td>2.360</td>
<td>2</td>
<td>1.075</td>
</tr>
<tr>
<td>19</td>
<td>I am bored by the idea of using a CMS in my teaching practice.</td>
<td>2.400</td>
<td>1</td>
<td>1.224</td>
</tr>
<tr>
<td>20</td>
<td>I could spend a lot of time using a CMS.</td>
<td>4.120</td>
<td>4</td>
<td>0.781</td>
</tr>
<tr>
<td>21</td>
<td>Every time I take a course in the use of a CMS it is necessary for me to be close to a person with more experience in using the tool.</td>
<td>2.960</td>
<td>2</td>
<td>1.206</td>
</tr>
<tr>
<td>22</td>
<td>Using a CMS inhibits my teaching practice.</td>
<td>2.400</td>
<td>2</td>
<td>0.912</td>
</tr>
<tr>
<td>23</td>
<td>Using a CMS favours communication in the educational process.</td>
<td>4.520</td>
<td>5</td>
<td>0.585</td>
</tr>
<tr>
<td>24</td>
<td>The use of CMS impedes the way of learning</td>
<td>2.520</td>
<td>2</td>
<td>1.262</td>
</tr>
<tr>
<td>25</td>
<td>The use of a CMS encourages me to keep going.</td>
<td>4.120</td>
<td>4</td>
<td>0.881</td>
</tr>
<tr>
<td>26</td>
<td>The CMS cause changes in the higher education system in Mexico.</td>
<td>4.480</td>
<td>5</td>
<td>0.585</td>
</tr>
<tr>
<td>27</td>
<td>Using CMS makes me feel insecure in what I am doing.</td>
<td>2.560</td>
<td>3</td>
<td>1.193</td>
</tr>
<tr>
<td>28</td>
<td>Working with a CMS makes me nervous (a)</td>
<td>2.800</td>
<td>2</td>
<td>1.118</td>
</tr>
<tr>
<td>29</td>
<td>Learning to use a CMS seems complicated to me.</td>
<td>2.360</td>
<td>2</td>
<td>1.150</td>
</tr>
<tr>
<td>30</td>
<td>I could use a CMS independently without asking help from others.</td>
<td>4.040</td>
<td>5</td>
<td>1.135</td>
</tr>
</tbody>
</table>

**Source:** Own elaboration

### Difference between Pre-test and Post-test Means

Tables 3, 4 and 5 show the analysis results of the significant differences between the means of the pre-test and post-test of the questionnaire dimensions: (a) Emotion showed in relation to the use of a course management system online, (b) benefits of using a course management system online, and (c) Self-learning regarding the use of a course management system online.

Also, the table below shows the t test results for each dimension of the questionnaire. The results of this test allowed the comparison of significant differences between the three dimensions of the pre-test and post-test questionnaires.
Table 3. Mean difference of the emotion dimension regarding the use of CMS between the pre-test and post-test questionnaires.

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>Pre-test Mean</th>
<th>Post-test Mean</th>
<th>Difference between Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>If I had the chance to use a CMS, I would be afraid to damage the equipment somehow.</td>
<td>2.360</td>
<td>2.840</td>
<td>0.480</td>
</tr>
<tr>
<td>7</td>
<td>The use of a CMS prevents me from doing a more interesting and imaginative work while teaching a course.</td>
<td>2.440</td>
<td>3.120</td>
<td>0.680</td>
</tr>
<tr>
<td>10</td>
<td>Using a CMS makes me feel uncomfortable.</td>
<td>2.360</td>
<td>2.600</td>
<td>0.240</td>
</tr>
<tr>
<td>12</td>
<td>The use of a CMS limits the teaching practice.</td>
<td>2.520</td>
<td>2.480</td>
<td>-0.040</td>
</tr>
<tr>
<td>13</td>
<td>Using a CMS is irrelevant in my teaching practice.</td>
<td>2.480</td>
<td>2.160</td>
<td>-0.320</td>
</tr>
<tr>
<td>14</td>
<td>The use of CMS is a passing trend.</td>
<td>2.320</td>
<td>2.560</td>
<td>0.240</td>
</tr>
<tr>
<td>15</td>
<td>I think using a CMS is a waste of time.</td>
<td>2.080</td>
<td>2.200</td>
<td>0.120</td>
</tr>
<tr>
<td>16</td>
<td>It is difficult for me to learn how to use a CMS properly.</td>
<td>2.440</td>
<td>2.680</td>
<td>0.240</td>
</tr>
<tr>
<td>18</td>
<td>In order to look less inexpert (a) I would prefer to stop using a CMS.</td>
<td>2.200</td>
<td>2.360</td>
<td>0.160</td>
</tr>
<tr>
<td>19</td>
<td>I am bored by the idea of using a CMS in my teaching practice.</td>
<td>2.120</td>
<td>2.400</td>
<td>0.280</td>
</tr>
<tr>
<td>22</td>
<td>Using a CMS inhibits my teaching practice.</td>
<td>2.720</td>
<td>2.400</td>
<td>-0.320</td>
</tr>
<tr>
<td>24</td>
<td>The use of CMS impedes the way of learning</td>
<td>2.120</td>
<td>2.520</td>
<td>0.400</td>
</tr>
<tr>
<td>27</td>
<td>Using CMS makes me feel insecure in what I am doing.</td>
<td>2.360</td>
<td>2.560</td>
<td>0.200</td>
</tr>
<tr>
<td>28</td>
<td>Working with a CMS makes me nervous (a)</td>
<td>2.440</td>
<td>2.800</td>
<td>0.360</td>
</tr>
<tr>
<td>29</td>
<td>Learning to use a CMS seems complicated to me.</td>
<td>2.160</td>
<td>2.360</td>
<td>0.200</td>
</tr>
</tbody>
</table>

Source: own elaboration.

Table 3 shows there is a difference between the pre-test and post-test means. As it can be observed, in most cases the post-test means were higher than the pre-test means. The 0.195 average and the standard deviation of 0.266 were obtained from the result of the differences between the pre-test and post-test means.

The emotion dimension Means and the pre-test and post-test questionnaires were used to carry out a statistical calculation of the student’s paired t-test. The statistical calculation’s result was \( t = 2.83 \). In addition, the \( t \) value in the Student’s \( t \)-distribution table was found.

To do so, 14 degrees of freedom were used (total of items – 1), also a trust level of 0.05, the value found was \( t = 1.7613 \). The \( t \) values (calculated and found values in the \( t \)-student’s table) are different, and for his reason it can be said that there is a difference in the use of a CMS for online courses between the pre-test and post-test in terms of the emotional level.

Table 4. Means difference regarding the benefit dimension in the use of CMS between the pre-test and post-test.

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>Pre-test Mean</th>
<th>Post-test Mean</th>
<th>Difference between Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The use of a CMS favours my perspective of distance education.</td>
<td>3.040</td>
<td>4.240</td>
<td>1.200</td>
</tr>
<tr>
<td>2</td>
<td>The use of a CMS encourages me to perform a more interesting and imaginative work at the moment I teach the course.</td>
<td>2.720</td>
<td>4.200</td>
<td>1.480</td>
</tr>
<tr>
<td>3</td>
<td>A CMS encourages me to use my personal abilities.</td>
<td>3.200</td>
<td>4.480</td>
<td>1.280</td>
</tr>
<tr>
<td>4</td>
<td>A CMS makes higher education in Mexico progress.</td>
<td>2.680</td>
<td>4.240</td>
<td>1.560</td>
</tr>
<tr>
<td>6</td>
<td>The use of a CMS allows me to do a more interesting and imaginative work while teaching a course.</td>
<td>2.880</td>
<td>4.320</td>
<td>1.440</td>
</tr>
<tr>
<td>9</td>
<td>A CMS is a major contribution to higher education in Mexico.</td>
<td>2.880</td>
<td>4.240</td>
<td>1.360</td>
</tr>
<tr>
<td>20</td>
<td>I could spend a lot of time using a CMS.</td>
<td>3.040</td>
<td>4.120</td>
<td>1.080</td>
</tr>
<tr>
<td>23</td>
<td>Using a CMS favours communication in the educational process.</td>
<td>3.120</td>
<td>4.520</td>
<td>1.400</td>
</tr>
<tr>
<td>25</td>
<td>The use of a CMS encourages me to keep going.</td>
<td>2.760</td>
<td>4.120</td>
<td>1.360</td>
</tr>
<tr>
<td>26</td>
<td>The CMS cause changes in the higher education system in Mexico.</td>
<td>3.200</td>
<td>4.480</td>
<td>1.280</td>
</tr>
</tbody>
</table>

Source: own elaboration
Table 4 shows there is a difference between the pre-test and post-test means; as it can be observed the post-test means were higher than the pre-test means in all the items. The result obtained from this difference was 1.34 and the standard deviation was 0.140.

The benefit dimension Means and the pre-test and post-test questionnaires were used to carry out a statistical calculation of the student’s paired $t$-test. The statistical calculation’s result was $t = 30.33$ Also, the $t$ value in the Student’s $t$-distribution table was found.

To do so, nine degrees of freedom were used (total of items – 1), also a trust level of 0.05, the value found was $t = 1.8331$. The $t$ values (calculated and found values in the $t$-student’s table) differ significantly, so it can be said that there is a difference in the use of a CMS for online courses regarding the benefit dimension.

Table 5. Means difference regarding the self-learning dimension in the use of CMS between the pre-test and post-test

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>Pre-test Mean</th>
<th>Post-test Mean</th>
<th>Difference between Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>It is important to have an instruction manual to learn how to use a CMS.</td>
<td>3.560</td>
<td>3.960</td>
<td>0.400</td>
</tr>
<tr>
<td>11</td>
<td>I need someone to tell me what the best way to use a CMS is during the course.</td>
<td>2.960</td>
<td>3.680</td>
<td>0.720</td>
</tr>
<tr>
<td>17</td>
<td>In one way or another, I can solve the problems I have when I using a CMS.</td>
<td>2.520</td>
<td>4.240</td>
<td>1.720</td>
</tr>
<tr>
<td>21</td>
<td>Every time I take a course in the use of a CMS it is necessary for me to be close to a person with more experience in using the tool.</td>
<td>3.160</td>
<td>2.960</td>
<td>-0.200</td>
</tr>
<tr>
<td>30</td>
<td>I could use a CMS independently without asking for help from others.</td>
<td>2.840</td>
<td>4.040</td>
<td>1.200</td>
</tr>
</tbody>
</table>

Source: Own elaboration

Table 5 shows the difference between the pre-test and post-test Means of the self-learning dimension of CMS for an online course. The post-test Means were higher than the pre-test means except for item 21. The result obtained from the difference between the pre-test and post-test Means was an average of 0.768 and the standard deviation was 0.736.

The self-learning dimension Means and the pre-test and post-test questionnaires were used to carry out a statistical calculation of the student’s paired $t$-test. The statistical calculation’s result was $t = 2.33$. In addition, the $t$ value in the Student’s $t$-distribution table was found.

To do so, four degrees of freedom were used (total of items – 1), also a trust level of 0.05, the value found was $t = 2.1318$. The $t$ values (calculated and found values in the $t$-student’s table) are different, and for his reason it can be said that there is a difference in the self-learning dimension regarding the use of a CMS for online courses.

After three and six weeks of the professors’ participation in the instructional strategy on the use of CMS DOKEOS, the percentage of use of these tools’ system was recovered. The data were obtained through the tool denominated reports (Informes) administration tools’ which is part of the CMS DOKEOS administration’s tool group.

The descriptive statistics refers to the percentage of use of the CMS DOKEOS tools, which identifies the most utilized tools as well as those least used.

Table 6 shows the descriptive statistics of use of the CMS DOKEOS by the 25 professors after three and six weeks of the post-test.
Table 6. Comparative percentage of the de use of the CMS DOKEOS tools between three and six weeks after the post-test administration

<table>
<thead>
<tr>
<th>CMS DOKEOS tools</th>
<th>% of use after three weeks of the post-test</th>
<th>% of use after six weeks of the post-test</th>
<th>Difference between percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Description</td>
<td>92</td>
<td>92</td>
<td>0</td>
</tr>
<tr>
<td>Exercises</td>
<td>12</td>
<td>72</td>
<td>60</td>
</tr>
<tr>
<td>Documents</td>
<td>92</td>
<td>100</td>
<td>8</td>
</tr>
<tr>
<td>Links</td>
<td>76</td>
<td>84</td>
<td>8</td>
</tr>
<tr>
<td>Agenda</td>
<td>16</td>
<td>12</td>
<td>-4</td>
</tr>
<tr>
<td>Forums</td>
<td>8</td>
<td>20</td>
<td>12</td>
</tr>
<tr>
<td>Users</td>
<td>92</td>
<td>100</td>
<td>8</td>
</tr>
<tr>
<td>Notifications</td>
<td>52</td>
<td>80</td>
<td>28</td>
</tr>
<tr>
<td>Tasks</td>
<td>68</td>
<td>100</td>
<td>32</td>
</tr>
</tbody>
</table>

Source: Own elaboration

DISCUSSIONS AND CONCLUSION

Discussion of the outcomes of this study will be presented based on the research questions as follows.

Research Questions One and Two. The following aspects were considered in the dimension denominated emotion in the use of a CMS: fear, interest, imagination, discomfort, limitations, irrelevance, inexperience, boredom, insecurity, nervousness and difficulty (see table 3). Considering the information from this dimension, it can be said that in most cases the post-test Means were higher than the pre-test Means. The result of the differences between the pre-test and post-test Means was an average of 0.195 and a standard deviation of 0.266. This means that the teachers who participated in this study, showed a positive attitude toward the emotion dimension regarding the use of the Course Management System. However, it is important to mention that out of the total items in this dimension, only items 12, 13, and 22 showed a negative difference between the pre-test and post-test Means.

Therefore, it can be said that the items linked to the limitation, irrelevance and inhibition aspects in the use of a CMS, were rated with major scales in the pre-test and lower scales in the post-test. Consequently, the result of the difference of these means allows us to interpret that the limitation, irrelevance and inhibition aspects in the use of CMS decreased after the participant took the training.

In this regard, Lopez (2004) stated that the attitude of the professors toward the use of a Virtual Learning Platform, particularly after they were provided with the training, helped decrease their levels of frustration and anxiety. Moreover, they did not show evidence of negative feelings.

In addition, Tejedor and Garcia-Valcarcel (2006) pointed out that the professors’ fear of ICT reduces gradually after they have taken the training in the use of these technological tools. They also added that trained professors reported positive appraisals and feelings toward the use of technological means.

In relation to the dimension denominated Benefits of the use of CMS, some aspects regarding the individuals were considered, such as: encouragement, abilities and interest in terms of the use and time spent in the CMS; some other aspects related to higher education in Mexico were considered too, as well as the benefits of this education level in the use of a CMS (see table 4).

Based on the above, it was determined that the post-test means were higher than the pre-test means for all the items. The result of the differences between the pre-test and post-test means was an average of 1.34 and a standard deviation of 0.140.

In this sense, it can be said that the professors taking part in this study showed a positive attitude toward the dimension: Benefits of the use of the CMS. Consequently, it can be inferred that the participants’ opinion on the EaD improved as a result of the training; and that the professors are more motivated and confident regarding their abilities to use the CMS as a tool that favours communication in their educational processes.

Additionally, the results of the pre-test and post-test means showed that after the training, the participants valued the importance of using the CMS in the higher education level in Mexico.
In this respect, Barajas, Noyola and Benitez (2012) pointed out the relevance of the use of a course management system as a mean of communication for the educational processes in a higher education institution in Mexico. In addition, these authors stated that the use of a CMS is perceived positively by professors due to the services offered to facilitate the teaching and learning activities, as well as the training processes that favour higher education in Mexico.

On the other hand, Chavez (2010) carried out a study on the effectiveness of a training course on ICT, which showed that motivation for the use of an administrative software increases after participating in a training session supported by the use of a CMS. This study also showed the effectiveness of the training course since professors were able to develop better personal abilities to use and implement the studied software.

The dimension denominated self-learning in the use of a CMS included the professor’s opinion about the support they can get from people and materials for the use of the CMS (see Table 5).

Therefore, it can be said that for most of the items of this dimension, the post-test means were higher than the pre-test means. However, it is important to mention that out of the total items in this dimension, only item 21, which is the one related to assistance from an expert in the use of the CMS, showed a negative difference between the pre-test and post-test means.

In this respect, it can be said that the professors participating in the study showed a positive attitude toward the dimension: Self-learning in the use of the CMS. Also, it can be inferred that, as a result of the training, the participants were willing to invest more time in the use of the CMS, to ask for help from experts if necessary, to revise instruction manuals and/or solve possible problems in the use of the CMS.

Regarding the interpretation mentioned above, Vidal-Martinez and Camarena-Gomez (2018), as well as Scagnoli (2005) determined that virtual environments facilitate and promote self-learning because the users of these systems are the ones in charge of the information. However, one of challenges of the use of the CMS is to lead self-learning toward collective knowledge of the CMS’s users (Scagnoli, 2005).

Similarly, Lopez (2004) claimed that the initial perception professors had about their ability to use the ICT independently, was transformed after the training they received.

Finally, based on the analysis and interpretation of results, it was concluded that the attitude of the professors toward offering EaD, defined in the dimensions: “Emotion in the use of a CMS”, and “Self-learning in the use of a CMS”, was affected positively after the professors participated in the “Workshop on instructional design for online courses using CMS DOKEOS”.

**Research Question Number Three.** In order to interpret the difference between the percentage of use of the CMS DOKEOS tools after three and six weeks of the post-test administration, it is necessary to point out that the tools in this comparison are the same ones included in the instructional strategy content of the Workshop on instructional design for online courses using CMS DOKEOS. Based on that information, it can be said that most of the tools of the CMS DOKEOS increased the percentage of use by the participants in this study. However, it is important to mention that the percentage of use remained the same between the three and six weeks of analysis, this was due to the central characteristic of the tool, which implies that the course program is published at the beginning and then there is no need for subsequent adjustments. In the case of the Agenda tool, the percentage decreased 4%, this might be because professors are accustomed to using a CMS at a presence-base modality, so the usually indicate the activities in person.

As in this study, Chavez (2010), stated that the application level of knowledge after a training course in the use of ICT increased positively. Chavez also reported that the trained professors expressed agreement with the application of their knowledge in their working context. In addition, Zempoalteca, Barragan, Gonzalez and Guzman (2017), Gros and Silva (2005) affirmed that the relevance of the ICT regarding their communicative effects and their impact on the distance-base teaching, is a key factor in the professors’ initial and continuous training.

In the view of the above, it can be stated that the professors’ attitude after the CMS DOKEOS training was positive in comparison to the attitude they showed before the training. Consequently, it can be concluded that the instructional strategy denominated Workshop on Instructional Design for Online Courses using CMS DOKEOS, contributed to the change in attitude of professors toward the use of this system for EaD.
Furthermore, the increase of the percentage of use was evident from week three to week six after the post-test administration, it is therefore concluded that professors are willing to invest more time in the effective utilization of the CMS tools, which shows a positive attitude toward the use of technological means.

Finally, it is important to mention that this research is the first referent that will allow the design and implementation of distance education programs in the host institution of this study. Hence, it can be said that the methodological development of this project can be replicated in academic institutions of the host public university and also in other higher education public institutions in Mexico.

**Limitations of the Study**

The main limitation of this research is that the instructional strategy was designed for the CMS DOKEOS, which means that the results from this study cannot be extrapolated to other similar systems due to possible difference of structure and technological tools, consequently the use and the instruction can be also different.

The fact that the research has been carried out at a specific time in the professors’ life, can be another limitation of this study as other groups with different characteristics might show different results.

Finally, the results of this research were established by the professors’ statements, who were selected intentionally. Therefore, another disadvantage is not to consider their students’ opinion with the purpose of complementing a more detailed view of the attitudes that teachers have before and after being trained in the use of CMS DOKEOS.

**Prospective Vision of the Study**

The results obtained from this study represent part of the necessary information to design distance education programs in the host institution. Therefore, the authorities are invited to analyse the results of this research in order to make the necessary decisions in relation to the training and qualification of professors to successfully participate in distance learning methods supported by the use of the CMS DOKEOS.

As already mentioned, the results of this research work cannot be replicated in other course administration systems, because this research was focused on the CMS DOKEOS. However, the findings of this research will be useful to promote the design of instructional strategies of similar technological systems.

For future research related to the topic of attitudes, instructional design and distance education, it is recommended to propose the following lines of research: (a) studies that generate evidence and / or knowledge about the practice of facilitating learning, by means of creation , use and administration of processes information and communication and technologies, (b) evaluations and proposals that produce knowledge about the application of empirical processes of educational practice and of the different instructional theories, to the instructional design of diverse educational modalities and (c) works on the background, evolution and trends of distance education models, which serve as the basis for developing relevant proposals for distance education and design educational evaluation models of this modality.
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ORGANIZATIONAL, PSYCHOLOGICAL AND PEDAGOGICAL CONDITIONS FOR THE USE OF E-BOOKS AND E-TEXTBOOKS AT SCHOOL

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ABSTRACT

The article defines the organizational, psychological and pedagogical conditions for the use of e-books and e-textbooks at school. The difference between e-books and e-textbooks is distinguished on the basis of systematization and comparison of scientific positions. Content analysis is made to determine the organizational and pedagogical conditions for the introduction of e-textbooks. The experience of using e-textbooks and e-books at school was generalized based on the results of a regional experiment, in which 25 schools participated. The results of the survey and questioning of 352 students, 296 teachers, and 357 parents are described. The results reveal the needs of respondents in e-textbooks and e-books, identify the advantages and disadvantages of their implementation. The main organizational, psychological and pedagogical conditions are defined. These are educational policy concerning the introduction of eLearning (requirements for mandatory e-textbooks, financial support for purchasing and updating, examination, standards for e-textbooks), availability and diversity of e-textbooks and e-books on the market of educational services, logistic, educational and methodological support of educational institutions, ergonomics, readiness of teachers, students, their parents to use e-textbooks and e-books, digital competence of teachers and students.

Keywords: e-Book, e-textbook, e-learning, interactive e-tutorials, digital textbooks.

INTRODUCTION

Globalization, the development of the information society and knowledge society promote SMART-Education and require a change in the content of education, the development of new techniques for the creation and use of eLearning content, that is rapidly evolving and becoming more diverse in the form of presentation. There are fundamental changes in pedagogy. Education is becoming personal, networked and adapted, using accessible and open content (Keats & Schmidt, 2007).

Distribution of smart systems, virtual and complementary reality, mobile devices also leads to the need for content modification, the introduction of microlearning, U-learning, e-Learning, which will allow students to study during the whole life from any device and be constantly in the information and education environment. The challenge for the school is to prepare students to take responsibility for their lifelong learning with the use of digital resources and tools. The rapid development of mobile devices facilitates the rapid dissemination of e-textbooks that can be used in real time and for distance learning (Fojtík, 2015). The development of cloud services and Web 2.0 services provides new opportunities for the use and creation of e-textbooks and the introduction of open education (Lee, Messom & Kok-Lim, 2013). Incorporation of digital technologies into the innovation and transformation processes of the society, the development and management of the learning environment are extremely important tasks due to which students can attend virtual classes, museums, use e-textbooks and other online tutorials from many sources at any time of the day or night (Goodyear & Retalis, 2010). E-books or e-textbooks offer universities or schools the additional environment, instructions or recommendations that improve the quality of learning. According
to the scientists from Malaysia, there are significant benefits of using e-books as textbooks in schools, and this is a new paradigm, especially for developing countries. E-books are different in terms of content and design, but all of them should meet the needs, abilities, interests of students and take into account the level of their knowledge. (Embong et al., 2012).

In order to provide inclusive education, it is necessary to use e-textbooks that take into consideration the peculiarities of teaching students with special needs, for instance, visually impaired ones. An e-textbook that contains two subsystems: Writer (comprising various categories of interactive exercises) and Reader (providing multimodal interaction, having search functions, marking, suggestion repetition, comments from users, activity record, and context-sensitive help for the dual user interface) can be an example. (Grammenos et al., 2007).

The content of e-books and e-textbooks for higher school should contain more research evidence. That was confirmed by a study at one of the UK universities (Rowlands, Nicholas Jamali, Huntington, 2007). The survey identified the needs of students in various types of e-books: textbooks (59.9%), reference books (52.4%), research monographs (46%).

The findings of the researchers gave answers to the questions about the conditions for the transition to e-textbooks and the choice of technologies for its implementation. They defined the conditions for the introduction of e-textbooks. Among them there is ensuring low cost of educational materials, standardization of content and its updating, improvement of e-content perception, reduction of health risk, protection of copyright. Technologies for creating and using e-textbooks can be divided into Hardware Technology (Multi-touch Technology, Electronic Paper, Flexible Display) and Software Technology (Reader Applications, Web 2.0 in Education, Web Services, Cloud Computing, Visual-Syntactic Text Formatting) (Lee, Messom & Kok-Lim, 2013).

A promising direction for the development of e-textbooks is the study of hybrid e-textbooks, which allow you to combine educational content with smart devices in the classroom, using both digital publications and the Semantic Web tools (Ghaem Sigarchian and all, 2018).

Teachers pointed out that the design of interactive e-books helps students develop the necessary learning skills: technological abilities, reading and writing skills, the ability to cognize and meta-knowledge. In addition, students note that interactive e-books positively influence their evaluation through the use of audio and visual content (Batoon, Glasserman MORALES, & Figueroa, 2018).

**Problem of Research**

The development of ICT and e-resources contributes to the introduction of digital resources in education and promotes scientific research on the conditions and consequences of the use of e-books, e-textbooks at school. The development of the e-textbooks industry has been widely reflected in the scientific researches on the effectiveness of their use, but the definition of organizational, psychological and pedagogical conditions for the use of e-textbooks and e-books at school remain beyond the attention of researchers. The views of teachers, students and their parents on the feasibility of using e-textbooks and e-books from a certain age and their impact on the success and health of children still require being studied. An additional analysis of the use of the concepts of “digital textbook”, “e-textbook”, “e-book” needs to be made to determine the opportunities, advantages and disadvantages of using these tools at school.

**Research Focus**

To determine the conditions for the introduction of e-textbooks and e-books at school, we first determine their differences and the possibilities of use. The analysis of search queries in Google’s trends has shown that in different parts of the world there are different approaches to the use of terms e-book, digital book, e-textbook. The most commonly used concept in science and in life is the term e-book.
The evolution of electronic materials from the earliest implementations at the beginning of the age of the Internet until today determines that most e-books are the original versions of classical (printed) analogues. This does not provide them with a particular advantage in using information technology. The first e-books were created by the volunteers manually, and the development of ICT and digitization or scanning allowed to create and maintain the work of well-known digital libraries and encyclopedias (https://www.wdl.org, https://books.google.com, www.theeuropeanlibrary.org).

The conceptual foundations for the formation of the world’s digital funds are the digitization of archival and library funds from different countries (Library and Archives Canada, National Library of Australia, Bibliothèque nationale de France, British Library, Vernadsky National Library of Ukraine). When creating digital libraries, it is important to identify technical and technological standards based on an internationally accepted system of requirements that will integrate digital resources into global digital projects.

C. Armstrong analyzes the concept of a book and e-book in science and proposes to define e-books as ‘any content that is recognizably ‘book-like’, regardless of size, origin or composition, but excluding serial publications, made available electronically for reference or reading on any device (handheld or desk-bound) that includes a screen’ (Armstrong, 2008).

E. Morgan wrote in the 20th century, ‘Electronic books are not just e-texts. E-books mean a combination of hardware/software used to read electronic data on a portable electronic device specially designed for such purposes’ (Morgan, 1999).

E-books can be defined as books that are ready to be read by computers or e-book readers, and they have some other additional features than printed books: visual and sound effects, and interactive links. The technology of e-books is supported by hardware, software and standard protocols, and some of its advantages and disadvantages have become an integral part of our academic and everyday life (Anameric & Rukanci, 2003).

The use of digital tools requires new ways of thinking and teaching, advanced training programmes. Something more than digital tools is needed to implement e-textbooks (Gronlund, Wiklund & Boo, 2018). A professional development course has shown that e-textbooks allow a teacher to use digital instruments and new approaches and prompt creative reasoning and argumentation processes (Swidan, & Abu-Abdoon, 2018).

An e-textbook is a digitized (or electronic) form of a textbook that usually requires approval by the government when it is used in the K-12 education system (Lee, Messom & Kok-Lim, 2013). Therefore, an e-textbook can be an e-book or a scanned version of a printed textbook.

E-textbooks differ from e-books in having both interactive links and interactive elements which are created using Adobe Flash or Java technology and appropriate for use on different devices (Pesek, Zmazek, & Mohorcic, 2014).

Digital textbooks should provide educational content through multimedia tools such as video, animation and virtual reality and their interactive features should stimulate individualised learning (Jang, 2014).
Researchers believe that it is the format of digital resources that is the basis for the classification and understanding of the difference between the concepts of e-books and e-textbooks. E-textbooks can be classified according to their content (Pesek, Zmazek & Mohorcic, 2014): d-textbooks (digitized e-textbook). They fully repeat the text formats of textbooks (pdf, EPUB2); r-textbooks (rich textbooks). Video, sound and the basic questions for self-control are added to d-textbooks. I-textbooks (interactive e-textbooks): interactive elements (simulators, didactic games, interactive models, maps, analytics, etc.) in HTML 5 and EPUB 3 format are added to r-textbooks.

Some e-textbooks have advantages over classical textbooks and they are called i-textbooks (interactive textbooks). This term identifies the new generation of e-textbooks that use the new media and provide good interaction with the user. The interactive elements of i-textbooks contribute to self-study and allow students to perform their activities many times on different sets of input data. The main technological advantage of i-textbooks is that they work on all devices because their content is developed using script-supported HTML5 tools JavaScript (Pesek, Zmazek & Mohorcic, 2014).

The desirable characteristics of a good e-textbook are the following (Lokar, 2015): availability on the Internet with the possibility to transfer to your own funds; adaptation to the needs of teachers, students and their groups; cost efficiency and productivity by reducing the time and money spent on creating and future changes and adaptations; adaptability to technology changes without redevelopment and transcoding costs; the ability to use different tools in different learning environments; the use of parts of the e-textbook in different contexts. The focus of our study is to summarize the best practice of using different types of e-textbooks and e-books and to determine which organizational, psychological and pedagogical conditions for using digital textbooks are effective.

PURPOSE OF THE STUDY

The purpose of the study is to define organizational, psychological and pedagogical conditions for the use of e-books and e-textbooks at school. The objectives of the study are to define organizational, psychological and pedagogical conditions for the use of e-books and e-textbooks, to analyses surveys on training with digital textbooks in order to determine the opportunities, disadvantages and benefits of their use at school.

METHOD

The research was carried out within the framework of the regional experiment of the research work “Organizational, psychological and pedagogical conditions for the introduction of elements of eLearning at school”. The students of 5th, 6th grades from 25 schools in the city of Kiev took part in the research. They received netbooks at regional funds and trained with e-books and e-textbooks.

The methods of research are theoretical: systematization and comparison of scientific regulations, experience of introduction of e-books and e-textbooks at school to determine the possibilities of their use; empirical: observation, questionnaires for determining the needs of teachers, students and their parents; content analysis to determine the organizational and pedagogical conditions for the introduction of e-textbooks. The purpose of the survey is to analyze the opportunities, challenges and benefits of using e-textbooks at school. 1005 respondents: 352 students, 296 teachers, 357 parents took part in the research.

15 experts (the representatives of the Department of Education, school leaders, coordinators responsible for informatization of education in schools, IT teachers) were involved in the definition of organizational, psychological and pedagogical conditions for introducing e-textbooks.

The schools that took part in the study included schools, gymnasiums, lyceums and special needs boarding schools. This provided the representativeness of the sample and the completeness and reliability of the reflection of the features of secondary education institutions in the Ukrainian capital. All educational institutions that participated in the experiment held the council meetings and formed supervisory and experimental groups of pupils of the 5th and 6th grades.
Participants

At the first stage (diagnostic) a survey of teachers of advanced training courses on the use of e-textbooks in professional activities was held. The Center for Scientific and Educational Innovation and Monitoring in Kyiv conducted a survey of the community of teachers and parents on their attitude towards the introduction of e-textbooks instead of printed ones, to the safety of their use for students’ health. 215 respondents attended the open online survey: 62 students’ parents, 153 teachers (headmasters, teachers).

At the second stage of the experiment, 13 institutions of comprehensive secondary education in Kyiv, in which this technology was introduced during the year, participated in questionnaires and interviews about the possibilities, challenges and advantages of introducing e-textbooks. The number of respondents was 285 people: 53 teachers, 154 pupils of the 6th grade, 78 parents.

At the third stage, 12 institutions of secondary education in the city of Kyiv participated in the survey. They joined the introduction of e-textbooks, taking into account the experience of educational institutions, which have already used e-textbooks for a year. The number of respondents was 505 people, including 90 teachers, 198 students of the 5th grade and 217 parents.

Data Collection and Analysis

The following tools were used to collect data in this study: questionnaires for students, teachers and parents. Participants were provided with a questionnaire on the Internet, answers were given anonymously, indicating only the name of the school in which the student is studying, or the teacher is working, the analysis of the documents, the analysis of school reports and consultation requests that implement experimental work, the analysis of general information for medical examinations of students.

FINDINGS

At the first stage of the experiment, we determined the importance of certain conditions that influence the introduction of e-textbooks using the method of determining the relative frequency of the choice of the experts (Smirnov, 1990).

It should be noted that a group rating is considered to be sufficiently reliable only in case of a high level of consensus among the experts. Therefore, the statistical processing of information obtained from the experts also includes an assessment of the level of consensus among the experts, which was determined using Kendall’s coefficient of concordance (\(W\)).

\[ v = \frac{\sum_{i=1}^{n} x_i}{T \cdot n}, \text{ where} \]

\( v \) - relative frequency of the selected indicator;
\( n \) - the number of experts;
\( T \) - the highest score according to the applied scale;
\( x_i \) - evaluation by an i expert;
\( \sum_{i=1}^{n} x_i \) - the sum of points according to the chosen indicator.

Scoring: significant-3 points, partly significant (rather yes, than no) - 2 points, partly negatively significant (rather no, than yes) - 1 point, insignificant - 0.
Table 1. The importance of conditions that affect the use of e-textbooks in the educational process

<table>
<thead>
<tr>
<th>Conditions (factors)</th>
<th>Expert assessments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Educational policy in the field of eLearning introduction</td>
<td>0</td>
</tr>
<tr>
<td>Availability and variety of e-textbooks and e-books on the market of educational services</td>
<td>0</td>
</tr>
<tr>
<td>Logistic and methodological support</td>
<td>0</td>
</tr>
<tr>
<td>Ergonomics</td>
<td>0</td>
</tr>
<tr>
<td>The readiness of teachers, students, their parents to use e-textbooks and e-books</td>
<td>0</td>
</tr>
</tbody>
</table>

All the experts noted the importance of the proposed conditions for the effective use of e-textbooks in the educational process. The functional capabilities of e-textbooks, their methodological and methodical components have the greatest influence on the effectiveness of the introduction of these tools in the educational process.

Verification of the consistency of expert assessments is checked by the coefficient of concordation, which is calculated by the formula:

\[ W = \frac{12 \cdot \sum (x - \bar{x})^2}{m^2(n^3 - n)} \]

\( W = 0.528 \), indicating an average degree of consistency of expert assessments.

The organizational, psychological and pedagogical conditions for using different types of e-books and e-textbooks at school can be defined as a set of factors that provide the organization, regulation, interaction of objects and phenomena of the pedagogical process to ensure quality education using eLearning tools.

**The First Condition: Educational Policy in the Field of e-Learning Introduction**

The e-book market is chaotic. For example, American schools offer a number of business models for the creation of a collection of e-books and e-textbooks: subscription to permanent access, license for a certain period, license with a certain amount of traffic, the simultaneous use with other digital products, the usage fee (for example, price per download). The New York Department of Education is contracting with Amazon to provide access to the e-collection to 1,800 public schools and, accordingly, 1.1 million students. The experience when every school bought e-books on its own was found to be ineffective from a financial point of view. Amazon offers the delivery of e-textbooks and other electronic content to the Education Department and manages it. At the same time, specialized tools allow teachers to track student progress, while students can use the built-in vocabulary and give feedback on the content. A model with constant unlimited access is the most popular among schools: the school pays for one copy of the publication, which can be used indefinitely (Ivashina, 2015).

A similar situation is with the use of e-textbooks and e-books in Ukraine, where since 2000s the educational e-books and e-textbooks market has developed. Until 2018, teachers and schools themselves identified the need for e-textbooks, according to the proposals (https://novashkola.ua, novashkola.com.ua, kmmedia.com.ua/books/, rozumniki.net) and their own IT infrastructure.

The survey of 300 teachers in advanced training courses showed that most of them (56.5%) episodically introduce e-textbooks into the educational process, and 23.9% of teachers do this systematically.

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However, the “Experiment on the implementation of the electronic textbook and electronic platform” has begun in Ukraine since 2018. The main purpose of it is to create the preconditions for the development of a system for the production of quality educational electronic content and to provide access to it for applicants of secondary education.

The study of the views of parents and teachers at the first stage of the experiment revealed that, in general, respondents favor the replacement of printed textbooks by electronic ones. More than half of parents (58.1%) are interested in innovations. The obtained results testify to the mixed opinion of teachers about the transfer of all schools to electronic textbooks. Although the majority (55.2%) of teachers are more likely to approve such a changeover, their opinion is uncertain, because the number of the teachers who fully endorse such a decision is 0%. More than a third of teachers and educators (36%) do not approve the idea of switching to e-textbooks. For 73.2% of respondents, it’s important to use e-textbooks free of charge and to propose government funding for innovation. Only 25.2% of respondents indicated readiness to refund the money for an e-textbook in the case if it was damaged. Parents and teachers have emphasized the need for educational policy on the introduction of e-textbooks and e-books.

Educational policy (at state, regional, educational institution level) in the field of introduction of eLearning (requirements for compulsory e-textbooks, financial support for the purchase of e-textbooks, examination, standards for e-textbooks, etc.) promote the systemic and efficient use of e-books and e-textbooks at school.

**The Second Condition: Availability and Variety of e-Textbooks and e-Books on the Market of Educational Services**

Let’s consider what characteristics of e-textbooks and e-books affect their choice at school.
The variety of e-textbooks on the educational market, globalization, the development of ICTs enables teachers to choose any textbooks and use open educational electronic resources (digital encyclopedias, libraries). Characteristics of e-textbooks are basic to determine their price, the devices on which they will be installed, the need of the access to the Internet, that is logistical support of schools. E-textbooks should be designed to support various operating systems, such as Windows, open source Linux software for PCs and iOS, open source Android software for smart devices, and affordable and open-source, high-quality content.

Table 2. Students’ answers to the question: “What e-textbooks are more convenient for you to work with?”, %

<table>
<thead>
<tr>
<th>Characteristics of e-textbooks</th>
<th>At the second stage of the experiment, %</th>
<th>At the third stage of the experiment, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>e-textbooks that contain videos, presentations, and tests</td>
<td>46.7</td>
<td>45.5</td>
</tr>
<tr>
<td>equally interesting and convenient</td>
<td>36.4</td>
<td>29.3</td>
</tr>
<tr>
<td>those that completely repeat printed textbooks</td>
<td>16.9</td>
<td>16.7</td>
</tr>
</tbody>
</table>

Table 3. According to the teachers the benefits of using e-textbooks are:

<table>
<thead>
<tr>
<th>The benefits of using e-textbooks</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>interest of students</td>
<td>79.2</td>
</tr>
<tr>
<td>the amount of illustrative material that provides a practical visual training</td>
<td>67.9</td>
</tr>
<tr>
<td>simplifying of work with the content due to tabs and page lookup capabilities</td>
<td>64.2</td>
</tr>
<tr>
<td>the ability to allocate individual words and phrases for clarity and concentration of attention</td>
<td>35.8</td>
</tr>
</tbody>
</table>

Table 4. According to the students the benefits of using e-textbooks are:

<table>
<thead>
<tr>
<th>The benefits of using e-textbooks</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>the school bag becomes lighter</td>
<td>82.5</td>
</tr>
<tr>
<td>you can quickly find the right information</td>
<td>30.5</td>
</tr>
<tr>
<td>you can work on different gadgets both at home and at school</td>
<td>17.5</td>
</tr>
<tr>
<td>modern submission of information</td>
<td>48.1</td>
</tr>
<tr>
<td>I like to use while studying</td>
<td>50.0</td>
</tr>
</tbody>
</table>

Teachers should provide a learning environment that uses existing technology. Modern technological advances facilitate teachers’ access to differentiated material and allow them to create their own textbooks and distribute them on the Internet without involving publishing networks (FlipSnack, Batalugu, Storyjumper,
The respondents noted that the creation of their own textbooks is an opportunity, but “it depends on the topic.” Others claimed that it would be better to have a database of teaching materials, prepared by experts and authors of printed textbooks. You can use amazon.com, www.apple.com/ipad en.wikipedia.org, ck12.org, discoveryeducation.com. Teachers can download e-textbooks from https://play.google.com or create their own (wikibooks.org).

Table 5. Teachers’ opinion on the basic conditions for the effective use of e-textbooks at the lessons, %

<table>
<thead>
<tr>
<th>The effective use of e-textbooks at the lessons</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>shock resistance of the device</td>
<td>66.0</td>
</tr>
<tr>
<td>the e-textbook should match the paper counterpart</td>
<td>62.3</td>
</tr>
<tr>
<td>availability of the Internet</td>
<td>62.3</td>
</tr>
<tr>
<td>the battery life of the device</td>
<td>58.5</td>
</tr>
<tr>
<td>free device</td>
<td>54.7</td>
</tr>
<tr>
<td>the ability of a teacher to work with a laptop at home</td>
<td>43.4</td>
</tr>
<tr>
<td>availability of installed programs to create documents, presentations, etc.</td>
<td>41.5</td>
</tr>
<tr>
<td>the ability to set up parental controls on the device (restricting access to specific sites, programs, time settings)</td>
<td>37.7</td>
</tr>
<tr>
<td>possibility of software to update e-textbooks</td>
<td>35.8</td>
</tr>
<tr>
<td>intuitive interface (ease of the use of an e-textbook)</td>
<td>34.0</td>
</tr>
<tr>
<td>using devices in the network to control students’ work</td>
<td>34.0</td>
</tr>
<tr>
<td>equipping classes with broader desks</td>
<td>24.5</td>
</tr>
<tr>
<td>two projectors</td>
<td>15.1</td>
</tr>
</tbody>
</table>

Creating an information and education environment and providing it with e-books and e-textbooks can encourage students to network and collaborate with other members of the learning community. It also develops distance education and self-education. For example, the resource for creating e-books and e-textbooks is the Lightbox multimedia educational platform that allows you to embed videos, audio files, slideshows, Google maps, web links, etc. in the materials for a specific topic. It’s a fully interactive, multidimensional, additional solution for students who seek to improve communication skills and literacy (Ivashina, 2015).

The Third Condition: Logistic and Methodological Support

Availability of IT infrastructure in an educational institution for the introduction of e-textbooks is the following: hardware (netbooks, computers, tablets, e-books), a local network, access to the Internet; licensed software (e-textbooks, e-books); access to digital libraries, the use of cloud services, Web 2.0, etc.; support services (system administrators, consultants, computer science teachers) for updating e-textbooks, installing them on the device, providing data protection and copyright; methodical recommendations for the use of e-books, e-textbooks at school.

After the first stage of the experiment, schools determined the need for the purchase of special cabinets for storing computer equipment and ensuring their work in sanitary norms. New features of devices (RAM and hard disk, batteries, etc.) are determined. There was a problem with installing additional software with antivirus and parental control programs.

The teachers found the need for methodological recommendations for delivering lessons with e-textbooks, the preparation of lessons using lesson designers and proposed the creation of a database of teaching materials for the experience exchange.

Teachers’ own methodological materials, which they can control and assume responsibility for the structure, updating and implementation of the educational process helped the teachers to acquire both the experience of self-replenishment, renewal of professional knowledge, personal involvement in this process, responsibility for it, and opportunities to manage their resources, to offer them for studying.
Ensuring the monitoring and control over the use of e-textbooks by teachers and students contributed to the comprehensive control of the learning process, the objectivity of evaluation. Teachers needed an analysis of the statistical information accumulated during the learning process, such as the number of requests for help, the time spent on individual tasks, the problems with downloading e-textbooks, etc.

The Fourth Condition: Ergonomics

Concerns about the negative impact on the health of children were reported by only 12.4% of respondents, 17.1% were unable to determine the answer, and 70.5% are sure that there is not such a threat. According to the respondents, the main requirement for electronic textbooks is safety for the user’s eyesight. The respondents identified the main criteria of e-textbooks: high-quality image (76.7%), ease of use (73.6%), the ability to update the content (63.6%). Among parents who agreed on the necessity to use e-textbooks, the majority were in favor of introducing them to 10-year-old students (35.5%). 22.6% of the respondents agreed that e-textbooks can be introduced from the age of 6, and only 14.5% - from the age of 16, others believe that any age is acceptable. After the introduction of e-textbooks in experimental groups, the opinion of parents almost did not change: 36.4% of them indicated that the most expedient to study using e-books and e-textbooks from the 5th grade.

Table 6. Parents’ answers to the question: “In your opinion, when is the most expedient to switch to electronic textbooks at school?”, %

<table>
<thead>
<tr>
<th>Grade</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>from the 1st grade</td>
<td>6.9</td>
</tr>
<tr>
<td>in elementary school, excluding the 1st grade</td>
<td>11.5</td>
</tr>
<tr>
<td>from the 5th grade</td>
<td>36.4</td>
</tr>
<tr>
<td>in secondary school, but not in the 5th grade</td>
<td>13.4</td>
</tr>
<tr>
<td>in high school (from the 10th grade)</td>
<td>11.5</td>
</tr>
<tr>
<td>hard to say</td>
<td>15.7</td>
</tr>
<tr>
<td>no matter what grade</td>
<td>4.6</td>
</tr>
</tbody>
</table>

Regardless of the stage at which e-books are implemented, interviewed institutions are (http://archive.chytomo.com/news/e-pidruchniki-v-shkolax-amerikanskij-dosvid), all of them insist that the combination of printed and electronic content is a valid standard in schools and school libraries, besides, this tendency will be maintained for a long time.

In our survey, almost half of the students like to work with both printed and electronic textbooks.

Table 7. The students’ choice for the use of printed and electronic textbooks, %

<table>
<thead>
<tr>
<th>The students’ choice</th>
<th>At the second stage of the experiment, %</th>
<th>At the third stage of the experiment, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>printed and electronic</td>
<td>46.5</td>
<td>48.1</td>
</tr>
<tr>
<td>electronic</td>
<td>38.9</td>
<td>42.2</td>
</tr>
<tr>
<td>printed</td>
<td>14.6</td>
<td>9.7</td>
</tr>
</tbody>
</table>

Table 8. The respondents’ answers to the question: “How often should e-textbooks be used in the educational process?”, %

<table>
<thead>
<tr>
<th>The respondents’ answers</th>
<th>parents, %</th>
<th>teachers, %</th>
<th>students, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>from time to time, along with printed</td>
<td>42.3</td>
<td>52.8</td>
<td>33.1</td>
</tr>
<tr>
<td>sometimes, e-textbooks are auxiliary</td>
<td>30.9</td>
<td>32.1</td>
<td>22.7</td>
</tr>
<tr>
<td>constantly</td>
<td>24.2</td>
<td>13.2</td>
<td>29.2</td>
</tr>
<tr>
<td>difficult to answer</td>
<td>2.6</td>
<td>1.9</td>
<td>12.1</td>
</tr>
<tr>
<td>should not be used</td>
<td>0.0</td>
<td>0.0</td>
<td>1.9</td>
</tr>
</tbody>
</table>
Regardless of whether the book is published as a textbook, a reference to a source, or a different type, most readers report using e-books as directories. They look for specific information and read short sections of the required information in all types of books (Nicholas et al., 2007).

**Table 9.** The respondents’ answers to the question: “Do you know why your child prefers to use a computer or other gadgets?”, %

<table>
<thead>
<tr>
<th>The respondents’ answers</th>
<th>parents at the second stage of the experiment, %</th>
<th>students at the third stage of the experiment, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>search for educational material, doing homework</td>
<td>73.1</td>
<td>63.6</td>
</tr>
<tr>
<td>games</td>
<td>60.3</td>
<td>44.2</td>
</tr>
<tr>
<td>entertainment (music, video)</td>
<td>60.3</td>
<td>60.2</td>
</tr>
<tr>
<td>training (simulators in Mathematics, educational games)</td>
<td>50.0</td>
<td>50.0</td>
</tr>
<tr>
<td>communication (social networks, texting)</td>
<td>50.0</td>
<td>38.3</td>
</tr>
<tr>
<td>viewing interesting web pages</td>
<td>46.2</td>
<td>40.3</td>
</tr>
<tr>
<td>reading (electronic libraries)</td>
<td>16.7</td>
<td>38.3</td>
</tr>
<tr>
<td>creating web pages, groups</td>
<td>7.7</td>
<td>14.3</td>
</tr>
</tbody>
</table>

Answering an open question, parents added that their children used their computers for online blogging, watching workshops on YouTube, watching cartoons and movies. Parents believe that while learning through e-textbooks, the children began to spend more time on a computer (or other gadget) (32.3%). This opinion was not confirmed by 42.4% of parents and 25.3% of respondents could not confidently say about the time spent by the child on gadgets.

**Table 10.** Parents’ answers to the question: “Did you notice the following problems?”, %

<table>
<thead>
<tr>
<th>Parents’ answers</th>
<th>%</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>problems in communicating with classmates, family members, friends</td>
<td>14.7</td>
<td>17.9</td>
</tr>
<tr>
<td>staying at a computer for more time than talking to you</td>
<td>49.8</td>
<td>34.6</td>
</tr>
<tr>
<td>worsening mood when there is no access to the computer</td>
<td>43.8</td>
<td>39.7</td>
</tr>
<tr>
<td>sitting at a computer at night</td>
<td>9.2</td>
<td>9.0</td>
</tr>
<tr>
<td>eating in front of the computer</td>
<td>31.3</td>
<td>32.1</td>
</tr>
<tr>
<td>conflicts with parents because of a computer</td>
<td>31.3</td>
<td>26.9</td>
</tr>
</tbody>
</table>

Sixth grade students use computers (or other gadgets) to find educational material, do homework (73.1% of parents, 63.6% of students), games (60.3% and 44.2% respectively), entertainment (music, video) (59.0% and 55.2% respectively), training (math’s, educational games, etc.) (50.0% and 50.0% respectively) and communication (social networks, texting) (50.0% and 38.3% respectively).

**The Fifth Condition: The Readiness of Teachers, Students, Their Parents to Use e-Textbooks and e-Books**

This condition characterizes the positive motivation of teachers and students to study and use e-textbooks for personal and professional growth. The use of digital means contributes to the self-education of teachers, the reorientation of teachers from the transfer of ready-made knowledge to students to the role of a consultant, a leader who indirectly organizes and encourages participants in learning activities, provides more opportunities for self-actualization and development of students. The digital competence of teachers, students and even their parents also needs special attention. Both teachers and students noted that the introduction of e-textbooks and e-books contributed to the development of their ICT competencies.
DISCUSSIONS AND CONCLUSION

The use of digital spaces should help develop not only the knowledge and skills of a child, but also the skills and competences for working with information and its use on the basis of critical thinking, problem-solving skills, creativity and innovation, be capable of cooperation and leadership, intercultural understanding, communication. This contributes to changing approaches to textbooks and resources used in education.

Modern education requires a textbook of a new format that differs from the traditional format in the form of a book. The studies have shown that the new textbook should form the educational environment. Textbooks of the new generation have the following characteristics: displaying results, ensuring maximum independence of students in the study, taking into account the needs and characteristics of students, providing opportunities for students to create their own educational product. Such an environment (Ivanova & Osmolovskaya, 2016) is capable of creating constructive tasks and developing skills of the 21st century.

Survey and observation of the work of experimental schools with e-textbooks showed their demanded functions and possibilities. They are available (both online and offline) to organize distance and mixed methods of learning. E-textbooks are also free of charge, open, adaptable, qualitative (interactivity, multimedia, pedagogical design, compliance with state standards), cross-platform, ergonomic.

The research (Wright, Fugett & Caputa, 2013) shows the similarities and differences in the productivity of reading and understanding in digital formats compared to printed forms. The authors compared the understanding of words from two sources of reading (electronic and printed books) and argued that the understanding of written materials remains unchanged for students, regardless of the presentation method (printed and digital).

B. Knight, notes that in the future, an e-textbook will be self-sufficient, open to access by a constantly changing book, developed by everyone without belonging to anyone (Knight, 2015). The authors of the study determined that particular attention should be given to understanding, preserving information and feedback when working with e-textbooks. They insist on the need to use electronic tools such as notes, annotations, tags, hypertexts and backlighting (Embong et al., 2012). It is more convenient for students to work with e-textbooks, which have interactive elements and compulsory elements are videos, presentations, and tests. The development of ICT promotes the creation of multimedia platforms that enable teachers to create their own eLearning resources and use all possibilities of open educational electronic systems.

It is necessary to build a new generation of electronic textbooks, including content, semantic enhancement and a case study. The informational model of electronic textbooks should include a knowledge base and ontology of the course, the use of cloud technologies, multimedia, Learning Record Store for studying and analyzing the outcomes of teaching, tracking behavioral data of students and using them (Zhang, & Zhang, 2015).

A general guideline for the successful use of e-textbooks is presenting best practices, teacher training, school administrators of the technology of using e-books and e-textbooks; selection of software and hardware and provision of educational institutions; consultations, methodological recommendations for participants in the educational process that do not have the necessary digital competence or have special needs; helping parents adapt to using their children's e-books and e-textbooks at home; updating e-books and e-textbooks and advising on working with devices that have e-Apps (Embong et al., 2012).

The definition of organizational, psychological and pedagogical conditions for the introduction of e-textbooks was facilitated by the opinion of 15 experts who were involved in the assessment of factors, criteria and indicators of effective use of ICT at school.

The experts identified 4 basic conditions for the introduction of e-textbooks and e-books at school.

- Educational policy (state, regional, educational level) on the introduction of eLearning, e-textbooks (requirements for compulsory e-textbooks, financial support for the purchase of e-textbooks, examination, standards for e-textbooks, etc.).
- The availability and diversity of e-textbooks and e-books on the educational services market. Logistic and methodological support. The availability of IT infrastructure in an educational institution for the introduction of e-textbooks: hardware (netbooks, computers, tablets, e-books), the Internet access, the availability of local area network; software (access to digital libraries, the use of cloud services, Web 2.0, etc.); support services (system administrators, consultants, computer science teachers) for updating e-textbooks, installing them on the device, providing data protection and copyright; educational and methodological support (e-books, e-textbooks, educational-methodical complexes, methodical recommendations on the use of hardware and software, e-resources of best practices).
• Ergonomics (sanitary norms of using e-textbooks to protect students from the negative effects of devices on their health).
• Readiness of teachers, students, their parents to use e-textbooks and e-books (digital competence of teachers and students).

Students, teachers and parents have confirmed their readiness to use e-textbooks and e-books under the conditions of material and technical provision of educational institutions, observance of sanitary norms, development of their own digital competence.

The research shows the prospects of using e-books and e-textbooks at school and needs further implementation. The conducted research does not exhaust all aspects of the mentioned scientific problem and needs further development of the diagnostics of the quality of education to substantiate the methods of using different types of e-textbooks and e-books taking into account the age of students based on the views of the authors of textbooks, teachers, students and their parents.

A promising area for the research is an analysis of the development of students’ logical, abstract, spatial, critical thinking while using electronic textbooks and e-books and a summary of the results on the formation of digital competence and information culture of participants in the educational process.

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OPERATIONAL INDICATORS OF THE LEARNING MANAGEMENT SYSTEM IN VIRTUAL SPACES SUPPORTED BY ICT

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ABSTRACT
The paper presents the conceptual framework and operational indicators of the Learning Management System in virtual spaces supported by ICT. The framework of the management system has three layers that are operational, management-operative, and management-decision. The conceptual foundation of the system is related to the Science of Education, the Science of Computing and the Science of Administration, and takes into account the representative model of the teaching-learning process of the student in virtual spaces supported by ICT. The dimensions, characteristics, variables, and indicators of the management system are assembled on the model in question. The indicators presented in the article correspond to 153 indicators of the operational layer. These were evaluated internationally with a confidence level of more than 90%. The operative indicators are contained in the dimensions of identification, academic, pedagogical-didactic, formative, of assessment of the virtual learning, and technological of the system of management of the virtual learning. The importance of the indicators presented ensures the success of the operational phase of the management system. Therefore, once the operation of the system is guaranteed, the success of the management-operative and management-decision layers of the system is assured. The correct fulfillment of the layers above guarantees the achievement of both the student’s learning in the virtual course and the institution that offers virtual teaching through virtual learning platforms supported by ICT.

Key words: LMS with ICT, operation-management-decision in eLearning, operative indicators, virtual learning.
INTRODUCTION

Virtual education is fundamental in the framework of an informational and global society. The preparation of human talent in a globalized society with a high research component is based on the socio-technical paradigm of the network society (Castells, 2004). The current society (2018) must ensure both the preparation of human talent for the network and take into account the risks and trends of a computerized society with a future horizon (Masera & Ortiz, 2018). The great responsibility of online, asynchronous, remote, and multilingual training supported by ICT must integrate international influence with local content (Mittelmeier, Rienties, Tempelaar, Hillaire, & Whitelock, 2018) to ensure eLearning from the student. The integration of the Science of Education, of the Computer Science, and the Administrative Science offer the necessary foundations to achieve the construction of a virtual learning management system. The science of education brings pedagogical and didactic approaches to the virtual teaching-learning process (Scherer, Tondeur, Siddiq, & Baran, 2018). Computer science provides the foundations of Algorithm and Software Engineering, to achieve the functioning of eLearning platforms (Garcia, Falkner, & Vivian, 2018), based on large volumes of data (Chitu, Cernian, & Sgarciu, 2018) updated in real time. The administrative science supports the processes of registration, teaching-learning, assessment, and evaluation of virtual learning (Martin & Kumar, 2018), and is the basis for integrating the operational, management and decision phases within the management system of virtual learning (Cheawjindakarn, Suwannathachote, & Theeraroungchaisri, nd). It is of the greatest importance to relate that within the framework of a current society generating new knowledge is virtual education which provides the greatest degree of flexibility in times, spaces, languages, content, and administrative processes. Then, based on the above, the system of management indicators of learning in its operative administrative and decision-management layers has to work in an integrated way within the virtual course and integrated through the course with the operation of the Virtual Education Institution (VEI).

LITERATURE REVIEW

The theoretical review of the basic foundations to build the system of management indicators takes into account i) Virtual class indicators. ii) Representative frameworks to evaluate virtual learning. iii) The models for the evaluation of learning in ICT. iv) Quality assurance systems in virtual education in the countries. v) The systems of standards and accreditation nationally and internationally in virtual education.

Virtual Class Indicators

Indicators of evaluation of online courses taking into account the continuous strategies of professional development (Perez-Foguet et al., 2018). These qualitative and quantitative indicators first assess the perception of the quality and relevance of teaching and second, the acquisition of student learning. Taking into account the modality of blended learning, the core elements of computational thinking are presented based on the learning environment and analyzing the impact of pre-university courses in institutions, teachers, and students (Basogain, Olabe, Olabe, & Rico, 2018). The quality of the academic courses in virtual education is evaluated through the instructional, communicative aspects, development of the course, and learning experiences based on the activities and perceptions of the students (Soffer, Kahan, & Livne, 2017). Analysis of commitment and persistence of the learning of the students in mass open courses in line (massive open online courses (MOOCs)). This analysis models the relationship between academic self-efficacy, teaching, utility, ease of use, commitment to learning and persistence in MOOCs (Jung & Lee, 2018), reaching the conclusion of the direct relationship that exists between self-study, the presence of the teacher, and the usefulness of the course with the commitment in the learning of the virtual student. The creation of 37 quality indicators to be applied to postgraduate courses in virtual medical education is a theoretical construct that applied the Delphi procedure to determine the consensus of the aforementioned indicators (de Leeuw, Walsh, Westerman, & Scheele, 2018).
Frameworks to Evaluate Virtual Education

The evaluation framework in the eLearning of courses and programs identifies seven elements that are institutional support, technological infrastructure, course design, support of instruction and learning, effectiveness of learning, satisfaction of students and teachers, and assessment of the virtual class and evaluation (Martin & Kumar, 2018), in order to ensure the quality of virtual education. In the framework of massive open online courses (MOOCs) platforms, criteria were identified to increase the commitment of students in their virtual learning process based on personal expectations, preferences and cognitive learning style (Assami, Daoudi, & Ajhoun, 2018). The dimensions of virtual teacher, course, technology, design, and environment in eLearning were identified in the framework as keys to improve the satisfaction of students in virtual classes (Asoodar, Vaezi, & Izanloo, 2016). Based on the challenges and opportunities of open and online education (OOE) applied to higher education institutions, the core concepts of education (OOE) were identified within which are "online teaching, support, assessment, external groups, flexibility, quality in education, reputation of the institution, and educational efficiency " (Schophuizen, Kreijns, Stoyanov, & Kalz, 2018).

Models to Evaluate Virtual Education

The model that aims to align the competencies with the learning activities to comply with the design of an e-assessment process (Guerrero-Roldán & Noguera, 2018), is based on the potential of the technology and has in account the formative approach of evaluation of virtual student learning. Based on the evaluative dimensions of quality in eLearning, a comparative analysis of 25 models and 42 dimensions of evaluation of virtual learning is carried out, reaching the conclusion that the institution, the technology, the student, the teacher, the pedagogy, and the evaluation of the development of the virtual course are the essential dimensions of the quality of virtual education based on ICT (Marciniak & Sallán, 2018). The quality of the virtual and hybrid education processes (virtual and face-to-face) is validated through the use of 74 quality indicators which are analyzed based on the success factors of "credibility, access, transparency, flexibility, interactivity, personalization, and productivity "(Blieck et al., 2018) of the virtual course course.

Quality Assurance Systems in Virtual Education

The quality assurance of massive open online courses (MOOCs) is done using data mining and semantic analysis in the areas of software, science, and administration (Cohen & Holstein, 2018). The quality assurance (QA) of the virtual courses is represented by a set of processes that are author content, course development, teacher recruitment, pedagogy, and online course content (Chua & Lam, 2007). This research concludes that the four important characteristics in the quality of virtual courses are teachers, exercises, learning atmosphere, and workload. The use of the Technology Enhancement Learning (TEL) concept, based on 24 research articles, ensures the quality of the students' learning outcomes, the teaching experience, and the assessment methods in their improvement when the students use them for their technological media learning (Tawafak, Romli, bin Abdullah Arshah, & Almaroof, 2018). The evaluation of the quality of the online courses in the United States is represented by standards related to the structure of the virtual course, the technology used in the student's learning, and the characteristics of communication to achieve discussion and interaction in the online course (Aldridge & Parker, 2018).

Standardization and Accreditation Systems

One of the most complete studies in designing eLearning quality indicators is contained in the “Handbook on Quality and Standardization in E-Learning” (Ehlers & Pawlowski, 2006), which contains the concept of quality of virtual education in its methods and approaches, the standards in E-Learning which is complemented by fields of practice and case studies. The Handbook contains the educational quality standards in eLearning related to the ISO / IEC 19736-1 standard relating the Quality Adaptation Model (QAM) which is adapted to the standard. The use of immersive learning environments for eLearning and evaluation of medical students allows for formative assessment mechanisms within the framework of the
“Accreditation Council for Graduate Medical Education (ACGME)” (McGrath et al., 2018). Based on the best practices approach, technology, faculty, administration, curricular structure, and support are considered as the necessary elements in the framework of online program accreditation processes (Bergeron & Fornero, 2018).

**THEORETICAL FOUNDATION OF THE OPERATIONAL INDICATORS OF THE LEARNING MANAGEMENT SYSTEM IN VIRTUAL SPACES**

The theoretical foundation of the indicators of the operational layer of the learning management system in virtual spaces takes into account the conceptual review of the literature as a basis to ensure the teaching-learning process in virtual education. In this sense, the indicators, frameworks, models, quality systems, and the guidelines and systems of accreditation in virtual spaces supported by ICT are taken into account as foundations. The review of the aforementioned literature is integrated into the representative model of the training process in virtual spaces supported by ICT shown in Figure No. 1 (Capacho, 2015) taking into account the science of education, computer science, and finally the administrative science applied to eLearning.

The model consists of 14 steps that are: 1. Construction of the virtual course, for which it is of the utmost importance to take into account the national and international standards for the construction of virtual courses such as IMS, LOM in order to incorporate the construction of the course the latest tools and insights of instructional design (Yago, Clemente, Rodriguez, & Fernandez-de-Cordoba, 2018), (Pástor, Jimenez, Gomez, & Isotani, 2018). 2. Organization and administration of the virtual curriculum, is the design of curricular structures (by subjects, by projects, formal, or informal) based on virtual courses. This step identifies the future vision of the Virtual University (Tait, 2018), with the purpose of fulfilling periods of the transformation of university education models to open, online, international, multilingual and distance educational models (Marshall & Flutey, 2018), in order to empower virtual education (Bordoloi, 2018). 3. The profiles of training (by competences, professionals, or business) are essential to the success of the virtual curriculums, in order to identify and evaluate the educational sufficiency with which the student is virtually assured by a correct assessment (Sarafzade, Bishop, Nagle, Tilden, & Oettinger, 2018), in order to achieve the correct professional profiles (Martins, de Menezes, Lima Terçariol, Gitahy, & Ikeshoji, 2018) and occupational (Heinen & Peeters, 2018) of the student at service of the information society. 4. The pedagogical approach (behaviorism, constructivism, constructionism) is important because it becomes the educational foundation of the virtual course, with a view to achieving a sustainable development (Thorne & Macgregor, 2018), with bases in collaborative learning (Rodriguez, Hudson, & Niblock, 2018) and using learning objects that have "smart" characteristics (Ahn et al., 2018) to make the student’s learning process easier. 5. The definition of virtual training objectives implies the use of approaches for the design of instructional level objectives (Bloom, Gagne, etc ...) in order to design quality objectives (Outlaw, Rice, & Wright, 2018) located in the context of a global virtual education that takes into account the current communication tools of the net generation (Fellas, Kazanidis, & Fotaris, 2018) (Zheng, Chen, & Burgos, 2018). 6. The pedagogy and the objectives of virtual learning are bases for the design of didactics as a virtual teaching strategy to use peer interaction processes in online courses playing the role of e-Tutor during group activities (Sansone, Ligorio, & Buglass, 2018), or definition of didactic approaches integrated between contents - learning objectives - training profiles where during the development of the virtual course repetitive didactic cycles are applied to the actions of interaction, feedback, and assessment of virtual learning (Stracke & Tan, 2018). 7. The integrated virtual teaching-learning process or the application of the didactic in the virtual course, step in which the integration of the communicative process between professors and students at a virtual level is validated (Soler & Sarsa, 2012). 8. Assessment of the student’s learning process, the point at which both the fulfillment of the learning objectives within the framework of the pedagogy used and the correct integration of the states of the virtual learning process are validated. 9. Evaluation of the learning results, This requires an integration between the Virtual Education Institution (VEI) and the industry in order to project to step 12., which means actions of transformation of traditional companies to digital businesses (Nissen & Seifert, 2018) using collaborative actions, large databases, remote statistical analysis, virtual assistance and evaluation, distribution of information results, to arrive at the administration of online knowledge databases. 10. Evaluation of the operation process of the technological platform, which represents
the basis of the Science of Computing in its software, hardware and electronic communication integration processes through the network (Ouadoud, Chkouri, & Nejjari, 2018), (Uziak, Oladiran, Lorencowicz, & Becker, 2018), (Porras, Alcántara-Manzanares, & García, 2018). 

11. Once the virtual course has been operated, the model leads to a process of continuous improvement of the virtual course to consolidate in the virtual curriculum an administrative process of total quality corresponding to Administrative Science (Aziz, Mahmood, & Bano, 2018). 

12. Integration of the virtual student to the professional life within the productive apparatus of the companies (Hamalainen, Lanz, & Koskinen, 2018) to comply with the next step. 

13. Evaluate the professional performance of virtual graduates (McLoughlin, Patel, O’Callaghan, & Reeves, 2018), at which point virtual curriculum compliance is validated to achieve the last step to be followed. 

14. Satisfy the needs of society regarding virtual education (Jackson, 2018).

It is of the utmost importance to emphasize that the representative model of the training process in virtual spaces (Figure No. 1) has the following characteristics: i) In the development of the process, the science of education, the science of computerization and administrative science are integrated. ii) The model is re-fed or closed-loop, which means that from any part of the model it is possible to return to previous steps and the final step (14.) or once the needs of society are identified, it is returned to the first (1.) step in terms of the continued redesign of the virtual course. iii) The operational indicators (Ii, 1 <= i <= 153) are distributed throughout the process, and are integrated into a set of dimensions, characteristics, and variables in order to explicitly identify the operation indicators in the framework of the learning management system in virtual spaces supported by ICT, which will be developed below.

INTEGRATION OF THE OPERATIONAL INDICATORS IN THE REPRESENTATIVE MODEL OF THE VIRTUAL SPACES TRAINING PROCESS

The integration of operational indicators in the representative model of the training process in virtual spaces requires a conceptual structure composed of dimensions, characteristics, variables and finally representative indicators of eLearning. Then from the general (dimensions) to the particular (indicators), the conceptual structure is:

1. Dimensions. The dimensions are systemic components of the online training process, representative of the impact of student learning when going from an initial learning state (Eo) to a final learning state (Ef), within a virtual training environment. The technical dimension of the virtual space and the evaluative dimension of learning are large dimensions of the virtual environment.

The dimensions with their respective processes that are going to be considered in the model are the following:

- Identification dimension of the model.
  - Identification process.
- Academic dimension.
  - Academic process.
- Pedagogical-didactic dimension.
  - Pedagogical process.
  - Educational process.
- Formative dimension.
  - Ethical dimension.
    - Ethical process.
  - Cognitive dimension.
    - Cognitive process.
  - Affective dimension.
    - Affective process.
  - Communicative dimension.
    - Communicative process.
- Aesthetic dimension.
  - Aesthetic process.
- Body dimension.
  - Body development process,
- Socio-political dimension.
  - Socio-political development process.

The aforementioned dimensions integrated into the representative model of the formation process are shown in Figure No. 2.

2. Feature. Category representative of the level of quality of online learning achieved by the student, which are grouped into dimensions or factors.

3. Variables: It is a representative set of the learning change achieved by the student when interacting with the activities, resources or components of the virtual environment; change that is valued both in quality and in level (quantitative) of learning.

4. Indicator. It is an empirical reference of the variable, representative of the degree of quality of the learning of the virtual space and to which they can be measured in qualitative or quantitative scales.

Within the Technical dimension corresponding to the characteristic "virtual space network services", taking into account the variable “distribution lists”, two indicators can be defined that are: nominal scale indicator = The virtual course allows the management of distribution lists ?, or indicator in scale Interval = How many distribution lists does the virtual course handle?

VALIDATION OF THE CONCEPTUAL STRUCTURE OF THE MODEL

The validation of the integrated conceptual structure (Figure No. 2) (Capacho, Jimeno & Salazar, 2018) was carried out in two phases, the first manual and the second computerized. In the manual phase, 33 accounts were carried out and in the computerized phase, 54 accounts for a total of 87 surveys. The surveys were conducted by expert virtual education judges representing the continents of America, Europe, Australia, Asia, and Africa. The manual validation achieved a total of 818 responses, while the computerized validation reached a total of 1207 responses.

Bearing in mind that the number of surveys conducted is greater than 30 (87≥30), and taking into account that the surveys follow a normal statistical distribution, using a confidence interval of 90% and an error of 10%, and being P equal to the proportion of respondents who do not disagree, it was concluded in the manual validation with n = 33 that P_{Manual} = (2.09 * 1.645) + 86.5359 = 89.97. For its part in the computerized validation for a n = 54 it was concluded that P_{Computerized} = (1.17 * 1.645) + 89.9027 = 91.83. Therefore, since in both cases the value of the calculated statistic falls within the acceptance region, it is deduced that based on the sample evidence, the initial hypothesis P = 0.9 is accepted, justified by the level of confidence initially selected, arriving at the conclusion that the indicators are valid with the participation of international judges.

REPRESENTATIVE SAMPLE OF THE CONCEPTUAL STRUCTURE OF THE MODEL

The conceptual structure of the model has 6 dimensions, 32 characteristics, 84 variables and 153 indicators is shown partially in Table No. 1. The number of indicators associated with each of the dimensions is Identification 14, Academic 25, Pedagogic 8, Formative 32, Evaluative 38, and Technological 36. Then taking into account the number of indicators accepted by dimension, it is emphasized that the model focuses its strength on the evaluative and formative dimensions with the greatest number of indicators. The evaluation dimension takes into account the assessment of student learning. The formative dimension is related to the teaching-learning process using the eLearning platform, and in this sense, it is this dimension that is responsible for processes through the model of ensuring the quality of virtual education.
Figure 1. Representative model of the process in virtual spaces supported by ICT.
Figure 2. Integrated dimensions to the representative model of the process in virtual spaces supported by ICT.
OPERATION OF THE OPERATIONAL INDICATORS OF THE LEARNING MANAGEMENT SYSTEM SUPPORTED BY ICT.

The operation of the operational indicators within the virtual learning management system is represented by the projected computer system representative of the aforementioned indicators (Figure No. 3). The virtual course forms a tree structure. The operational indicators are contained within a tree structure. From the upper branch of the tree to the leaves, this tree is composed of dimensions, characteristics, variables, and indicators. The indicators are at the level of the leaves of the tree.

The content tree structure of the virtual course (with the name of the course in the root) and its components (Syllabus, virtual content (virtual modules, learning objects), announcements, course mails, external mail, discussions, calendar, groups virtual, distribution lists, discussion forums, virtual tutorials, programming projects, student assessment, calendar, rubric, ..., wikis) is compared with the structure of operational indicators. This comparison is made by an expert judge in virtual education. The judge evaluates the virtual course comparing the operational indicators of the model, with the tree structure of the virtual course. This comparison generates a set of relationships, between the indicators of all the dimensions with the content of the virtual course. The comparison results in an evaluation of the virtual course. This evaluation is done in a qualitative and quantitative way. In the qualitative relationship, the concept of the evaluation of the relationship at a qualified level is placed. This scale makes the course assessment for the indicated ratio, in the scales excellent [80; 100], very good [60; 79], good [40; 59], regular [20; 39] and for improvement [0; 19] Therefore the concept of online course evaluation is both qualitative and quantitative.
<table>
<thead>
<tr>
<th>Identification</th>
<th>Academy</th>
<th>Pedagogical-Didactic</th>
<th>Formative</th>
<th>Evaluative</th>
<th>Technological</th>
</tr>
</thead>
<tbody>
<tr>
<td>Define the identity of an e-learning course on their membership in a virtual education center. The dimension contains authors and actors of the course with their identifying characteristics and conditions of the intellectual property.</td>
<td>Contains objectives, teaching methodologies, curriculum flexibility of online course and logistical support for the achievement of student training profiles to interact with the virtual course; dimension corresponding to interactive learner academic process subject-object virtual learning.</td>
<td>Contains the definition of the components related to the pedagogical and didactic approaches applied in the virtual course to achieve the formation of student profiles and consequently their virtual learning.</td>
<td>It contains both the necessary categories related to instruction of students in specific knowledge, as the necessary categories for the student develops all its features, conditions and potentials, as a person looking human development through a virtual environment to serve the society.</td>
<td>The evaluative dimension meets the central role of research objective assessment of learning acquired by the student in the virtual course; therefore, the dimension contains the essential components of the evaluation process of student learning in virtual environments.</td>
<td>The technological dimension defines the characteristics that contain essential indicators to assess the construction and performance of the platform to support virtual learning, in their construction, hardware, software, and communications.</td>
</tr>
<tr>
<td>Feature 1. The course has an identity that characterizes it as virtual learning environment located within an educational system and different from others of its kind.</td>
<td>Feature 1. The virtual course certifies the training profile of student knowledge, methodologies and basic principles of the area of knowledge to which belongs the virtual environment, and ensures student learning and training for a respective work, taking into account the progress of both the subject area of the course as the Information Technology and Communications - ICT.</td>
<td>Feature 1. The virtual learning environment used in the process of student learning one or multiple pedagogical approaches, considering both classical pedagogy and new approaches to modern pedagogy.</td>
<td>Feature 1. The virtual course ensures the development of ethics, cognitive, emotional, communicative, aesthetic, physical and socio-political dimensions of the student through the structuring of content organized into thematic units to achieve comprehensive training students.</td>
<td>Feature 1. The virtual course meets national / international for making virtual learning environments standards.</td>
<td>Feature 1. The virtual course defines the virtual learning space.</td>
</tr>
<tr>
<td>Variables: Existence of an educational institution within which there is a charge of creating the academic unit (department or program), administration and development of an online course</td>
<td>Variables: 1. Clarity of definition of training profiles (professional, occupational, competencies) that aims to achieve the virtual course to develop the objectives. 2. Clarity of objectives and goals of the virtual training course. 3. Concordance between the content and methods of the virtual environment with the area of knowledge to which the virtual course belongs. 4. Adequacy of the contents, methods, and activities in the virtual classroom to achieve compliance with the course objectives and achieve virtual student learning. 5. Correspondence between the objectives and goals of the virtual training course with the organizational structure (exploration, prioritization, selection, classification and organization (sequential, hierarchical, network or hybrid)) the contents of the virtual environment. 6. Continuous updating of virtual course according to their nature, technological changes in the area of information technology and communications - ICT, and work skills required for the area to which the virtual training environment belongs.</td>
<td>Variables: 1. Focus (s) Teaching (s) in the virtual course. 2. Consistency between (the) pedagogical approach (s) and curriculum design e-learning course. 3. The virtual course clearly identifies the target population (or collective) which is directed e-learning course. 4. Correspondence between the pedagogical approach and teaching methodologies of the e-learning course.</td>
<td>Variable 1: Existence: The virtual space for the development of ethics, cognitive, emotional, communicative, aesthetic, physical and socio-political dimensions related to the contents of the virtual learning environment.</td>
<td>Variables: 1. The existence within the virtual course clear and concrete specification of how this is going to assess student learning. 2. The degree of correspondence between the nature of the virtual course, teaching methods and forms of assessment of student learning virtually. 3. The concept of students about justice and fairness rates of assessment of student learning is applied.</td>
<td>Variables: 1. The existence of national / international employees in the construction of virtual course standards.</td>
</tr>
</tbody>
</table>
Academy
Indicators: 1. Verifiable information in the trading platform of the course on the name and type of educational institution responsible for the online course, approved by the Ministry of Education of the country or responsible and belonging to a nation's education system body. 2. Existence in the virtual environment education program name that owns the virtual course, as an academic unit responsible for the construction, development, and monitoring of virtual course. 3. Trustable information in the virtual environment of the Educational Project to which belongs the course or curriculum structure (formal or informal) which is part of the course for virtual learning. 4. Existence in Education online course level (undergraduate, graduate) that owns the course.

Pedagogical-Didactic
Indicators: 1. The virtual course is a document (subdivision or program content) where present and explain the virtual course. 2. The virtual course specifically provides training profiles to be achieved in students through the development of its objectives. 3. The virtual environment has objectives (general or course) and specific to student training. 4. The opinion of teachers and students (separately) on the clear definition of the objectives of the virtual course. 5. Review of educational and professional experts in the area to which the virtual course on the validity of content and methods used in the development of virtual learning belongs. 6. Opinion students about the organizational structure of the virtual environment. 7. The virtual course has a recording and documentation of its versions in the computer center or academic unit responsible for the virtual environment. 8. Opinion teacher (computer and the area of knowledge to which the virtual course belongs) on the level of upgrade virtual environment. (by topic or thematic course units) in terms

Formative
Indicators: 1. Verifiable information on the virtual course of learning activities that promote comprehensive e-Learning (development of above dimensions) of the students.

Evaluate
Indicators: 1. Verifiable information within the virtual course of learning activities that promote comprehensive e-Learning (development of above dimensions) of the students.

Technological

DISCUSSION OF THE RESULTS OF THE INVESTIGATION

The operative indicators integrated into the System of management of the virtual learning have a support based on the Science of the Education, the Science of the Computation, and the Administrative Science applied to the eLearning. About the Science of Education, the indicators are based on the process in the essential educational categories such as education, pedagogy, didactics, teaching-learning process, assessment of student learning, and evaluation applied to virtual training. The indicators in relation to Computer Science contain the basic variables of software standards, hardware, computer networks, learning objects, and virtual communication processes necessary to be evaluated through the indicators to guarantee and improve the operation of the virtual platform. Recognizing the importance of platform development in terms of indicators such as Blackboard, Moodle (Pan, Wang, & Luo, 2018), (Bourdoucen, 2018) It is difficult to find research that integrates the essential bases of virtual training with ICT represented by education-computing-administration.

The context for which the indicators were constructed and validated is an international coverage of the participation of judges from several continents with characteristics of different countries, languages, and virtual educational systems. It is of the utmost importance to recognize structures of quality indicators such as those related to the Distance Education and Training Council (DETC) (Stella & Gnanam, 2004),
the indicators of success in distance education in Australia (Martz, Reddy, & Sangermano, 2004), or the indicators of countries of the European Union Spain (Peach, 2001), Portugal (Coutinho, 2007), or Italy (Pigliapoco & Bogliolo, 2005); but they are indicators built for local contexts of countries.

The indicators of operation in virtual spaces are not only integrated to the representative model of the training process in eLearning but are bases for the continued actions of the virtual learning management system. This management system belongs to the area of Strategic Administrative Science (Romiszowski, 2018), (Ahlstrand, Lampel, & Mintzberg, 2001), (Henderson, Henderson, Grant, & Huang, 2018) specifically related to the prospective operation of the Virtual Educational Institution and its courses offered. Then, they are indicators that, based on the basic concepts of the theory of Education, are adapted in present time to the technological conditions of the training platforms, but are projected in actions of management, decision, and prospective of the virtual course and consequently of the virtual institution.

FUTURE RESEARCH

Operational indicators are the first component of Learning Management Systems in virtual spaces supported by ICT. Based on the preceding, the continuous research actions of the system are: i) Construction of management-operational indicators of Management Systems. These indicators interrelate the operation of the virtual course with the management of the units of the Virtual Educational Institution at the level of middle management commands. Then they are indicators of human resources necessary for virtual training, process indicators of academic programs and their virtual courses, and physical indicators at the level of technological resources necessary for the virtual education offer of the institution through the programs of eLearning ii) Design and construction of the management-decision indicators of the Virtual Educational Institution, which are built based on operational and management-operational indicators. These indicators are indicators of virtual education programs or courses, demand in eLearning, process, and result of the institution that offers virtual education, and are the indicators that interrelate with the indexes of the Ministry of National Education of the country, in order to comply with the preparation of human talent at the virtual level of a country education system at the service of society. iii) Integrate the indicators of the operative, management and decision layers representative of the virtual learning management system, justified by educational postulates (John Dewey (Davidson-Shivers, Rasmussen, & Lowenthal, 2018), Kurt Lewin (McFarland, 2017), Malcon Knowles (Dawson, Burton, Bessette, & Wright, 2018)) where the indicators are based on one or several educational postulates applied to virtual training with ICT.

CONCLUSIONS

• The indicators were developed based on the representative model of the training process in virtual spaces supported by ICT.
• The formal bases of the model integrate the Science of Education, the Science of Computing, and the Science of Administration, applied to the process of virtual signing.
• The 153 indicators designed are valid with a confidence level of 90% and an error of 10% having computerized validation values equal to 91.83.
• A number of 106 indicators of the 153 correspond to the formative, evaluative and technological dimensions of the virtual learning management system. Therefore, about 70% of the indicators integrate the evaluation of virtual learning through virtual education platforms, which is the essence of the virtual training process.
• Finally, the operational indicators are based on their research horizon for the construction and validation of the management and decision indicators of the learning management systems in virtual spaces.
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EFFECTIVENESS OF GAMIFICATION ELEMENTS IN BLENDED LEARNING ENVIRONMENTS

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ABSTRACT

The purpose of this study was to determine the effectiveness of blended learning environments enriched with the use of gamification elements. The study was carried out using the convergent parallel mixed design, in which the qualitative and quantitative data were integrated. The study was conducted with 63 participants who were randomly divided into control and experimental groups. In the experimental group, the activities were enriched in the environment by using the gamification elements but not in the control group. The data were collected by Community of Inquiry data collection tool, academic achievement test, Instructional Materials Motivation Survey, experience activity, and interviews. According to the results, no difference was observed between the groups in terms of community of inquiry model, academic achievement, motivation. These findings are supported by qualitative data. According the findings, it could be stated that learning occurred in the form of latent learning in the experimental group.

Keywords: Gamification, blended learning, community of inquiry, motivation.

INTRODUCTION

Technological developments change the structure of learning environments. Now, learning environments are transformed into a blended structure with face-to-face and online environment through web-based learning activities. In the field of educational technology, face-to-face and online environments have been compared within the context of their instructional qualities for long years. Today, rather than comparing these environments (Xu & Jaggars, 2014), there are tendencies towards the establishment of blended learning environments, which bring superior aspects of these environments together (Garrison & Vaughan, 2008). Related researches on blended learning points to the importance of putting these two environments into practice (Garrison & Vaughan, 2008; So & Brush, 2008; Vaughan & Garrison, 2005).

Within the scope of blended learning, the face-to-face environment is used to allow learners’ access, to increase their motivation and to establish interaction with each other via in-class activities, while different online applications are used for the same purposes in online environment. Examples of such online environments include social networks, Web 2.0 tools, MOOCs and Learning Management System (LMS) (Hoic-Bozic, Dlab & Mornar, 2016). Among these environments, especially LMSs are widely used in online learning activities. LMS allows designing a special web-based teaching process involving the planning, application and evaluation of a course (Kidd, 2010). In addition, LMS provides different tools such as chat and discussion forums to support interactions and communications between student-student, student-content and student-teacher (Lonn, Teasley & Krumm, 2011; Moore, 1989). In addition, LMS also brings
about such advantages as submitting homework, accessing course materials, viewing the grades, guiding one's own learning, developing one's upper-level thinking skills and supporting group work (Islam & Azad, 2015; Macfadyen & Dawson, 2012).

Related research findings demonstrate that blended learning is more effective when compared to traditional education (Al-Qahtani & Higgins, 2013; Chang et al., 2014; Drysdale, Graham, Spring, & Halverson, 2013; Means et al., 2013; Smith & Suzuki, 2015). Despite these potentials of blended learning, increasing interest in the learning material (Nsibande, 2014), monitoring and managing students’ participant progress (Kanchanamala & Muppidi, 2016), and learning interactions (Draffan & Rainger, 2006) are among the challenges in blended learning. In addition, how to make blended learning environments more effective is still an issue of debate among a number of researchers (Moskal, Dziuban & Hartman, 2013). In order to increase the effectiveness of blended learning and to overcome the related difficulties, several studies have been conducted within different research contexts (Halverson et al., 2014), and based on the results of these studies, various methods and models have been suggested (Graham, Henrie & Gibbons, 2014). For instance, a blended learning model enriched with Web 2.0 tools was suggested and examined with respect to academic achievement by Hoic-Bozic, Dlab and Mornar (2016). As another example, Staker and Horn (2012) suggested a four-structure model for K-12. Moreover, the concept of gamification, which has been investigated intensively in recent years, has the potential to increase the effectiveness of blended learning and to overcome the related difficulties. In recent years, the extent to which gamification, which is based on the use of game-related characteristics in out-of-game environments, is effective in blended learning environments has been a matter of debate (Harman, Koohang & Paliszkiewicz, 2014). Therefore, the present study aimed to determine the effectiveness of gamification in blended learning environments.

LITERATURE REVIEW

Blended Learning

Blended learning is a concept which has been emerged from powerful aspects of face-to-face and online learning (Garrison & Vaughan, 2008; Vaughan, Cleveland-Innes & Garrison, 2013). In practice, advantages of both environments are blended by gathering them within the context of in-class and online activities in a way to be consistent with the curriculum (Garrison & Vaughan, 2008). According to Staker and Horn (2012), in blended learning, students learn at least in part through online learning, and learn at least in part at a supervised brick-and-mortar location away from home. The studies on blended learning mostly focus on the environment-method discussion. In most of these studies, blended learning and traditional learning were compared (Al-Qahtani & Higgins, 2013; Chang et al., 2014; Drysdale et al., 2013; Hamza, 2015; Smith & Suzuki, 2015), and it was found that students in blended learning environments had higher levels of achievement, motivation and attitudes when compared to those in traditional learning environments (Caputo, 2010; Drysdale et al., 2013; Hebebci & Errugrul, 2015; Tuysuz & Balaman, 2011). Besides these studies, Cheng and Chau (2016) reported significant relationships between learning styles of learners and their online participation, between online participation and academic achievement and between achievement and satisfaction. In addition, in related researches, there are several other studies comparing online learning and blended learning (Drysdale et al., 2013; Hoic-Bozic, Dlab & Mornar, 2016; Patchan et al., 2015).

The studies have been carried out over the last decades to improve the effectiveness of online learning and blended learning. One of the related models is that of the Community of Inquiry (CoI) (Garrison, Anderson & Archer, 2010; Golding, 2015). This model suggests supporting online learning with the cooperative and constructive view point and increasing the effectiveness (Arbaugh et al., 2008). According to the CoI model, learning occurs with the interaction of the elements of social, cognitive and teaching presence (Garrison, Anderson & Archer, 1999).

In related literature, there are various studies on the indicators of the CoI model. In their study conducted to determine the indicators of the CoI model, Scott, Sorokti and Merrell (2016) reported that gamification had a positive effect, while Yildirim (2017) points out gamification-supported blended learning has positive impact on students’ attitudes towards the lesson. Besides, according to the analysis of the studies about gamification is done by Dicheva, Dichev, Agre and Angelova (2015), gamification of blended learning
courses is the major in the studies. Therefore, in order to determine the effectiveness of gamification in blended learning environments, there is a need for these three elements as well as for the indicators of these elements.

Gamification

Growing of gamification, both in practice and in the field of research (Dichev & Dicheva, 2017, is defined by researchers in different ways (Deterding et al., 2011; Marczewski, 2015; Werbach & Hunter, 2012; Zichermann & Cunningham, 2011). Also, gamification is defined by as use of game design elements in non-game contexts. Gamification is also referred to by Zichermann and Cunningham (2011) as use of game thinking and game mechanics to engage users to solve problems. According to the most comprehensive definition of gamification put forward by Kapp (2012), “gamification is using game-based mechanism, aesthetics and game thinking to engage people, motivate action, promote learning, and solve problems”. As mentioned in the definitions reported in related literature, gamification can be regarded as use of such elements of games as badges, experience point, leaderboard and level in non-game contexts. According to studies about the gamification; it is seen that the elements such as score, point, badge, aim and goals, leaderboard, feedback, reward, experience, achievement, profile, difficulty, challenge, level, virtual goods, progress bar are used in gamification environments (Koivisto, & Hamari, 2019; Cuhadar, & Akgun, 2018; Subhash, & Cudney, 2018). In order for gamers to know what they do in games and why they do these things (Marczewski, 2015), the goals are set clearly in games (Kapp, 2012). Therefore, in a gamified environment, each element of gamification, the goals, the missions and the functioning of the gamified environment should be clarified. In addition, in gamified, the point is effective in such issues as monitoring the progress, management of awards, winning badges, and the leaderboard (Marczewski, 2015), and participants are awarded (Kapp, 2012). Besides, experience point is used as one of feedback tools (Aldemir, Celik, & Kaplan, 2018). In this respect, experience point is used to reveal and award individuals’ progress in the gamified environment. Leaderboard which is an important tool for participants to see their position instantly in gamified environments (Marczewski, 2015; Mert, & Samur, 2018), has an important place in facilitating learning as well as in encouraging learners (Zichermann & Cunningham, 2011). Moreover, the experience scores of the participants change through the points, in this way, participants can learn about their experiences in a gamified environment (Kapp, 2012; Werbach & Hunter, 2012. Also, awards can be effective in strengthening individuals’ behaviors in the behaviorist viewpoint (Werbach & Hunter, 2012). Badges which are icons that appear on participants’ profile pages if they accomplish the previously assigned missions (Werbach & Hunter, 2012) can be preferred as virtual rewards and determine their positions in gamification environments (Zichermann & Cunningham, 2011). Badges can be used a tool recording students’ academic achievements in LMS (Marczewski, 2015) Moreover, badges are virtual rewards obtained via a certain effort or achievement, they are not an objects distributed free (Zichermann & Cunningham, 2011). Feedback used as another tool in the gamification environment is often preferred. It also can be an effective method supporting students to direct to intended behaviors (Werbach & Hunter, 2012; Zichermann & Cunningham, 2011). The feedback tools can be prefered in gamified environments so as to learn about the accuracy or inaccuracy of a particular behavior (Kapp, 2012). Gamification elements like experience point, level and progress bar can be used to provide feedback in gaming environments.

In literature, there are several studies considering gamification within the context of academic achievement. Su and Cheng (2015) state that mobile learning supported with gamification is more effective in terms of academic achievement when compared to traditional teaching, while Kuo and Chuang (2016) point out that gamification draws users’ attention with respect to academic development, increases engagement between them and motivates them. In addition, there are several other studies investigating the effectiveness of badges, one of the elements of gamification. Davis and Singh (2015), in their study, found that badges helped motivate learners, keep records of their achievements and control their own learning. Besides the positive effects of gamification like academic achievement, motivation, interests and attitudes, its negative effects are being investigated in related literature as well. Hanus and Fox (2015) claim that gamification has negative effects of motivation, level of satisfaction and academic achievement. It has also been examined in terms of motivation the fact that recent studies carried out on game and gamification have focused on the influence of the elements of gamification (Davis & Singh, 2015; Domínguez et al., 2013; Hanus
In the scope of the research, effectiveness of gamification elements in blended learning was examined in terms of learning through looking to the academic achievement, and motivation and CoI as they are effective in the formation of academic achievement in general.

Motivation which is a major focus of learning constitute another research topic in related literature about gamification. Yilmaz and O'Connor (2016) point out that the software development process supported with gamification increase both learners’ motivation and their participation. Dominguez et al. (2013) claim that gamification is emotionally and socially effective and that the system of award and competition motivates learners. Seixas, Gomes and de Melo Filho (2016) reports that gamification is an effective method to create engagement amongst students.

Considering that blended learning is more effective than the traditional way of teaching (Al-Qahtani & Higgins, 2013; Chang et al., 2014; Drysdale et al., 2013; Means et al., 2013; Smith & Suzuki, 2015; Tamim et al., 2011), it could be stated that instead of comparison of blended learning with traditional teaching, studies on overcoming the difficulties in blended learning and on increasing its effectiveness come into foreground. As stated by Garrison and Vaughan (2008), there is a need for the CoI model to determine the potential of blended learning. Therefore, the effectiveness of the elements of gamification in blended learning environments was examined within the framework of CoI model. According to CoI model, since learning occurs with the interaction of the elements of social, cognitive and teaching presence (Garrison, Anderson & Archer, 1999), the effectiveness of the elements of gamification in blended learning environments was examined within the framework of these three elements and the indicators of these elements (Table 1).

Table 1. Elements, categories and indicators of CoI model (Garrison & Arbaugh, 2007)

<table>
<thead>
<tr>
<th>Elements</th>
<th>Categories</th>
<th>Indicators</th>
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<tbody>
<tr>
<td>Teaching presence</td>
<td>Design &amp; Organization</td>
<td>Setting curriculum &amp; methods</td>
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<tr>
<td></td>
<td>Facilitating Discourse</td>
<td>Sharing personal meaning</td>
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<td></td>
<td>Direct Instruction</td>
<td>Focusing discussion</td>
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<td>Social presence</td>
<td>Open communication</td>
<td>Risk-free expression</td>
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<td></td>
<td>Group Cohesion</td>
<td>Encourage Collaboration</td>
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<tr>
<td></td>
<td>Affective expression</td>
<td>Emoticons</td>
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<tr>
<td>Cognitive presence</td>
<td>Triggering Event</td>
<td>Sense of puzzlement</td>
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<td></td>
<td>Exploratory</td>
<td>Information exchange</td>
</tr>
<tr>
<td></td>
<td>Integration</td>
<td>Connecting ideas</td>
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<tr>
<td></td>
<td>Resolution</td>
<td>Apply new ideas</td>
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</tbody>
</table>

In the current study, the purpose was to investigate the effectiveness of gamification elements in blended learning environments within the context of teaching, social and cognitive presence, academic achievement and motivation. In line with this purpose, this study addressed the following research questions:

1. What is the influence of gamification elements on participants’ teaching, social and cognitive presence?
2. What is the influence of gamification elements on participants’ academic achievement?
3. What is the influence of gamification elements on participants’ motivation?

**METHOD**

As the research design to be applied in the study, the Convergent Parallel Mixed Methods Design was used (Creswell, 2014). In the study, the quantitative and qualitative data were collected simultaneously within a 13-week schedule and related with each other for analysis. The research process is given in Figure 1.
Participants
The participants of the study were 63 freshman students (30 experimental, 33 control group) taking the course of Information Technologies in Education-I given. As freshman students are expected to have low levels of awareness of an experience in online learning, the participants of the study were selected especially among freshman students. In addition, since the goal of the related course is to develop students’ knowledge about and skills in computer sciences, the research topic and the application process are consistent with the objectives of the course. The ages of the participants ranged between 18 and 27, and the mean of their age is 19 in the current study.

In line with the primary purpose of the study, the course was set for two classes of students, the participants were assigned to these two groups on random basis. Also, one of these two groups were determined as the experimental group and the other as the control group again randomly. Therefore, the simple random sampling method was used to determine the participants in the study (Fraenkel, Wallen & Hyun, 2011).
Data Collection and Analysis

The research data were collected via the community of inquiry data collection tool, academic achievement test, Instructional Materials Motivation Survey, experience activity, semi-structured interviews and focus group interview.

Community of Inquiry (CoI) Data Collection Tool

For the purpose of determining the participants’ perceptions regarding the online environment, the CoI measurement tool developed by Arbaugh et al. (2008) and adapted to Turkish by Ozturk (2012) was used. CoI tool was formed by three factors as teaching, social and cognitive presence. In the study, in relation to appropriateness of the measurement tool to the accepted factors reported in related literature, confirmatory factor analysis (CFA) was conducted using the software of Lisrel 9.1 for the data collected from 277 participants who individually experienced online learning in blended learning environment. The results obtained via CFA were interpreted based on the studies reported in related literature (Çokluk, Yılmaz & Oğuz, 2012; Hu & Bentler, 1999; MacCallum, Browne & Sugawara, 1996; Sumer, 2000; Tabachnick & Fidell, 2007). According to the findings obtained in these studies and the results obtained via CFA, it was seen that the model demonstrated fitness of good for a number of values (Chi-square: 1428.96, Chi-square/df: 2.73, p-value: .069, RMSEA: .081, SRMR: .057, NFI:.957, NNFI:.970, CFI:.972, GFI:.739, AGFI:.703). Since the GFI value is sensitive to the sample size, the model was accepted without doing any modification on the model or without excluding any times though the GFI value demonstrated a low level of goodness of fit (Sharma et al., 2005). Within the scope of the present study, the whole scale (α=.94) and the teaching (α=.89), social (α=.82) and cognitive presence factors of the scale (α=.86) could be said to have a high level of internal consistency (Akbulut, 2010; Ozdamar, 2004).

Academic Achievement Test

In the study, for the purpose of determining the background knowledge and academic achievements of the participants, an academic achievement test was developed. For this test, a total of 125 multiple-choice questions used in previous exams conducted within the scope of the course were classified considering the difficulty levels of the 13 lesson subjects constituting the content of the course. While determining the questions to be included in the achievement test, special attention was paid to balanced distribution of the questions in terms of their difficulty levels not only to ensure content validity with respect to the lesson subjects but also to develop a reliable measurement tool. The reliability coefficient based on the item variance of the test was examined with the method of Kuder-Richardson 20 (KR-20), and the value obtained was .501 for the pretest and .585 for the posttest. The KR-20 value depends on the context, goals and the length of the test, and the reliability coefficient of tests developed by teachers is expected to range between .50 and .85 (Miller, Linn & Gronlund, 2009).

Instructional Materials Motivation Survey (IMMS)

In the study, in order to determine the participants’ levels of motivation, the Instructional Materials Motivation Survey developed by Keller (2010) and adapted into Turkish by Kutu and Sozbilir (2011) was used. The original version of this measurement tool was made up of four factors, while the one adopted into Turkish included two factors attention-relevance and confidence-satisfaction with explained about %45 of the variance. In the study, the Cronbach Alpha internal consistency coefficients of the measurement tool (α) was calculated as .84 for the factor of attention-relevance, .71 for the factor of confidence-satisfaction and .87 for the whole scale. Since the value was higher than .80, the measurement tool could be said to have a high level of reliability, but the dimension of confidence-satisfaction of the scale could be said to be moderately reliable (Akbulut, 2010; Ozdamar, 2004).
Experience Activity

The experience activity is a data collection tool gathering participants’ learning experiences about the blended learning process on weekly basis in LMS. The participants expressed their views on their motivation and satisfaction about blended learning process. The activity with a six-items semi-structured questionnaire form was presented to them every week, totally 13 weeks. During the experience activity, a total of 618 views were reported (334 views from the experimental group; 284 views from the control group).

Interviews

In the study, the semi-structured interviews and focus group interview were used as qualitative data collecting tools to find out answers for the research questions. Moreover, the semi-structured interviews were called as “interviews”. They were performed with the participants face-to-face. For these interviews, the participants in the control group were chosen depending on their level of online participation and in the ones in the experimental group were chosen based on their leaderboard status in LMS. In this way, the participants with the highest, moderate and lowest levels depending on their participation in LMS were chosen using the maximum variation sampling method that is one of the purposeful sampling methods (Buyukozturk et al., 2014). The interviews were held with 41 participants from the two study groups in the middle and end of the research process. During these interviews, a semi-structured interview form including questions regarding the participants’ rates of satisfaction and motivation was used.

The focus group interview in the experimental group was carried out in order to gather the views of the participants about gamified experience. It can be the best way to obtain people’s opinions through a structured group conversation in which information is solicited by the moderator (Vaughn, Schumm & Sinagub, 1996). With the interview, it was aimed to increase the variety of the data source in the qualitative dimension of study. The interview was conducted with 15 semi-structured questions in nine categories. During the beginning of this interview, two warm-up questions were used to help the participants to be ready for it. Then, it was held with six participants focusing on motivation, academic achievement, and teaching social and cognitive presence. The focus group interview was conducted in 107 minutes.

Application

Based on a blended learning model, the study was conducted with face-to-face and online learning environments. In the face-to-face, the researcher presented the course content as well as conducting applications on weekly basis in the computer class. In the online environment, it was conducted with Moodle (LMS) at any time of the day. Images of the environments where the study was conducted are given in Figure 2.
Two different courses were created in the LMS for online learning. General access section created for students to access at any time to some activity. A social forum activity and an instant messaging in this section were created so as to provide them the Moore’s (1989) learner-learner interaction. In this section, it was aimed to provide the participants to make an interaction with their peer with the social forum activity.

As this study is based on blended learning, online activities were prepared being parallel to the face-to-face activities. These activities in LMS were constituted with such different plugins and modules of Moodle as forum, page, feedback, homework and exams. The experimental group was enriched with gamification elements thanks to Moodle’s features and plugins and the face-to-face activities. None of these gamification elements were used in control group. According to theoretical grounds about related literature using of gamification elements in the experimental group were explained below and presented on Figure 3:

![Figure 3. The gamification elements in the study](image)

According to Zichermann and Cunningham (2011), user profile has an important role to award the users. The user profile was created in LMS in order to record the participants’ achievements. The participants’ information in the user profile was displayed.

The participants were scored using their actions on the LMS, such as messages sent in forums, events, and navigation. They earned experience points with these actions. They increased their levels, took a higher position in the leaderboard, got awards and obtained badges with the experience point. A leaderboard is an element of gamification is used as a user to compare with their own achievements with the others. For this purpose, two different leaderboards were formed to show their earned experience and completed activities points in LMS.

The participants were provided with feedback on their experiences and positions in the gamified environment. In the experimental group, a level system was created depending on the experience point and the participants gained a higher level when they gained certain experience points. The feedback about level up was shown instantly on the participants’ screen as suggested by Zichermann & and Cunningham (2011). Also, feedback
about activities were given with instant, direct and clear information to them via the progress bar, activity-reminding e-mail and activity completion. The progress bar and leaderboard which is used as a feedback tool in this study are given in Figure 4.

![Figure 4. The feedback tools used in the study](image)

Awards are effective tools in the development of individuals' behaviors (Werbach & Hunter, 2012). Therefore, in the study, the experience point, badges and face-to-face award activity were used as awards to reward for the participants. When participants completed the activities in LMS, related badges were given instantly to award their behaviors and notify them about their positions in gamified environment (Gibson et al., 2015; Zichermann & Cunningham, 2011). The badges were created and named with respect to related rules in the context of the activities. When they gained the badge of wheel of fortune or were the first to reach a certain level, they got the right to join the face-to-face award activity in face-to-face environment. Then, they turned the wheel of fortune (see Figure 5) the face-to-face environment and have won awards that can be used in or out of the gamified system. Moreover, according to Kapp (2012), the restriction could be a useful game element to motivate gamers. The activities were restricted according the time, level and completion of the prerequisite activities being specific to the context of weekly activities to motivate them in online learning.

![Figure 5. Wheel of fortune activity which is used in the research](image)
Data Analysis

The quantitative data in the study was analyzed with independent samples t-test, 2 X 2 mixed design ANOVA and Pearson product-moment correlation, while the qualitative data gathered from each data source were analyzed using content (inductive) analysis method within its own context.

After the qualitative data were analyzed separately within its own context of each data source, all the data were gathered under a single roof. Based on these data, the codes and themes were determined. For the direct quotations, the participants' personal information was kept confidential. In this direction, the sources of their views were determined as “E, Interview-3” referring to the third interview of the experimental group.

To ensure trustworthiness for the qualitative data, several strategies were used. In the study, since two researchers were involved in the research process, it was possible to take the views of more than one person. In addition, as the research process lasted 13 weeks, in-depth data were collected during and at the end of the research process. The qualitative data sources were diversified with experience activity, interviews and focus group interview. Also, the qualitative data collected by the researchers were coded again by an expert from the field of educational technologies, and appropriateness of the data was examined. Moreover, for the validity and reliability of the qualitative data, the codes and themes obtained were examined by two researchers’ expert in the field of education technologies.

FINDINGS

This part presents the findings obtained via the quantitative and qualitative research data. Since the convergent parallel mixed design was used in the study, the findings are presented below by relating the qualitative and the quantitative data.

Findings Regarding the Community of Inquiry

The effectiveness of the gamification elements was examined with respect to the CoI model. Table 2 presents the descriptive findings in relation to the mean scores of the groups regarding the teaching, social and cognitive presence factors of the CoI model.

<table>
<thead>
<tr>
<th>Groups</th>
<th>n</th>
<th>( \bar{x} )</th>
<th>SD</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching</td>
<td>C</td>
<td>33</td>
<td>4,05</td>
<td>0,61</td>
<td>-0,226</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>30</td>
<td>4,08</td>
<td>0,35</td>
<td></td>
</tr>
<tr>
<td>Social</td>
<td>C</td>
<td>33</td>
<td>3,91</td>
<td>0,60</td>
<td>-0,047</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>30</td>
<td>3,92</td>
<td>0,46</td>
<td></td>
</tr>
<tr>
<td>Cognitive</td>
<td>C</td>
<td>33</td>
<td>3,97</td>
<td>0,63</td>
<td>0,118</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>30</td>
<td>3,96</td>
<td>0,45</td>
<td></td>
</tr>
</tbody>
</table>

\( C: \) Control group (non-gamified blended), \( E: \) Experimental group (gamified blended)

In order to determine whether the mean scores for the factors were significant between the experimental and control groups, independent samples t-test was applied. The results revealed that there was no significant difference between the mean scores of the two groups with respect to the teaching, social and cognitive presence factors (p > .05). For a more in-depth examination of this result, the data collected via the qualitative data collection tools were examined within the context of the CoI model indicators put forward by Garrison and Arbaugh (2007).
The qualitative data regarding the teaching presence were examined within the context of the online activities in the online environment and within the context of the faculty member's teaching method in the face-to-face environment. The qualitative data were examined within the contexts of the online activities and the faculty member's teaching method, the former being in online environment and the latter in face-to-face environment, both of which are the indicators of the teaching presence. The participants in the two groups reported that the faculty member's teaching method was interesting. In relation to this, one of the participants said, “I found the course content and the teaching style of the teacher quite interesting... (C, Experience-4)”. In addition, the participants in the two groups stated that they were satisfied with the face-to-face lessons. Regarding this, one of the participants said, “I was pleased with the good teaching method used by the teacher (E, Experience-6)”. The participants reported that their thoughts were considered via the online activities and that these activities were fairly interesting. Another indicator of the teaching presence focuses on sharing personal meaning. The participants stated that they felt comfortable while sharing their thoughts and emotions regarding this indicator in the face-to-face and online environments. In relation to this, one of the participants said “It was really good to use such a webpage in this course. I think it was more effective. I found the teachers interesting. I felt myself in comfort. I was happy to be here (E, Experience-6)”. The participants in both groups pointed out that the activities in the online environment were quite interesting since these activities were in the form of discussion and that this situation pleased them a lot. One of the participants who reported views about the activities in the online environment said “I was happy because the activities this week were easy, and they were mostly in the form of discussion. (E, Experience-5)”. These findings demonstrated that consistent with the quantitative data obtained via the CoI data collection tool, the participants in the two groups reported similar views as supported by the qualitative data.

Within the dimension of social presence, social interaction between the participants was examined. In order to achieve social interaction between the participants, discussion activities were carried out in the online environment. In relation to this, the participants in the experimental and control groups reported similar views. One of the participants in the control group who responded to the question of how they felt said “Comfortable because for example, we shared information with friends we already know. (C, Interview-1)”. In the social forum activity prepared for the participants to establish social interaction between them, it was seen that they did sharing within the framework of different topics. In the control group, four discussion topics were started, and no response was given to these topics; on the other hand, in the experimental group, 358 discussion topics were initiated, and a total of 4915 responses were given go these topics. This difference between the two groups can be explained with the fact that the participants in the experimental group got an experience point with the use of the social forum. In relation to this, one of the participants said “For example, as the role of gamification in discussion activities, I need to do something in the forum to get a point. I have to join a discussion, I mean I have to do something there. (E, Focus group interview)”. It was seen that the participants started discussions in the social forum or tended to join current discussions to get an experience point and that they thus were involved in social interactions. However, in the social forum activity, it was also found that participation only for the sake of getting an experience point caused other participants to develop negative emotions. In relation to this, one of the participants said “During the activities, the posts texted just to make a comment demoralize me. (E, Experience-7)”. According to the indicators of cognitive presence, it was seen that the participants focused on the importance of new knowledge. It was reported that new knowledge increases motivation, draws interest and leads to positive emotions. This situation was mentioned similarly in the experimental and control groups. One of the participants in the control group said “We got new knowledge via the activities, and we did better activities each passing week. (C, Experience-7)”. Besides getting new knowledge in online environment, the participants also mentioned the importance of sharing the new knowledge. In relation to this, one of the participants said, “I liked sharing our knowledge in the forum (E, Experience-3)”. It was found for both groups that the activities in online environment encouraged the participants to do search for information. The participants stated that they did search using the Internet and other sources of information to do the activities in online environment. According to these findings, the participants in the two groups reported similar views regarding the dimension of cognitive presence.
Findings Regarding Motivation

In order to determine the effectiveness of gamification elements in blended learning environment, the data obtained via the interviews, focus group interview, experience activities and IMMS regarding the participants’ motivation were examined. Table 3 presents the descriptive findings regarding the data obtained via IMMS.

Table 3. Independent samples t-test results regarding the attention-relevance and confidence-satisfaction mean scores of the groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>n</th>
<th>x</th>
<th>SD</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attention-relevance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>33</td>
<td>3,77</td>
<td>0,59</td>
<td>-.594</td>
<td>.555</td>
</tr>
<tr>
<td>E</td>
<td>30</td>
<td>3,85</td>
<td>0,47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confidence-satisfaction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>33</td>
<td>3,57</td>
<td>0,49</td>
<td>.447</td>
<td>.657</td>
</tr>
<tr>
<td>E</td>
<td>30</td>
<td>3,52</td>
<td>0,41</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The attention-relevance and confidence-satisfaction scores of the groups were examined using independent samples t-test, and for these factors, no significant difference was found between the groups. In order to examine this situation in-depth, the qualitative data were used.

Although no significant difference was found between the motivations of the experimental and control groups depending on the quantitative data, the qualitative data revealed that gamification was influential on the participants’ motivations to a certain degree. The influence of gamification on motivation was mentioned by a participant as follows: “To me, the gamification technique should be used in the following years as well. Our motivation was at its highest level. (E, Interview-3)”. This view can be related with the dimension of volition defined in the ARCS-V model as transformation of intention to action (Keller, 2008). The participants’ views that the gamification elements increased motivation was gathered under the codes of badge, experience point and activity completion. It was seen that both getting a badge and the appearances of the badges had positive influence on the participants’ motivations. In relation to this, one of the participants said “The shapes of the badges had a motivating effect; it made us wonder what we would win when we completed the activity. Thus, we did the activities more quickly. (E, Interview-3)”. The participants reported that for their motivation, it was important for them to get a point via their experiences in online environment. In relation to this, one of the participants said “It increased my motivation. For example, you gave us homework. It was not just simple homework actually. At the same time, it would bring me points, and my points would increase … (E, Interview-1)”. The participants thought that they felt themselves more successful as they got experience points and that their levels of participation increased accordingly. This increase in the participants’ levels of satisfaction helped increase the participants’ motivations. In addition, it was seen that the experience point increased the participants’ motivations with respect to the leaderboard, winning awards, maintaining competitiveness and reaching a higher level. The participants tended to get experience points to reach higher levels and to remove the activity restrictions. One of the participants mentioned the influence of level on motivation saying “I had a good motivation because I was ambitious to reach a higher level, and I used the website more. (E, Experience-10)”. The participants tried to get experience point to compete with the other participants and worked harder when they saw their opponents got experience points. Therefore, it was seen that being competitive by getting experience points increased the participants’ motivations. In relation to this, one of the participants said “…for example, as my friends used it, I went online every day to catch them. Thus, it influenced my motivation positively. When I saw my friends getting points, I used the online environment more. I started to learn… (E, Interview-1)”. In addition, it was seen that the experience point increased the participants’ motivations as it allowed winning awards and influenced the participants’ positions in the leaderboard. The participants made efforts to get experience points to be at higher levels in the leaderboard, and their motivations increased as they took a place at higher levels in the leaderboard. In relation to this, one of the participants said “My motivation was high because after long weeks, I ranked first in LMS. This increased my motivation (E, Experience-10)”. When the activities were completed in the experimental group, a notification of activity completion appeared next to the activities, and this notification was found to have
positive influence on the participants’ motivations. In relation to this, one of the participants said “when all of them are ticked, it increases your motivation. If there is no tick, then you feel there is something missing (E, Interview-3)”. The gamification elements had negative influence on motivation in certain respects. The participants’ views that the gamification elements decreased their motivation were gathered under three main headings: restriction, experience point and activity completion. The restrictions were rules that the participants had to meet to access the activities of the following week. When the previous activities were not completed or when the necessary level was not reached, the restrictions for the activities were not removed. It was found that these restrictions decreased the participants motivation. In relation to this, one of the participants said “This week, my motivation was rather low because my next activities were not opened. (E, Experience-7)”. It was found that the participants’ loss of the leading position in the leaderboard or their lower-level position in the leaderboard had negative influence on their motivation. One of the participants mentioned this situation saying, “My motivation decreased unavoidably when I lost my leading position in the leaderboard (E, Interview-2)”. In addition, the participants reported that the notification for activity completion had negative influence on their motivation besides its negative effects. Regarding this, one of the participants said “Well, your motivation decreases if you do not do even one of them. For example, this was also the case for me (E, Interview-3)”.

Findings Regarding Academic Achievement

In order to examine the effectiveness of gamification in blended learning in terms of academic achievement, the participants’ levels of academic achievement were measured using pretest and posttest. The pretest scores of the participants in the experimental group ($\bar{x} = 46.55; \text{SD} = 1.97$) and of those in the control group ($\bar{x} = 46.67; \text{SD} = 2.30$) increased in the posttest for the experimental group ($\bar{x} = 58.55; \text{SD} = 2.37$) as well as for the control group ($\bar{x} = 61.87; \text{SD} = 2.20$). Figure 6 presents this change in the scores of the groups.

![Figure 6. Graphical presentation of the change in the pretest and posttest scores of the groups](image)

According to Figure 6, it is important to note that the two groups had similar pretest scores while their scores increased in the posttest. In order to examine the combined interaction of the increase in the posttest scores, 2 (experimental and control groups) X 2 (pre and post-test) mixed ANOVA was conducted. For the
prerequisite assumptions of this test, Box's M (p=.608) and Levene (p_{pre-test}=.712 and p_{post-test}=.466) tests were applied, and it was seen that these assumptions were ensured. Table 4 presents the results obtained via the 2 X 2 mixed ANOVA test in relation to the pretest and posttest of the groups.

<table>
<thead>
<tr>
<th>Sources of Variance</th>
<th>Sum of squares</th>
<th>SD</th>
<th>Mean square</th>
<th>F</th>
<th>p</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
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<td>0,421</td>
<td>.519</td>
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<tr>
<td>Error</td>
<td>13504,10</td>
<td>61</td>
<td>221,38</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within group</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurement</td>
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<td>5813,029</td>
<td>66,473</td>
<td>.000</td>
<td>.521</td>
</tr>
<tr>
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<td>80,457</td>
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<td>.015</td>
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<td>Error</td>
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<td>87,449</td>
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<td></td>
</tr>
<tr>
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<td>62</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

The scores of the groups were examined using independent samples t-test, no significant difference was found between the pretest (t(1,61)= -0,40, p=.968) and posttest (t(1,61)= -1,02, p=.312) scores. When Table 4 is examined, it is seen according to the 2 X 2 mixed ANOVA results that there was a significant increase in the posttest scores of both groups (F(1,61)=66,473, p<.001). However, when Measurement * Group was examined, no significant difference was found (F(1,61)=0,920, p=.341). In order to examine this finding in-depth, the data obtained via the qualitative data collection tools were used.

The participants in the experimental group tried to get experience point in order to obtain a badge, to take part in the face-to-face award activity and to be in an upper place in leaderboard. They stated that they completed the activities for this purpose. In addition, the participants in the experimental group did research to complete the activities and shared the information they obtained. It was seen that thanks to this, the participants got new knowledge or reinforced their current knowledge. In relation to this, one of the participants said “Probably, a competitive person, for example, I completed those activities because I wanted to take the first lead in the leaderboard, and I learned something in that way. I mean it had such an advantage. Perhaps, the purpose was to take the lead there, or to get a badge, or to win the wheel of fortune, but I learned something thanks to this. To me, gamification had quite good effects here. It slowly contributes to your learning. You asked me whether participation or learning? If there is no participation, then there will be no learning at all. (E, Focus group interview)”. Based on the participant’s view, it could be stated that different from the control group, learning occurred in the form of latent learning in the experimental group. However, since the influence of latent learning was not included in the scope of the study, the relationship between latent learning and academic achievement was not examined.

For the purpose of interpreting academic achievement, the data regarding the perceived difficulty levels of the activities were examined. The mean difficulty level was determined by calculating the mean scores regarding all the activities in the research process. According to the results of the independent samples t-test, no significant difference was found between the groups with respect to the perceived mean difficulty level scores of the activities (t(1,61)= -.738, p=.463). The relationship between the participants’ academic achievement scores and the mean perceived difficulty level scores was examined using Pearson correlation coefficient (r). The results of this test revealed a low level of negatively significant relationship between academic achievement and perceived difficulty level (r=-.274, p=.031). Accordingly, it could be stated that as the level of academic achievement increased, specialization in the related subject increased, which in turn led to a decrease in the perceived difficulty of the activities.

**DISCUSSIONS AND CONCLUSION**

The present study aimed to determine the effectiveness of the gamification elements in blended learning environments. In line with this purpose, the effectiveness of the gamification elements in blended learning environments was examined with respect to CoI, motivation and academic achievement.
In the study, it was found that the teaching, social and cognitive presence mean scores obtained via the CoI data collection tool was not any significant difference between the groups in means of statically. This situation was thought to result from the fact that the participants in both groups reported similar views about the indicators of the CoI model. In addition, as required by the potential of blended learning (Garrison & Kanuka, 2004; Torrissi-Steele & Drew, 2013), the situation in question had positive influence on the two groups. In related literature, it is pointed out that blended learning is more effective when compared to traditional teaching and online teaching (Shea & Bidjerano, 2012). In addition, Scott, Sorokti and Merrell (2016) hold the belief that gamification can be effective in blended learning environments, but this thought was not confirmed by the present research findings. Also, it could be stated that gamification elements in blended learning environments may have positive influence on the learner-learner interaction as awards help increase social interaction between students. Parallel to this finding, Hamari (2017) states that gamification is important for the establishment of social interactions. For this reason, as mentioned by Utomo et al. (2014), the students in the gamified environment participated more in the discussion activities. However, in the forums, it was seen that the irrelevant subjects mentioned by participants caused other participants to get bored, and this situation was thought to have negative influence on the participants’ levels of social presence. According to the data obtained via IMMS, no significant difference was found between the experimental and control groups’ motivation scores. The reason for this finding is that, on the one hand, while gamification increases the motivation of the participants; on the other hand, as stated in the study by Hanus and Fox (2015), it can be said that the intrinsic motivation of the participants is reduced in long-term gamification experience. However, according to the participants’ views, the gamification elements were found to have positive effects on motivation in certain respects. In addition, the participants reported that the blended learning environment supported with gamification increased motivation as it was influential on experience point, going up in levels, competition, winning awards and being in higher positions in leaderboard. This finding is consistent with the findings of other studies in related literature which reported that gamification have positive influence on motivation (Barata, Gama, Jorge, & Goncalves, 2015; Bell, 2014; Buckley & Doyle, 2014; Dicheva et al., 2015; Kuo & Chuang, 2016; Hamari, 2013; Hamari & Koivisto, 2015; O’Donovan, Gain & Marais, 2013; Sailer, et al., 2017; Tauer & Harackiewicz, 2004). In addition, as mentioned by Zichermann and Cunningham (2011), going up in levels contributed to the participants’ feeling of achievement. Thanks to this, it is thought that the dimension of satisfaction of the ARCS-V model was influenced positively. Also, it was found that the competitive environment created due to the experience point was positively influential on the participants’ motivation, and this finding supports other studies in literature which point out that competition has positive influence on motivation (Bowser et al., 2013; Burguillo, 2010). Moreover, it was seen that the participants’ motivations increased thanks to the awards. This finding is consistent with the one obtained by Keller (1987), who suggested using awards to increase the dimension of satisfaction of the ARCS-V model. In the present study, the participants stated that their motivations increased when they found a place in upper positions in the leaderboard and decreased in lower positions. However, this finding does not support the finding obtained by Lieberoth (2015), who reported that declaring one of the participants as the winner does not influence motivation. In line with all these findings, it could be stated that gamification contribute positively to motivation blended learning environments. For this reason, as stated by Landers, Bauer & Callan (2017), the gamification elements such as leaderboard, point, etc. can be used as an effective tool for the gamify of assigned tasks. In the study, the gamification elements had negative influence on motivation in some other respects. The participants in the experimental group stated that their motivations decreased to the restrictions, experience point and activity completion. As the present study was designed in accordance with blended learning, it was necessary to use face-to-face and online environments together. Therefore, the activities in online environment were restricted by time. It was found that depending on these restrictions, the participants’ motivations were influenced negatively. This finding is consistent with the findings of other studies which reported that restrictions cause pressure on participants and thus lead to a decrease in their motivations (Lee & Hammer, 2011; O’Donovan, 2012). As mentioned by Keller (2016), in such a case, it is though that the obstacles that prevent participants from being successful have negative influence on the dimension of confidence in the ARCS-V model. In addition, it was seen that experience point had negative influence on motivation with respect to the leaderboard, competitive environment and level. The participants’ motivations
increased when they took a place in upper positions in the leaderboard and decreased in the opposite case. This finding is parallel to Reeve and Deci’s view (1996) that participants successful in competition have higher levels of motivation. On the other hand, it is important to remember the point made by Deci et al. (1981) that competition does not increase intrinsic motivation; in contrast, it even has negative influence on intrinsic motivation. In addition, Song, Kim, Tenzek, & Lee (2013) point out that competition based on gamification is not influential on the motivations of individuals who do not have a competitive personal trait. Besides this, the findings of the study carried out by Hanus and Fox (2015) demonstrate that the motivation scores of the group in which gamification was not used did not differ significantly from those of the group which involved gamification. In addition, it was seen that the motivation increased when certain tasks were completed, and the badge was won in the gamified environment. This is consistent with the finding of the study by Huang and Hew (2018), indicating that the motivation of badges to be gained when participants complete certain tasks has increased. On the other hand, when tasks are not completed, and the badge is not won, there is also a decrease in motivation. In addition, in the study by Hamari, Hassan, & Dias (2018), the gamification features can be perceived as more important by users who have easier goals, who are outcome-focused and who are more inclined to prove themselves to others. These results can be interpreted that users who do not have above traits can not perceived gamification as more important. Therefore, while use of gamification in blended learning environments increases participants’ motivations in some respects, but it sometimes decreases their motivations in other respects.

In the study, it was found that the increase in the participants’ posttest scores did not differ significantly depending on the groups. This finding is consistent with the one reported by McKernan et al., (2015) that awards in game-based education are not influential on learning. In addition, the finding in question contradicts with the finding obtained by Yildirim (2017), who reported that gamification-based teaching applications have positive influence on students’ academic achievements. Considering that motivation has an impact on success in the game environment (Ozhan & Kocadere, 2019); the findings of this research related to motivation show similar characteristics with the findings of academic achievement. Therefore, it can be said that the finding obtained in academic achievement may be the result of the motivation. Additionally, as stated by Zainuddin (2018), it can be said that thanks to the gamified environment, the participants emphasized that they learned new information. Besides academic achievement, the participants in the experimental group stated that they did the activities to obtain the gamification and that they thus developed and reinforced their current knowledge via latent learning. This finding supports the finding reported by Gibson et al., (2015) that participants obtain information thanks to their competition with others. Senemoglu (2011) points out that latent learning does not reflect upon one’s performance. Within the scope of the present study, the participants’ latent learning was not measured. Therefore, it is though that the participants’ latent knowledge developed thanks to the gamification did not reflect upon the results of the achievement test.

In the study, it was found that the participants shared something just to get experience point and to maintain competition. Although the participants developed their knowledge via latent learning to get experience point, it should be remembered that the factor of competition was prior to developing one’ knowledge getting information. Therefore, this finding could be said to contradict with the one obtained by Burguillo (2010), who reported that the competitive environment was influential on one’s performance in learning. In addition, this situation regarding academic achievement is thought to be likely to result from the potential of blended learning. The reason is that in related literature, it is pointed out that blended learning contributes to meaningful learning (Garrison & Kanuka, 2004; Garrison & Vaughan, 2008). For this reason, the similar academic achievements of the groups in the present study could be said to be due to the influence of blended learning on meaningful learning. For this reason, the similar academic achievements of the groups in the present study are resulted from the influence of blended learning on meaningful learning. Also, the mentioned findings appear due to CoI and motivation-related findings as well as to the question of the effectiveness of gamification in a long-term investigation of gamification. For, Hanus and Fox (2015) explain that some game elements may feel more exciting at first, but over time the novelty can expires, and excitement can decrease. Similarly, Rachels, & Rockinson-Szapkiw (2018) conducted a study that lasted 12 weeks and found that no differentiation between gamified and non-gamified groups in terms of language skills. Therefore, in future studies on gamification, it is recommended to examine the effect of time factor on academic achievement, motivation, and CoI.
LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

In the study, the participants’ latent learning was not measured. As participants are likely to do latent learning while getting the gamification elements, future studies could also measure this type of knowledge.

Although LMS, prepared for gamification using Moodle’s plugins allows a number of gamification elements, the fact that gamification was limited to Moodle’s plugins was another limitation of the present study. Considering the fact that gamification is context-specific, in future studies, gamification could be structured based on the research context.

The study was carried out with gamification elements giving instructions, progress bar, badge, level, experience point, leaderboard, award, restrictions of activities based on certain criteria such as level, time and activity completion and presenting notifications to participants regarding the activities. Considering having more different gamification components in the related literature (Karatas, 2014), future studies could conduct with different kind of elements. Furthermore, in some cases, the use of gamification elements may create a negative situation in terms of academic achievement. For example, in the study by Christy & Fox (2014), it was seen that the leaderboard adversely affected academic achievement. In addition, it is stated in the literature review studies (Majuri, Kõivisto, & Hamari, 2018; So & Seo, 2018) that the gamification and gamification elements can have some negative effects despite the other positive results. Therefore, it is recommended that the gamification elements should be selected as consistent with context in the future studies.

Another limitation in this research is that despite the IMMS having four factors in its original version, two factors version are adapted to Turkish by Kutu and Sozbilir (2010) and used in this study. However, to conduct gamification and motivation researchers with IMMS, its four factors version is recommended while doing similar studies. Different data collection tools for motivation other than IMMS can be used for investigating effect of gamification.

CONCLUSIONS

This study aimed to investigate the effectiveness of gamification elements in blended learning environments within the context of CoI framework, academic achievement and motivation. Despite some limitations about using gamification elements in blended learning in the study, these elements contribute positive effects to students’ latent learning. According to quantitative results, no significant difference was found between the experiment and control groups’ teaching presence, social presence, cognitive presence, academic achievement and motivation scores. When qualitative results show the fact that gamification elements in blended learning environments have positive effect on these variables, on the other hand vice versa. In conclusion, the gamification elements in blended learning environments was to have both positive and negative effects with respect to the CoI model, academic achievement and motivation.

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REFERENCES


BANGLADESH BETAR’S FARM PROGRAMS TO MOTIVATE FARMERS: AN ANALYSIS OF EFFECTIVENESS AS DISTANCE EDUCATION

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ABSTRACT
Bangladesh Betar (BB), the national radio of Bangladesh has been providing extension services to the mostly uneducated Bangladeshi farming communities for the diffusion of modern farm technologies from its very beginning. This study aimed at evaluating the effectiveness of farm programs (FPs) of BB as distance education through assessing its capacity to motivate the farmers. A sample of 465 farmers was surveyed for primary data and the binary logistic regression model was used for data analysis. This study has revealed that those who listen to the FPs of BB were found more likely to adopt modern farm technologies than those who did not listen to the FPs. The concerned authority should take the necessary steps to make the farmers listen to the FPs of BB for educating and motivating them.

Keywords: Bangladesh Betar, farmers of Bangladesh, farm programs, distance education, farm technologies.

INTRODUCTION
Radio is a powerful and popular audio media conveys message from one station to all. It is a fascinating medium among the various mass communication media because of its special characteristics. It continues to be as relevant and potent as it was in the early years despite the emergence of more glamorous media. It is a truism that in the first phase of broadcasting spanning three decades from the early twenties, radio reigned alone or was the dominant player. Bangladesh Betar (BB) (The National Radio of Bangladesh) is the largest electronic mass media in Bangladesh with the biggest infrastructure covering the whole of Bangladesh. It is the only media that can reach everywhere from solitary villages to the impassable hill tracts and from deep forest to deep sea. Agriculture is one of the most emphasized sectors of BB because Bangladesh is a country of an agrarian economy. Bangladesh is mainly a rural based agricultural country with an area of 1,47,570 square kilometer. The development of Agriculture is mostly dependent on the use of modern technologies by the farmers. About 23.08% of the country’s Gross Domestic Product (GDP) and 62% of the employment opportunity comes from agriculture (BBS, 2005). Agriculture dominates the economy of Bangladesh by providing food, employment, income and foreign exchange (Hasan et al., 2016). But, a recent study showed that almost all of the farmers (88.94%) bear poor knowledge of agriculture (Hasan et al., 2017). This is why the farm programs (FPs) of BB are designed and aired for the development of the whole agriculture and the
farming communities of Bangladesh. Because the basic function of the FPs of BB is to provide extension services to the farmers. The main function of extension is to assist transfer of appropriate technologies to farmers (Kashem, Halim & Rahman, 1992). And for this reason radio has been the medium used most extensively in developing societies over the past several decades as a cost-effective means of providing information and education to diverse target groups (Mclean, 1992). There is considerable support for the view that radio is an effective medium of instruction (Nwaerondu & Thomson, 1987). In many countries farm radio forums have been proven to be very successful. Farm radio forums as agents for the transmission of knowledge have proven to be a success beyond expectation (Mathur & Neurath, 1959), while radio cuts across any literacy barriers (Ani and Baba, 2009; Ariyo et al., 2013). In a recent study by Hasan, et al. (2017a) while assessing for a strong level of knowledge, it was seen that the percentage of listeners of the FPs of BB was almost seven times higher than the non-listener group.

Bangladesh is supplying to meet the basic needs of her population from its net cultivable land which is estimated around 8.29 million hectare but still perhaps agricultural productivity of this country is one of the lowest in the world. However, the agricultural production can be increased if appropriate technologies are used by the farmers who are the primary unit of adoption of improved farm practices. The BB along with different government agencies, have been trying from the very beginning to educate farmers in Bangladesh about different farm technologies (Hasan et al., 2017). The BB in collaboration with other agricultural departments does this job because multi-channel communication is more effective than single channel communication (Rogers, Braun & Wermilion, 1975). Besides, radio is used as an effective medium to instill a motivation, collaboration, and development skills needed, as well government plan and agenda to the masses (Yusof, Ibrahim & Wán, 2012). Most farmers in every sector of agriculture are unaware of the existence, use, and benefits of modern technologies for farming (Hasan et al., 2017a). These gaps in farming knowledge can be better addressed by radio as there is considerable support for the view that radio is an effective medium of instruction (Nwaerondu & Thomson, 1987).

As the FPs of BB demonstrate the very qualities of a good program needed to disseminate the correct information to the right people, the FPs of BB should be effective in motivating the farmers. There are some studies in Bangladesh where BB was rated based on the extent to which it was used as an information source (BBS, 2011; Kashem, Halim, & Rahman, 1992; Kashem & Poddar, 2000; Kashem & Islam, 2001) and how effectively it conveyed the information (Amin, 2010). However, there is no sound study on the effectiveness of BB in motivating the farmers. Therefore, this study aimed to evaluate the effectiveness of FPs of BB as distance education in motivating the farmers about farm technologies.

DATA AND METHODS

Sources of Data

By dint of document analysis and sample survey data were collected from both the primary and secondary sources. In case of document analysis, document of BB and other relevant organizations were analyzed. By means of questionnaire survey technique, primary data were collected from the sampled farmers.

The BB has twelve regional stations and all the stations have their own customized FPs whose formats and contents are set by the Head Office of BB. So, a single station of BB can epitomize the whole of BB in case of FPs. The BB Khulna, and BB Rajshahi have been purposively selected for this study. The BB Khulna covers Khulna District and BB Rajshahi covers the Rajshahi District. Thus, the study field covers both Khulna and Rajshahi Districts. Using a multistage stratified sampling technique firstly eight upazillas (sub-districts) were selected from the two districts (four from each district). Secondly, eight unions (the smallest local government units) were selected from eight upazillas (one from each upazilla) and thirdly, sixteen villages (two from each union) were selected. At the 4th stage, using random sampling technique, final respondents (farmers: crop, livestock, fisheries) were selected from each village and finally, the total sample size was determined (Figure1).
The sample size was calculated using a single proportion formula by using 95% confidence interval (CI), margin of error 5% and 10% non-response rate were added to compute the total sample size. In this regard, Cochran (1963) developed the formula to yield a representative sample for proportions:

\[ n = \frac{Z^2 \cdot p(1-p)}{e^2}, \]

which is valid where \( n \) is the sample size, \( e \) is the desired level of precision, \( p \) is the estimated proportion of an attribute that is present in the population. The value for \( Z \) is found in statistical tables which contain the area under the normal curve. In this study, \( e \) are considered.

According to this formula, 384 respondents from the two districts need to be surveyed. But for the betterment of this study 465 respondents were selected from the two study areas and the area and sector-wise sampling are presented in Table 1.
Table 1. Area and sector-wise sample sizes of the farmers and listeners of FPs of BB

<table>
<thead>
<tr>
<th>Farming Sectors</th>
<th>Number of farmers in Khulna (n₁)</th>
<th>Number of farmers in Rajshahi (n₂)</th>
<th>Total</th>
<th>FPs Listeners (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop</td>
<td>81</td>
<td>191</td>
<td>272</td>
<td>17(6.25)</td>
</tr>
<tr>
<td>Livestock</td>
<td>33</td>
<td>42</td>
<td>75</td>
<td>6(8.00)</td>
</tr>
<tr>
<td>Fisheries</td>
<td>79</td>
<td>39</td>
<td>118</td>
<td>8(6.78)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>193</strong></td>
<td><strong>272</strong></td>
<td><strong>n = 465</strong></td>
<td><strong>31(6.67)</strong></td>
</tr>
</tbody>
</table>

Note: ‘FPs, farm programs’, ‘BB, Bangladesh Betar’

Data Collection

A survey was conducted from June to September 2014 to collect primary data relevant to the study objective from 465 farmers. Secondary data were collected using a content analysis technique from the documents of BB and other relevant organizations viz. Ministry of Agriculture and, Ministry of Fisheries and Livestock.

Data Analysis

To analyze data frequency distribution followed by z-test and binary logistic regression analysis were conducted. Groups were formed with 272, 75, and 118 farmers respectively from crop, livestock, and fisheries sector. Farmers of each sector were then divided into listener (coded 1) and non-listener (coded 0) groups. Some regularly broadcast scientific practices (10, 9 and 7 types of scientific practices for crop, livestock and fisheries, respectively) were selected for a comparative analysis between the groups (listener and non-listener) of FPs of BB.

The scientific farm technologies (sector-wise) which the farmers of the respective sectors are taught about through the FPs of BB are as follows:

Crop Sector

Integrated pest management (IPM), using balanced fertilizer, using Guti urea, using pesticides scientifically, using scientific seedbeds, harvesting seeds separately, irrigation at a critical moment, using organic fertilizer, drying seeds at times, examining the soil for using fertilizers.

Livestock Sector

Using anthelmintic regularly, artificial insemination for cows, cleaning dwelling places, giving vaccine to the cows before rainy season, feeding urea molasses straw, giving vaccine to chicken regularly, drying grass before feeding in the rainy season, separating the sick animals from others, and burying the dead animals.

Fisheries Sector

Water purification, using lime for keeping water fresh and fish healthy, maintaining the food-ratio, examining health of fish timely, maintaining fish number, separating the infected fish from others, and seeking doctor’s suggestions during diseases.

The different types of radio programs (discussion, talk, drama, songs, etc.) are taken for dissemination of the farm technologies and for the motivation of the farmers. Sometimes successful farmers of different sectors are invited to the programs to discuss about their scientific practices in farming for the motivation of the farmers.

A frequency distribution of the responses of the farmers was conducted to check whether they follow the scientific farm practices or not. Each positive response was coded ‘1’ and otherwise ‘0’. Then the significance test (z-test) of the differences was conducted. In the simple binary logistic regression models, scientific farm practices (Yᵢ, i=1, 2, 3, 4, 5, 6, 7, 8, 9) were treated as the dependent variables and classified in the following manners:
\[ Y_i = \begin{cases} 0, & \text{low} \\ 1, & \text{high} \end{cases} \quad \text{where } i = 1, 2, 3, 4, 5, 6, 7, 8, 9. \]

The significant factors in z-test, were considered as the predictors of simple binary logistic regression analysis. The results of binary logistic regression models were presented as odds ratios (ORs) with 95% CI for easy understanding of the effects of the associated factors on scientific farm practices. Statistical Package for Social Sciences (SPSS) version 17.0 (SPSS Inc., Chicago, IL; USA) and STATISTICA 8 were used for data analysis.

RESULTS

The study results revealed that the farmers were mostly habituated to unscientific farm practices. The BB usually designed the FPs with a view to persuading the farmers to adopt the scientific technologies in farming and to relieve their adverse mindset towards the experts and farm technologies. It was observed that in the crop sector, out of 272 farmers only 17 (6.25%) farmers listened to the FPs (Table 1). This study has also divulged that in the comparison between the listeners and non-listeners of FPs the scientific practice acceptance rate is high among the farmers who listen to the FPs (Table 2).

Table 2. Significance test of difference of proportions of farm practices in the crop sector

<table>
<thead>
<tr>
<th>Farm practices</th>
<th>Listening FPs</th>
<th>Number of farmers (n)</th>
<th>Practicing Farmers (%)</th>
<th>p-values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated pest management</td>
<td>No, 255</td>
<td>25(09.80)</td>
<td>4(23.52)</td>
<td>0.057</td>
</tr>
<tr>
<td></td>
<td>Yes, 17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using balanced fertilizer</td>
<td>No, 255</td>
<td>16(6.27)</td>
<td>4(23.52)</td>
<td>0.009</td>
</tr>
<tr>
<td></td>
<td>Yes, 17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using Guti urea</td>
<td>No, 255</td>
<td>13(5.09)</td>
<td>5(29.41)</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>Yes, 17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using pesticides scientifically</td>
<td>No, 255</td>
<td>38(14.90)</td>
<td>6(35.29)</td>
<td>0.028</td>
</tr>
<tr>
<td></td>
<td>Yes, 17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using scientific seedbeds</td>
<td>No, 255</td>
<td>24(9.41)</td>
<td>4(23.52)</td>
<td>0.055</td>
</tr>
<tr>
<td></td>
<td>Yes, 17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harvesting seeds separately</td>
<td>No, 255</td>
<td>102(40)</td>
<td>12(70.58)</td>
<td>0.0149</td>
</tr>
<tr>
<td></td>
<td>Yes, 17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irrigation at a critical moment</td>
<td>No, 255</td>
<td>6(2.35)</td>
<td>1(5.88)</td>
<td>0.382</td>
</tr>
<tr>
<td></td>
<td>Yes, 17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using organic fertilizer</td>
<td>No, 255</td>
<td>184(72.15)</td>
<td>12(70.58)</td>
<td>0.889</td>
</tr>
<tr>
<td></td>
<td>Yes, 17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drying seeds at times</td>
<td>No, 255</td>
<td>138(54.11)</td>
<td>10(58.82)</td>
<td>0.704</td>
</tr>
<tr>
<td></td>
<td>Yes, 17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Examining the soil for using fertilizers</td>
<td>No, 255</td>
<td>4(1.56)</td>
<td>0(0.00)</td>
<td>0.596</td>
</tr>
<tr>
<td></td>
<td>Yes, 17</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: ‘FP, farm programs’

In the significant tests, it was seen that in most of the cases (IPM, using balanced fertilizer, using Guti urea, using pesticides scientifically, using scientific seedbeds, and harvesting seeds separately) of scientific practices in a crop sector the differences between the listeners and non-listeners were quite significant (p < 0.05). In the logistic regression model, it was seen that in case of crop sector if a farmer listened to the FPs, he/she was more likely to adopt scientific farm technologies- IPM, using balanced fertilizers, using Guti urea, using pesticides scientifically, harvesting seeds separately, using scientific seedbeds were 2.962 times (OR: 2.962; 95% CI: 0.895-9.802), 4.596 times (OR: 4.596; 95% CI: 1.344-15.719), 7.756 times (OR: 7.756; 95% CI: 2.376-25.321), 3.316 times (OR: 3.316; 95% CI: 1.138-9.662), 3.553 times (OR: 3.553; 95% CI: 1.215-10.390), 2.962 times (OR: 2.962; 95% CI: 0.895-9.802) respectively than the farmers who did not listen to the FPs (Table 3).
Table 3. Effects of farm programs of Bangladesh Betar on the farm practices in the farmers

<table>
<thead>
<tr>
<th>Farm sectors</th>
<th>Scientific practices</th>
<th>Characteristic</th>
<th>Coefficient (β)</th>
<th>SE (β)</th>
<th>p-values</th>
<th>Odds ratio (OR)</th>
<th>95% CI for OR Lower</th>
<th>95% CI for OR Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop</td>
<td>Integrated pest management</td>
<td>Do not listen (r)</td>
<td>1.086</td>
<td>0.611</td>
<td>0.075</td>
<td>2.962</td>
<td>0.895</td>
<td>9.802</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Listen</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Using balanced fertilizer</td>
<td>Do not listen (r)</td>
<td>1.525</td>
<td>0.627</td>
<td>0.015</td>
<td>4.596</td>
<td>1.344</td>
<td>15.719</td>
</tr>
<tr>
<td></td>
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<td>Listen</td>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Using Guti urea</td>
<td>Do not listen (r)</td>
<td>2.049</td>
<td>0.604</td>
<td>0.001</td>
<td>7.756</td>
<td>2.376</td>
<td>25.321</td>
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<tr>
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<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Using pesticides scientifically</td>
<td>Do not listen (r)</td>
<td>1.199</td>
<td>0.546</td>
<td>0.028</td>
<td>3.316</td>
<td>1.138</td>
<td>9.662</td>
</tr>
<tr>
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<td>Listen</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Harvesting seeds separately</td>
<td>Do not listen (r)</td>
<td>1.268</td>
<td>0.548</td>
<td>0.021</td>
<td>3.533</td>
<td>1.215</td>
<td>10.390</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Using scientific seedbeds</td>
<td>Do not listen (r)</td>
<td>1.086</td>
<td>0.611</td>
<td>0.075</td>
<td>2.962</td>
<td>0.895</td>
<td>9.802</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Listen</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Livestock</td>
<td>Using anthelmintic regularly</td>
<td>Do not listen (r)</td>
<td>1.931</td>
<td>1.122</td>
<td>0.085</td>
<td>6.897</td>
<td>0.764</td>
<td>62.217</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Listen</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cleaning dwelling places</td>
<td>Do not listen (r)</td>
<td>2.369</td>
<td>1.125</td>
<td>0.035</td>
<td>10.682</td>
<td>1.177</td>
<td>96.976</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Listen</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vaccinate the chicken regularly</td>
<td>Do not listen (r)</td>
<td>1.891</td>
<td>0.912</td>
<td>0.038</td>
<td>6.625</td>
<td>1.109</td>
<td>39.565</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Listen</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: ‘R, the reference category’, ‘CI, the confidence interval’

In the livestock sector, 8% (only 6 out of 75) farmers listen to the farm programs (Table 1). The study also revealed that in the comparison between the listeners and non-listeners of FPs of BB the scientific practice adoption rate is high among the farmers who listen to the FPs of BB (Table 4).

Table 4. Significance test of the difference of proportions of farm practices in the livestock sector

<table>
<thead>
<tr>
<th>Farm practices</th>
<th>Listening FPs</th>
<th>Number of farmers (n)</th>
<th>Practicing Farmer (%)</th>
<th>p-values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using anthelmintic regularly</td>
<td>No</td>
<td>69</td>
<td>29(42.00)</td>
<td>0.055</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>6</td>
<td>5(83.33)</td>
<td></td>
</tr>
<tr>
<td>Artificial Insemination</td>
<td>No</td>
<td>58</td>
<td>31(53.44)</td>
<td>0.250</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>5</td>
<td>4(80.00)</td>
<td></td>
</tr>
<tr>
<td>Cleaning dwelling places</td>
<td>No</td>
<td>69</td>
<td>22(31.90)</td>
<td>0.014</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>6</td>
<td>5(83.33)</td>
<td></td>
</tr>
<tr>
<td>Vaccinate before rainy season</td>
<td>No</td>
<td>65</td>
<td>23(35.38)</td>
<td>0.131</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>6</td>
<td>4(66.67)</td>
<td></td>
</tr>
<tr>
<td>Feeding urea molasses straw</td>
<td>No</td>
<td>58</td>
<td>7(12.06)</td>
<td>0.087</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>5</td>
<td>2(40.00)</td>
<td></td>
</tr>
<tr>
<td>Vaccinating the Chickens Regularly</td>
<td>No</td>
<td>54</td>
<td>16(29.63)</td>
<td>0.022</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>5</td>
<td>4(80.00)</td>
<td></td>
</tr>
<tr>
<td>Drying grass before feeding in the rainy season</td>
<td>No</td>
<td>58</td>
<td>9(15.51)</td>
<td>0.795</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>5</td>
<td>1(20.00)</td>
<td></td>
</tr>
<tr>
<td>Separating the sick animals from the others</td>
<td>No</td>
<td>69</td>
<td>45(65.22)</td>
<td>0.080</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>6</td>
<td>6(100.00)</td>
<td></td>
</tr>
<tr>
<td>Burying the dead animals</td>
<td>No</td>
<td>69</td>
<td>37(53.62)</td>
<td>0.795</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>6</td>
<td>5(83.33)</td>
<td></td>
</tr>
</tbody>
</table>

Note: ‘FP, farm program’
In the significant tests, it was seen that in most of the cases (using anthelmintic regularly, cleaning dwelling places, and vaccinate the chickens regularly) of scientific farm practices the differences between the listeners and non-listeners were quite significant (p < 0.05). In the logistic regression model, it was seen that if a farmer listened to the FPs, he/she was more likely to adopt scientific farm technologies—Using anthelmintic regularly, Cleaning dwelling places, vaccinate the chicken regularly were 6.897 times (OR: 6.897; 95% CI: 0.764-62.217), 10.682 times (OR: 10.682; 95% CI: 1.177-96.976), 6.625 times (OR: 6.625; 95% CI: 1.109-39.565) respectively than the farmers who did not listen to the FPs (Table 3).

In the fisheries sector, 6.78% (only 8 out of 118) farmers listen to the FPs of BB (Table 1). The study also revealed that in the comparison between the listeners and non-listeners of FPs of BB, the scientific farm practice adoption rate is found higher among the farmers who listen to the FPs (Table 5). In the significant tests, it was seen that in most of the cases of scientific practices the differences between the listeners and non-listeners were not significant. But the fact is that the listeners are motivated more to accept the new scientific farm technologies.

<table>
<thead>
<tr>
<th>Farm practices</th>
<th>Listening FPs</th>
<th>Number of Farmers (n)</th>
<th>Practicing farmer (%)</th>
<th>p-values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water purification</td>
<td>No</td>
<td>110</td>
<td>93(84.54)</td>
<td>0.2311</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>8</td>
<td>8(100.00)</td>
<td></td>
</tr>
<tr>
<td>Using lime for keeping water fresh and fish healthy</td>
<td>No</td>
<td>110</td>
<td>16(14.56)</td>
<td>0.4263</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>8</td>
<td>2(25.00)</td>
<td></td>
</tr>
<tr>
<td>Maintaining the food-ratio</td>
<td>No</td>
<td>110</td>
<td>18(16.36)</td>
<td>0.5329</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>8</td>
<td>2(25.00)</td>
<td></td>
</tr>
<tr>
<td>Examining health of fish timely</td>
<td>No</td>
<td>110</td>
<td>77(70.00)</td>
<td>0.2935</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>8</td>
<td>7(87.50)</td>
<td></td>
</tr>
<tr>
<td>Maintaining fish number</td>
<td>No</td>
<td>110</td>
<td>9(8.18)</td>
<td>0.4009</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>8</td>
<td>0(0.00)</td>
<td></td>
</tr>
<tr>
<td>Separating the infected fish from others</td>
<td>No</td>
<td>110</td>
<td>80(72.73)</td>
<td>0.08186</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>8</td>
<td>8(100.00)</td>
<td></td>
</tr>
<tr>
<td>Seeking doctor's suggestions during diseases</td>
<td>No</td>
<td>110</td>
<td>47(42.73)</td>
<td>0.07672</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>8</td>
<td>6(75.00)</td>
<td></td>
</tr>
</tbody>
</table>

Note: ‘FP, farm program’

DISCUSSION

The objective of the study was to reveal the effectiveness of FPs of BB in motivating the farmers to adopt the scientific farm practices. It was seen that in most of the cases the farmers who listened to the FPs tried to follow the scientific practices more than that of the farmers who did not listen to the FPs. It means, the FPs were effective in motivating the farmers to adopt the scientific technologies in farming and this finding agrees with the previous studies of many researchers (Jain, 1987; Piotrow et al., 1992, etc.). The reason behind this finding might be that the farm programs are Ashor based (a format of FP) discussion programs where there are some actors along with the expert who discusses on a certain topic of scientific farm technologies in local vernacular where their conversation was inspirational and in some programs successful farmers of any sector present the success stories which might act as a motivational force. In comparison among the sectors (crop, livestock, and fisheries) it was seen that the fisheries and livestock farmers are less motivated than the crop farmers. The reason behind this might be that fewer programs on livestock and fisheries are broadcast in comparison with the crop sector. The study result revealed that only one day per week is fixed for each of the two sectors (livestock and fisheries) whereas programs on crop sector were broadcast four days per week. Even the mindset of the farmers who listen to the farm programs shaped up better than that of the farmers who do not listen to the FPs. This result is in agreement with those of the studies (Jain 1987; Sasidhar, Majumdar & Garg, 2008; Heong et al., 2008). The reason behind this finding might be that after listening to the FPs of BB they could make a comparison between the information they got from FPs and what the field level experts suggested. When the experts’ suggestion matched with the information got from FPs they got motivated. This study revealed that the FPs have the ability to motivate the farmers.
In this study, it was also seen that many of the farmers who do not listen to the FPs of BB deserve negative mindset towards the government experts. A vast majority of the respondents considered that the experts especially the Agriculture Officers and Fisheries Officers do not know anything. Even some of the farmers thought that if they follow the suggestions of those experts, they would be at stake and that is why they used to do everything according to their own indigenous farm knowledge. But, none of the farmers who listen to the FPs made any adverse comments about the experts and modern technologies. This is a clear indication of the effectiveness of the FPs of BB in changing the mindset of the farmers and motivating them thereby.

The limitation of the study is that the study is confined to crop, fisheries and livestock sectors and the forest sector is deliberately excluded for time and economic restraints. Another limitation of the study is that out of eight divisions only Rajshahi and Khulna were selected as the study areas. There may be further studies on developing a listener-driven marketing strategy, finding out the device which is culturally fit to convey the FPs to the farmers and so on for accelerating the extension services.

CONCLUSION

The research findings divulge that in every sector the farmers who listen to the FPs of BB are more aware of the modern technologies for farming and are more likely to adopt the new farm technologies more than the farmers who do not listen to the FPs of BB. So, it implies that the FPs of BB are effective to motivate the farmers in adopting the modern farm technologies. Even there is a positive change in the mindset of the farmer who listens to the FPs better than that of the farmer who does not listen to the FPs. This is why the concerned authorities should take necessary steps to make the farmers listen to the FPs of BB for the betterment of their farming.

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THE COMPARISON OF TRUST DEVELOPMENT IN VIRTUAL AND FACE-TO-FACE COLLABORATIVE LEARNING GROUPS

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ABSTRACT

The study investigates the effect of delivery types of (virtual and face-to-face) collaborative learning environments on the development of trust among group members in a graduate course. For this aim, a quasi-experimental, non-equivalent group comparison was used. It comprised a total of 64 participants – 21 in the face-to-face group, and 43 in the virtual group. Study participants were comprised of students registered in a course entitled ‘Web-based Education: Principles of Design and Implementation’ in the spring semester as part of either a virtual or traditional face-to-face graduate program in Information Systems at an institute of higher education in Turkey in 2010. Trust levels were measured at two different occasions, namely in the beginning and end of the semester, for both study groups. The participants completed a web-based course material design project as a collaborative group activity. The results indicate that trust increases over time among virtual participants, but declines among face-to-face participants. While levels of trust among virtual course participants are lower than those of face-to-face course participants in the beginning of the semester, trust levels of virtual participants surpass those of face-to-face participants by the end of the semester. This study demonstrates that trust can develop in virtual learning environments. The initial level of trust should be taken into consideration by instructors or managers before forming groups.

Keywords: Trust, face-to-face communication, e-learning, collaboration, virtual groups, collaborative learning, quasi-experimental.

INTRODUCTION

Trust is acknowledged to play an important role for the flourishing of collaborative relations both in real life and in cyberspace (Gerdes, 2010). Both in virtual or traditional communities, the main purpose of participation is expected to be sharing information; in contrast, in an educational environment there are pre-defined activities which must be completed by participants or students under certain goals or objectives. In an educational environment, the major purpose is learning and sometimes collaborative activities are used to enhance learning outcomes by taking advantage of information sharing. For this reason, from trust development respect, there might be certain distinctions between collaborative and individual learning activities. Also, the situation may additionally change in a virtual mode.
In a collaborative learning environment, the outcomes of groupwork and group-member satisfaction are affected by numerous factors. These include the cognitive, affective and psycho-motor skills of the members comprising a group. The positive feelings of group members tend to trigger motivation, leading to successful group accomplishments. For instance, trust can motivate individuals to complete a task as a group while a lack of trust can have the opposite effect. For this reason, trust is one of the factors which have a greatest effect on what group members are able to accomplish. By consolidating and extending existing research on trust, particularly with regard to virtual groups and collaborative learning environments, this study aimed to identify and explore the key factors affecting the development of trust within collaborative learning groups. In the study the word ‘group’ was preferred to be used instead of the word ‘team’ to define the participants who came together to work on a collaborative project for the purpose of completing one of the course requirements.

Collaborative Learning Groups

Williams, Duray & Reddy (2006) define collaborative learning as a groupwork with peers seeing themselves as a source of authority and knowledge. These groups are self-managed and communicate their decisions to the instructor. Vygotsky (1978) believed that peer interaction, which takes place more in collaborative learning groups, leads to individual cognitive development and knowledge acquisition. It is suggested in the literature that collaborative learning group work results in deeper learning and understanding based on learners’ involvement in a process of knowledge construction through discussion, debate and argumentation with others (Fransen, Kirschner & Erkens, 2011). Existence of positive cooperation in these groups promotes intergroup interaction where group members encourage and facilitate other’s capability to learn and achieve the group goals (Tseng, 2008). Similarly, Sangin, Molinari, Nussli and Dillenbourg (2010) underline that the effectiveness of collaborative learning relies on the quality of social interaction during collaboration. However, members should be convinced that every other group member endeavors to contribute to group work and that are no ‘free riders’ (Salomon & Globerson, 1989).

Tseng (2008) emphasizes that groups working in collaboration construct knowledge while interacting. For a successful group work, members should respect other’s comments and doubts, clarify misconceptions with proof and incorporate other member’s contributions. Supporting this Crowe et al. (2017) state that trust plays an important role in peer-assisted learning. Although it is the ideal case, it is often not that easy to create a trustful, supportive, communicative atmosphere in groups and a consensus among the members (Tseng, 2008) particularly, in computer-supported collaborative learning environments (Jannsen, Erkens & Kirschner, 2010). This necessitates mutual information exchange and existence of a high degree of trust among collaboratively working group members. Successful collaborative learning requires both cognitive processes such as discussion, reasoning, reflection, critical thinking etc. and social processes such as developing positive affective relationships, trust, feelings of group cohesiveness etc. (Phielix, Prins, Kirschner, Erkens & Jaspers, 2010).

Development of Trust among Collaborative Learning Group Members

Presence, development and survival of trust is so vital for group performance that its effect on group outcomes has been extensively examined in the literature (Stacey, 2002; Liu, Magjuka & Lee, 2008; Mitchell & Zigurs, 2009; Van Gennip, Segers & Tillema, 2010; Fransen, Kirschner & Erkens, 2011). Mutual trust, and sense of community (Fransen Weinberger, & Kirschner, 2013; Leroy, Rittner, Johnson, Gerteis, & Miller, 2017) are defined to be as key factors to successful collaboration. In fact, building up mutual trust improves learner-learner interaction (De Meo, Messina, Rosaci, & Sarné, 2017) or vice-versa. Various studies have found trust to enhance collaboration among group members (Serva & Fuller, 2004); to influence group effectiveness through its impact on problem-solving, decision-making and communication within groups (Kiffin-Petersen, 2004); and to affect knowledge-sharing within groups (Staples & Webster, 2008). However, establishing trust has been defined as one of a set of challenges faced by virtual groups (Ocker & Fjermestad, 2008). In fact, both virtual and face-to-face groups have similar difficulties in developing and manipulating trust.

Trust development is not only the antecedent of a successful collaborative work but it is also a consequence. It is reported that trust develops during the course of effective collaborative groupwork but not in isolation,
within continuous interaction, communication, repeated interpersonal exchange and cooperation (Wilson, Strauss & McEvily, 2006; Crossman & Lee-Kelley, 2004). Besides, similar to ‘real life’, trust among group members develops with sincerity, effort and the dedication of group members. Social exchange theory asserts that interpersonal trust is positively associated with the amount of sharing. Both providers and requestors of information need to feel that the other party is sincere in order to be sure that not only is the information received from others accurate and helpful, but that information provided to others will be used appropriately. Without trust, this process does not progress; i.e., there is no social exchange (Staples & Webster, 2008).

**Virtual Groupwork and Trust Building**

With recent advances in technology, traditional face-to-face groupwork has moved virtual as a result of widespread use of Internet technology in learning environments. Establishing trust has been singled out as one of the key challenges faced by virtual groups (Coppola, Hiltz & Rotter, 2004). Virtual team trust has been defined as “the overall willingness of virtual team members to rely on one another that results from the aggregate of potential trust dimensions achieved through socio-emotional and task processes and supported by technological capabilities” (Mitchell & Zigurs, 2009: p. 72). Virtual groups require high levels of trust if they are to succeed. West and Wallace (1988) explain that when group members feel others to be supportive rather than threatening – which points to the level of trust – they are more likely to communicate, which leads to increases in information-sharing and idea-exchange, and, in turn, increases in the number of new ideas developed.

It is apparent that the development of trust and the amount of expertise- and knowledge-sharing have a mutually affect on one another. Cheng, Nolan and Macaulay (2013) found that the development of trust in virtual groups, however, did not follow a standard pattern and influenced in fluctuations and complexities. Besides, in a temporal virtual group, there is no luxury and sufficient time to devote on trust building (Panteli & Duncan, 2004). In a short project life-cycle, it is critical to develop trust quickly and remain it until the project is finalized. The durability of virtual groups is dependent on commitment and personal trust relationships which may be easily hindered due to the absence of face to face communication (Nandhakumar & Baskerville, 2006).

To recap, trust is one of the most prominent factors for successful virtual collaboration (Leroy et al., 2017), and it is suggested in the literature that the effect of socio-emotional processes such as trust should be examined in a collaborative learning environment (Isohätälä, Järvenoja, & Järvelä, 2017). It is obvious that there is a need for further studies investigating trust development in such environments. The purpose of the current study is to investigate the effect of delivery types of (virtual and face-to-face) collaborative learning environments on the development of trust among group members in a graduate course.

**METHOD**

This study investigated the degree to which levels of trust among group members are affected by performing tasks as a group and type of instruction delivery (face-to-face vs. virtual). The study was designed as a quasi-experimental, non-equivalent group comparison study – a type of study design commonly used when random assignment of study participants is not possible (Johnson & Christensen, 2008). Trust levels were measured at two different occasions, namely in the beginning and end of the semester, for both study groups.

The following research questions were investigated:

1. Do groupwork activities affect trust among group members from the beginning to the end of the semester?
2. Does course-delivery mode (virtual or face-to-face) affect trust among group members?
3. Does trust change among group members over from the beginning to the end of the semester depend on course-delivery mode?
4. (As a follow-up, if any significant differences are found with regard to the first three questions), which components of trust – ability or benevolence/integrity of group members – can account for these differences?
Study Participants

Study participants were comprised of students registered in a course entitled ‘Web-based Education: Principles of Design and Implementation’ at spring semester as part of either a virtual or traditional face-to-face graduate program in Information Systems at an institute of higher education in Turkey in 2010. The students registered for the course in both modes of delivery were voluntary participants of the study. Thus, the method of ‘Convenience Sampling’ was applied for the identifications of study participants. Fraenkel and Wallen (2000) defined Convenience Sample as ‘a group of individuals who (conveniently) are available for study. The course was offered by the same instructor (one of the authors of the study) following the same syllabus. Acceptance into the graduate program was based on the same criteria for both groups (virtual or face-to-face) of students.

A total of 64 students participated in the study. Students were grouped according to mode of course delivery; accordingly, 43 students (86% male, 14% female) were in Virtual Group and 21 students (67% male, 7% female) were in the Face-to-face Group. Demographic information about the participants are given in Table 1.

Table 1. Demographics of the Participants

<table>
<thead>
<tr>
<th>Mode of Delivery</th>
<th>Participants</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>6</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>37</td>
<td>86</td>
</tr>
<tr>
<td>Virtual (n:43)</td>
<td>Occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Engineering</td>
<td>24</td>
<td>56</td>
</tr>
<tr>
<td></td>
<td>Government Officials, Technician, Military Personnel, Teachers</td>
<td>13</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>6</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>7</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>14</td>
<td>67</td>
</tr>
<tr>
<td>Face-to-Face (n:21)</td>
<td>Occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Engineering</td>
<td>13</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td>Teachers</td>
<td>5</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Nurses, Administrators &amp; Other</td>
<td>3</td>
<td>14</td>
</tr>
</tbody>
</table>

Students in Virtual Group had not met prior to the course and not allowed to communicate with each other until the beginning of the course in order to increase the quality of the study results. Students in the Face-to-face Group may or may not have known each other from previous courses.

The word ‘group’ was preferred to be used instead of the word ‘team’ to define the participants who came together to work on a collaborative project for the purpose of completing one of the course requirements. Thus, these individuals were not exposed to any prior training on how to behave in a team and how to exercise some social skills (effective communication, conflict resolution, time management, celebrating success, critical thinking and pair feedback, etc.) but they were just clarified about what was expected from them.

Procedure

In the beginning of the semester, both face-to-face and virtual group students were informed by the instructor about group projects to be completed as a course requirement. With the instructor’s guidance, all students in both Virtual (Experimental Group) and Face-to-face (Control Group) Delivery Groups registered for ‘Google Groups’, which enabled them to communicate and work together on their projects on details with other group members. In the Google Groups environment, students formed their groups, identified other group members, chose a project topic from among those provided by the instructor, and worked collaboratively, sharing their project documents and ideas throughout the semester.
The instructor followed the same syllabus and content (ppt slides) for both modes (virtual or face-to-face) of student groups, regularly monitored all students’ activities through ‘Google Groups’, and provided them with guidance throughout the semester. Students in the Face-to-face Group (Control Group) attended a course implemented completely on-campus over a 14-week semester. Students in Virtual Group (Experimental Group) followed the course through weekly one-hour-synchronized chat sessions with the instructor. In addition, these students in Virtual Group were able access to the course content via a Learning Management System that allowed them to study asynchronously, that is continuously (24/7).

Both groups of students were assigned a project that involved developing a web-based instructional material teaching one of the areas either suggested by the instructor (e.g. for teaching history, science or math or a foreign language topic, teaching a subjectmatter to K12 kids etc.) or any chosen by themselves.

Groups of students were required to prepare and submit their project proposal and analysis, design-development and implementation-evaluation reports throughout the semester at pre-determined intervals. In the end of the semester, both groups presented their work to a panel of members (instructors and experts in the field of study) in a face-to-face session on campus. Project proposals and reports were collected by the instructor from both virtual and face-to-face groups at pre-planned and pre-announced intervals. The timetable for submissions is given in Table 2.

<table>
<thead>
<tr>
<th>Course Requirements</th>
<th>Weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14</td>
</tr>
<tr>
<td>Group formation</td>
<td>x</td>
</tr>
<tr>
<td>Project proposal</td>
<td>x</td>
</tr>
<tr>
<td>Analysis</td>
<td>x</td>
</tr>
<tr>
<td>Design</td>
<td>x</td>
</tr>
<tr>
<td>Implementation</td>
<td>x</td>
</tr>
<tr>
<td>Evaluation</td>
<td>x</td>
</tr>
<tr>
<td>Trust Development Measurement*</td>
<td>1.</td>
</tr>
</tbody>
</table>

* Trust scales were released to students for self-administration at the beginning and end of the course.

Students’ achievement of the course was determined by evaluating their group project reports, so every student was expected to contribute to the completion of their group project. As indicated in the timetable, both groups were given the same amount of time to prepare and submit their reports for each phase of their projects; thus, participants were expected to spend almost same amount of time on the activities before their trust levels were measured. The maximum scores delivered for each project phase (and for reports) are given in Table 3.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Percentage/60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis</td>
<td>15</td>
</tr>
<tr>
<td>Design</td>
<td>15</td>
</tr>
<tr>
<td>Implementation</td>
<td>15</td>
</tr>
<tr>
<td>Evaluation</td>
<td>15</td>
</tr>
</tbody>
</table>
The reports were considered to represent 60 percent of the total course grade (15% per report), and a final exam was administered in the end of the semester accounted for the remaining 40 percent. Grades were determined by a panel that included the instructor and additional experts. In order to increase the objectivity of the evaluation, all presentations were videotaped and watched several times by a panel of members before scoring.

Data Collection Instruments

Trust levels of participants were measured using the trust scale for virtual communities developed by Ridings, Gefen and Arinze (2002). The scale consisted of two dimensions – ability of other members (6 questions) and benevolence/integrity of other members (5 questions) – and allowed participants to assess their peers’ ability and benevolence/integrity during the project. In order to measure changes/developments in trust over time, the scales were implemented in Week 1 during the initial meeting and in Week 14 following the final presentation for both delivery modes (Table 2).

The scale was developed during previous semester offer of the same course. The scale was translated into Turkish from the original form which was in English and again Turkish for clarity of understanding. In the next stage, the instrument was delivered to four students who evaluated the instrument for the clarity of language and consistency check between what items tell and what students comprehend. Based on those students’ feedback, the instrument was improved. A principal component analysis with varimax rotation was conducted to determine the validity of each of the dimensions of the Turkish version of the scale on the fall semester students of the same course participated in another study. There were 60 students 25 from virtual (10 females) and 35 from face to face class (12 females). Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett’s Sphericity tests were conducted to check whether the data for each dimension was appropriate for factor analysis. To meet the criteria, KMO measures were expected to be higher than .60 (Kaiser, 1974) and Bartlett’s test results to be significant (Pett, Lackey, & Sullivan, 2003). Factor loadings above .320, identified as the threshold for a sufficient and meaningful relation (Tabachnick & Fidell, 2007), were considered acceptable. Cronbach’s $\alpha$ was calculated for each dimension to assess reliability.

KMO & Barlett’s test results for the dimension Ability of other members were .707 and $X^2 (28) = 212.177$, $p < .01$, demonstrating that the data satisfied the aforementioned criteria. Principal component analysis found the 6 questions in the Ability dimension explained 79.39% of total variance, with factor loadings ranging between .815-.932. The Cronbach’s $\alpha$ value for the Ability dimension was .95.

KMO & Barlett’s test results for the dimension Benevolence/Integrity of other members were .749 and $X^2 (10) = 194.105$, $p < .01$. Principal component analysis found the 5 questions in the Benevolence/Integrity dimension explained 68.11% of total variance, with factor loadings ranging between .726-.900. The Cronbach’s $\alpha$ value for the Benevolence/Integrity dimension was .88.

As indicated by the above measures, both scale dimensions, as well as their individual components, can be considered valid and reliable for measuring the trust of group members.

Data Analysis

In order to respond the research questions of the study, repeated measures of ANOVA was employed. Field (2005) suggests the use of repeated-measures analysis when the same individuals participate in all stages of an experiment. In the present study, trust variable was measured at the beginning and end of the semester, and the group variable was made up of the delivery types of the course either face to face or virtual.

THE RESULTS

While the use of repeated measures of ANOVA helps to reduce the unsystematic variability of the study and provides greater power to notice the effects of variables, the “assumption of sphericity” (p. 428), i.e. the similar relationships assumed between pairs of experimental conditions in repeated-measures designs, must
be checked before interpreting any results in cases where there are more than two repeated measures. Since this study conducted measurements at only two occasions, the assumption of sphericity was not a concern (Field, 2005). As recommended by Field (2005), repeated-measure ANOVA was performed to answer the research questions in the present study. Means and standard deviations for trust measurements are presented in Table 4.

Table 4. Results of repeated-measure ANOVA for Trust

<table>
<thead>
<tr>
<th>Semester Occasions</th>
<th>Delivery Type</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Face to face</td>
<td>Virtual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>M</td>
<td>SD</td>
<td>n</td>
<td>M</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>In the beginning</td>
<td>21</td>
<td>4.37</td>
<td>.48</td>
<td>43</td>
<td>4.23</td>
<td>.69</td>
<td></td>
</tr>
<tr>
<td>In the end</td>
<td>21</td>
<td>4.31</td>
<td>.56</td>
<td>43</td>
<td>4.43</td>
<td>.57</td>
<td></td>
</tr>
</tbody>
</table>

Trust among group members did not demonstrate any significant change between the beginning of the semester (M = 4.27, SD = .63) and the end of the semester (M = 4.39, SD = .69), F (1, 62) = 1.649, p = .204. Therefore, with regard to Research Question 1, groupwork activities did not seem to influence the degree of trust among group members.

Before analysing Research Question 2, the homogeneity of variance across groups assumption was analysed using Levene’s Test of Equality of Error Variances. Levene’s tests showed no significant difference in trust measured in the beginning of the semester [F (1, 62) = 1.04, p = .318] or in the end of the semester [F (1, 62) = .001, p = .982]. This means that the assumption was not violated. For Research Question 2, univariate ANOVA test results suggest that course delivery type had no significant effect on average trust levels among group members in the beginning (M = 4.34, SD = .52) or in the end of the semester (M = 4.33, SD = .63), F (1, 62) = .002, p = .962. These results confirmed that, in answer to Research Question 2, course delivery type did not influence group members’ trust in other group members.

With regard to Research Question 3, trust levels of students in both the Face-to-face and Virtual Groups were found to change over time with a medium effect size and sufficient power [Wilk’s λ = .924, F (1, 62) = 5.132, p < .05, Cohen’s d = .47]. Moreover, in the beginning of the semester, trust levels among students in the Face-to-face Group (M = 4.37, SD = .48) were higher than those in Virtual Group (M = 4.23, SD = .69). The fact that students in face-to-face groups may have had previous contact could explain this finding. However, data collected at the end of the semester indicated that the trust levels of students in the Face-to-face Group had decreased (M = 4.31, SD = .56), while those in the Virtual Group had increased (M = 4.43, SD = .57) over time. Figure 1 illustrates changes in trust in relation to course delivery type.

Figure 1. Interaction between Trust and Delivery Type
Given that the interaction between trust and delivery type was found to be significant, repeated measure ANOVA was used to examine the interaction between delivery type and two components of trust, ability and benevolence/integrity of group members, in order to answer Research Question 4. Descriptive results for both components are provided in Table 5.

<table>
<thead>
<tr>
<th>Semester Occasions</th>
<th>Delivery Type</th>
<th>Face to face</th>
<th>Virtual</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>M</td>
<td>SD</td>
<td>n</td>
</tr>
<tr>
<td>Ability of Other Members</td>
<td>At the beginning</td>
<td>21</td>
<td>4.29</td>
<td>.50</td>
</tr>
<tr>
<td>At the end</td>
<td>21</td>
<td>4.35</td>
<td>.55</td>
<td>43</td>
</tr>
<tr>
<td>Benevolence/Integrity of Other Members</td>
<td>At the beginning</td>
<td>21</td>
<td>4.44</td>
<td>.57</td>
</tr>
<tr>
<td>At the end</td>
<td>21</td>
<td>4.27</td>
<td>.65</td>
<td>43</td>
</tr>
</tbody>
</table>

The interaction between group-member ability and course delivery-type was not found to be significant \[\text{Wilk's } \lambda = .994, F (1, 62) = .356, p = .553\]. In contrast, the interaction between group-member benevolence/integrity and course-delivery type was found to be significant with close to high effect size \[\text{Wilk's } \lambda = .861, F (1, 62) = 10.026, p < .01, \text{ Cohen's } d = .70\]. Thus, the findings related to building overall trust among group members engaged in an educational project can be attributed mainly to the benevolence/integrity of other group members, not their ability.

DISCUSSION

According to the study results, while the levels of trust among group members did not vary significantly between Face-to-face and Virtual groups in the end of the semester, the change in trust levels over the course of the semester did vary significantly according to the mode of course delivery. These results might provide a general understanding about how trust develops in groups of students in virtual and face-to-face collaborative learning environments.

The existence of effective communication among groupmates has been shown to have a positive effect on the development of trust, with virtual groups said to be capable of developing better flow of communication and more casual communication than traditional groups (Martins, Gilson & Maynard, 2004). In this study, although the level of trust among students in Face-to-face group was higher than that of students in Virtual Group in the beginning of the semester; this situation reversed itself by the end of the semester. It is probable that the increase in trust among virtual students was due in part to their needs of and efforts for communicating more effectively in their limited interaction time. Besides, these students may have benefitted more from the ‘Google Groups’ platform compared to Face-to-face group ones. Their limited interaction may have also enforced virtual students to work more eagerly on group tasks; which could be further investigated in additional studies.

It is also likely that face-to-face group students previously came into contact with each other through other courses in the graduate program, whereas virtual students did not have a chance to meet previously for any schoolwork and thus did not have a chance to build trust. This could explain why trust level of virtual students was lower than that of face-to-face students in the beginning of the semester. The increase in trust levels towards the end of the semester among virtual students would be supported by Ridings, Gefen and Arinze’s (2002) suggestion that “the importance of trust in co-located workgroups may be somewhat different from trust in virtual organizations and societies where people may never actually meet in person” (p. 275). According to Handy (1995), face-to-face communication, which is the most effective means of generating trust, is easy for local members; whereas, building trust in a virtual environment is problematic.
because team members usually have no common past and/or have not previously met face-to-face (Lin, Standing & Liu, 2008). This indicates that effective communication, particularly during the early stages of a group's development, plays a crucial role in gaining and maintaining trust (Anderson, McEwan, Bal & Carletta, 2007).

Gerdes (2010) states that computer-mediated communication implies greater uncertainty compared to face-to-face communication. Given that developing trust requires time, it is likely that virtual participants in this study were only able to build and develop trust towards the end of the semester, that is, after they had performed certain collaborative activities. A study examining the effects of communication opportunities in different mode groups (Bos, Olson, Gergle, Olson & Wright, 2002) asserted that face-to-face groups develop trust faster than virtual groups. Similarly, in the current study, face-to-face students seemed to develop trust earlier than virtual students; however, by the end of the semester, the level of trust became lower in comparison to virtual students. A recent meta-analysis related to trust development in virtual teams (Mitchell & Zigurs, 2009) discussed the need for addressing the relationship between time and trust in virtual teams in diverse contexts. The results of the present study indicate that trust can develop over time with effective communication and that virtual learners are able to understand each other's insights more clearly and trust each other more with the passage of time. The study was conducted over a 14-week semester in which the trust of students was measured first during the 1st week and again during the final week. The results point out that the time required for effective trust development is another significant issue to be investigated in further detail. While the current study provides an overall idea regarding the issue of time in the development of trust among group members, whether the amount of trust acquired changes with respect to the number of tasks, deadline or work-load are other issues worthy of investigation.

**CONCLUSION**

This study examined how trust develops during virtual collaborative learning activities and compared this with development of trust in a face-to-face collaborative learning environment. The results demonstrated that trust increased over time among virtual participants, but declined among face-to-face participants; moreover, trust levels were strongly affected by the benevolence/integrity, but not by the ability of other group members.

This study was limited to its use of a quasi-experimental nonequivalent group comparison design (Johnson & Christensen, 2008), which has the potential for selection bias, since groups were not randomly assigned. In order to control the selection bias, trust was measured at two different occasions. The first measurement was performed in the beginning of the semester which was considered a 'pretest' to control for existing significant differences in trust levels that might have resulted from probable previous interaction among members in the face-to-face group. Another study limitation was concerned with selection maturation, i.e. one group may have had more experience than the other group regarding trust development; however, given similar demographic characteristics of the participants, it is hardly possible to occur with this regard. Finally, selection-regression, i.e. differences in the populations of the two groups, was another study limitation. Although the study included participants from a variety of professions, these were distributed heterogeneously between two groups.

In order to minimize the mentioned limitations and obtain more robust results, further studies that apply true-experimental models may be carried out. Moreover, given that the present study did not consider any confounding factors during the development of trust, further research regarding any confounding factors that might affect the process of trust development is strongly recommended. Other topics of future research might include the relation between trust and other groupwork outcomes, such as task accomplishment, number of tasks completed and group performance. Finally, the effects of initial group trust, time spent on collaborative work and task type on the development of trust over time are also worth examining. This accumulated evidence-based knowledge can be used to support instructors teaching in collaborative groups.
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REFERENCES


ABSTRACT

The purpose of the study was to reveal the effect of a course taken through distance education on students’ readiness and attitudes. Sequential explanatory design method was used as a research method in which qualitative and quantitative measurements were used in the research. For the quantitative data, a single group pre-test/post-test design was used as an experimental model; for the qualitative data, open-ended questions were asked in order to elicit students’ opinions following the experimental process. The study group consisted of 266 students from different faculties and departments who were studying undergraduate and associate degree programmes at a private university in Turkey. Results indicated that the course taken through distance education had a significant effect on students’ gaining Computer and Internet Self-Efficacy and was effective in improving undergraduate students’ self-directed learning skills. Moreover, the course taken through distance education had a significant effect on students’ familiarity with e-learning. Additionally, the course was found to be effective in decreasing the escape attitudes from e-learning.

Keywords: e-Learning, distance education, e-readiness, attitude.

INTRODUCTION

The use of ICT is becoming more and more important within the modern educational process, and there have been many questions raised concerning its efficacy. Classical forms of education are augmented by the modern computer, mediated communication and education, as well as with new forms of organisational change, funding, and changing attitudes towards ICT. Attitudes amongst undergraduate students towards effective learning environments play an important part in their higher education (HE). An effective learning atmosphere is a flexible arrangement of elements that affects student learning success for all stakeholders such as learners, faculty members or professional staff (Appatova & Prats, 2007). It could be said that the learning process is actually influenced by the environment in which the technology is used. The presence of learning supported in this environment may be associated with many variables. Learning management systems used in the e-learning process serve as an opportunity to prepare the ground for learning. In support of this, there are a number of theoretical models that have been suggested to assist in the understanding of factors impacting the acceptance of these information technologies. The Unified Theory of Acceptance and Use of Technology (UTAUT) model, developed by Venkatesh, Morris, Davis, and Davis (2003), attempted to explain how individual preferences influence technology usage in terms of perceived usefulness, ease of use, and intention to use. This model not only underscores the individual differences on technology usage and acceptance, but also determines the probability of reducing and increasing the effects of these variables. According to the model, performance expectancy, effort expectancy, and social influence were hypothesised and discovered to influence behavioral intention to use a technology, while behavioral intention and facilitating conditions
determine technology use’ (Venkatesh, Thong, & Xu, 2016, p. 329). Marchewka, Liu, and Kostiwa (2007) analysed the effect of Blackboard usage from the UTAUT model perspective and reported that students had positive attitudes toward using Blackboard, that using Blackboard was deemed a good idea, and that they liked working with it. Another study focusing on UTAUT by Yoo, Han, and Huang (2012), aimed to uncover the motivational effects on employees’ purpose of using e-learning in the office. They theorised that variables such as performance expectancy, social impacts, and enabling circumstances were factors of extrinsic motivation, whilst effort expectancy was a factor of intrinsic motivation.

Allport (1935) named an attitude as a ‘mental or neural state of readiness, organized through experience, exerting a directive or dynamic influence on the individual’s response to all objects and situations to which it is related’ (p. 810). Another definition states ‘attitude is a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour’ (Eagly & Chaiken, 1993, p. 1). Fishbein and Ajzen (1977) stated that attitudes can explain people’s intentions towards behaviour, and that intention is also a direct predictor of behaviour. When the literature about learners’ attitudes for online learning are examined, according to a study by Ozgur and Tosun (2010), it was emphasised that no significant effect was found on the e-learning Attitudes of the Internet Experience in research conducted with experimental and control groups at the beginning and end of a 14-week Internet-supported course. In a similar study, the effects of web-based active learning applications on teacher attitudes towards courses were investigated (Arikan, 2006). In the experimental design study, web-based learning applications positively affected attitudes towards the lesson. Tekinarslan (2009) reported that students who had used the Web for nine common Web activities indicated significantly more positive attitudes toward the Web on most subscales. Moreover, the students with higher Web experience in terms of frequency of usage had higher attitudes on all subscales. Also, the findings indicated that PC-owning students, who were therefore more likely to frequently use the Internet (e.g., daily), had significantly higher attitudes on the usefulness, self-efficacy, and affective subscales than non-PC-owners.

Zabadi and Al-Alawi (2016) conducted a study to examine students’ attitudes towards e-learning. The study examined the impacts of gender, technology usage, and skills on students’ attitude towards e-learning. Their analysis provided strong support for three null hypotheses. In addition, the study found the influence of gender, technology usage, and skills to be statistically significant, with students having generally positive attitudes towards e-learning. Consequentially, the researchers concluded with a high degree of confidence that university students are willing to accept many courses via the online medium. Despite the fact that students consider an effective learning environment to be very important, student self-motivation is also equally important (Fabac, Vidacek-Hains, & Pazur, 2011). In their study, Sun and Chen (2016) reviewed 47 studies and research on online teaching and learning published since 2008, primarily focusing on how theories, practices and assessments are applicable to the online learning environment. Based on their findings, the authors argued that effective online instruction is dependent upon well-designed course content; motivated interaction between the instructor and learners; well-prepared and fully-supported instructors; creation of a sense of online learning community; and the rapid advancement of technology.

When the literature about learner readiness for online learning is examined, it can be seen that readiness is a key factor for online learning. Hao (2016) conducted a research study that resulted in numerous implications of students having much lower readiness levels for previews and in-class communication self-efficacy than for other readiness dimensions; both the associated and cause-effect relationships of readiness levels and language beliefs indicate that improving students’ language beliefs is essential if the adoption of flipped learning is to be successful, and lastly teachers need to convince students of their proficiency, competency, and show empathy with their students to order to increase readiness levels. Parkes, Stein, and Reading (2015) conducted a study to assess the level of preparedness of students for a range of e-learning competencies described in behaviour-specific terms. Their results showed that students were considered unprepared for a range of e-learning competencies; in particular, time management, critical thinking skills, and collaboration with others. According to Engin’s (2017) study, there was a significant relationship between the levels of learners’ readiness for online learning and levels of emotional intelligence. The results revealed that students did not feel ready in terms of time management, critical thinking skills, or collaboration with others.

With regards to learner readiness for online learning, Ilgaz and Gulbahar (2015) conducted a study to explore participants’ readiness and expectations at the beginning, and their satisfaction levels at the end,
of an online learning experience. Quantitative analysis showed that online learners placed more emphasis on factors affecting success, with access to technology and ICT competencies perceived as individual characteristics as a whole. Results from the qualitative data showed that they had an expectation of being able to address the deficiency of not being able to attend formal education due to their individual responsibilities. Based on this, it is observed that access type (to education) supports the interaction and thereby creates an expectation. In a study conducted by Ozturk, Ozturk, and Ozen (2018) to determine the effects of levels of readiness and satisfaction of students with online learning experiences, the level of teacher candidates’ readiness and satisfaction from web-based distance education were found to be above average. Cole, Shelley, and Swartz (2014) conducted a series of surveys over eight academic terms. There were no statistically significant differences found in the level of satisfaction based on gender, age, or level of study. Overall, the students rated their online instruction as moderately satisfactory, with hybrid or partially online courses rated as somewhat more satisfactory than fully online courses. ‘Convenience’ was the most cited reason for satisfaction, whilst ‘lack of interaction’ was the most cited reason for dissatisfaction. Topal (2016) determined the relationship between e-course satisfaction and online learning readiness by ascertaining student levels, and the effect of materials used in e-learning on student satisfaction. There was no significant difference found in the students’ satisfaction with exams and homework as assessment tools, or the content of text-based documents (including Portable Document Format or .pdf) as content tools. However, text-based documents and exams were among the most used tools in the courses. Student satisfaction was high when the number of materials used in courses was seven or more; that is, as the number of materials increased, so did the students’ satisfaction level. The levels of student readiness for online learning were high in all subdimensions, and there was a positive significant relationship between students’ levels of readiness and their satisfaction level. Moreover, the satisfaction levels of learners who were self-directed, had high motivation and could control their own learning appeared to be affected positively.

Considering the relationship of online learning readiness with other variables, Horzum, Kaymak, and Gungoren (2015) found that students’ online learning readiness levels directly predicted their academic motivation and indirectly predicted their perceived learning. It was also found that student academic motivation directly predicted their perceived learning. The proposed model was verified in accordance with data obtained from the research. Using the model, Horzum et al. (2015) determined that academic motivation is effective in increasing perceived learning in online learning, and that increasing readiness is an effective way to increase academic motivation. Similarly, Jena (2016) conducted a study to find the interrelationship of student attitude, readiness, and learning style towards the effective use of Virtual Learning Environments (VLEs), and revealed a correlation among learning readiness, attitude, and learning style, with each factor influencing the effective use of the VLE.

To summarise, in order to increase student motivation and satisfaction within the e-learning process, the important factors are considered to be the interaction between teachers and students (Cole et al., 2014; Ilgaz & Gulbahar, 2015; Sun & Chen, 2016; Parkes et al., 2015), course content with well-designed and rich materials (Ilgaz & Gulbahar, 2015; Sun & Chen, 2016), and the level of readiness to learn online (Hao, 2016; Horzum et al., 2015; Parkes et al., 2015; Topal, 2016). On the other hand, some research studies have shown no meaningful effect of attitude towards e-learning (e.g., Ozgur & Tosun, 2010), whilst other studies showed attitude towards e-learning as positively influencing active participation in e-learning applications (Aixia & Wang, 2011; Rhema & Miliszewska, 2014; Zhu, 2012). Overall, e-learning attitude has been shown to influence the acceptance of online courses (Zabadi & Al-Alawi, 2016), and the use of web-based learning practices (Arikan, 2006; Tekinarslan, 2009).

According to the literature review, it is clear that students’ readiness level, attitudes, and satisfaction are important variables that affect distance learning. Therefore, the current study aims to answer the following research questions.

For students who take courses via distance education:

1. Do the readiness levels of online learning learners change significantly through distance education?
2. Do the attitudes towards e-learning of students taking courses through distance education change significantly?
3. What are the thoughts of students taking courses through distance education?
METHOD

Sequential Explanatory Design method was utilised as the research method for the current study, in which qualitative and quantitative measurements were both employed in the research. According to Johnson and Onwuegbuzie (2004), the researcher can answer research questions in a broader and more complete way, since the research is not limited to one single method. It is also necessary to reveal more descriptive details of the general state of the qualitative data, while the quantitative data research problem gives a general outcome (Creswell, 2012, p. 542). For the quantitative data, a single group pre-test/post-test design was used as an experimental model; whilst for the qualitative data, open-ended questions were asked in order to elicit opinions from the students after the experimental process (Table 1).

Table 1. Design of the study

<table>
<thead>
<tr>
<th>Pre-test</th>
<th>Treatment (14 weeks)</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Readiness for Online Learning Scale</td>
<td>Activities via distance education</td>
<td>Readiness for Online Learning Scale</td>
</tr>
<tr>
<td>Attitude Scale for e-Learning</td>
<td></td>
<td>Attitude Scale for e-Learning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Open-ended questions</td>
</tr>
</tbody>
</table>

Students in the study group received Computer Literacy (CL) lessons though distance learning over a duration of 14 weeks. The CL course is a university-wide compulsory course, with the exception of the Faculty of Engineering, and designed with consideration of the learning environments required for distance education. The course has been conducted through distance education for the past three semesters.

The course was conducted through Moodle™, which is a learning management system (LMS) used by both instructors and trainees. Presentations summarising each subject, documents giving detailed narration (course notes), source videos, and measurement-evaluation activities all took place offline within the LMS learning environment. In the online learning environment, synchronous (live) lessons were held with video-based lectures each week for one lesson hour and then the course was shared via the registration system. The course was based on the basic module and standard module of the European Computer Driving License (ECDL Foundation, 2017), which was renewed after 2013 with regard to changes in society and technology.

Participants

The study group consisted of 266 students from different faculties and departments who were studying undergraduate and associate degree programmes at a private university in Turkey. A total of 402 students participated in the pre-test, and 574 students participated in the post-test. As a result of the online questionnaire forms, data from 266 students involved in both the pre-test and post-test were analysed within the scope of this study. Of the study group participants, 75.9% \((n = 202)\) were female and 24.1% \((n = 64)\) were male. Moreover, 4.9% \((n = 13)\) were attending a preparatory class, 84.6% \((n = 225)\) were first-year students, 7.5% \((n = 20)\) were second-years, and 3.1% \((n = 8)\) were attending other years (see Table 2).

Table 2. Demographic features of the Study Group

<table>
<thead>
<tr>
<th>Gender</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>202</td>
<td>75.9</td>
</tr>
<tr>
<td>Male</td>
<td>64</td>
<td>24.1</td>
</tr>
<tr>
<td>Total</td>
<td>266</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grade</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparatory class</td>
<td>13</td>
<td>4.9</td>
</tr>
<tr>
<td>1st year</td>
<td>225</td>
<td>84.6</td>
</tr>
<tr>
<td>2nd year</td>
<td>20</td>
<td>7.5</td>
</tr>
<tr>
<td>Other years</td>
<td>8</td>
<td>3.1</td>
</tr>
<tr>
<td>Total</td>
<td>266</td>
<td>100</td>
</tr>
</tbody>
</table>
Data Collection Tools

Learners’ Readiness Towards Online Learning (LROL)

The Readiness for Online Learning Scale was originally developed by Hung, Chou, Chen, and Own (2010). The adaptation of the scale to Turkish and its validity and reliability studies were performed by Yurdugul and Alsancak Sarikaya (2013). The scale is formulated as a five-point, Likert-type instrument, consisting of 18 items in five different factors.

Within the scope of the current study, Explanatory Factor Analysis (EFA) was performed for the construction validity. The Kaiser-Meyer-Olkin (KMO) value of the scale was found to be .897. Bartlett’s test was found to be significant ($p < .01$). In the EFA, when the five-factor structure of the scale was examined, despite explaining 67.8% of the variance, the eigenvalue of the 5th factor was found to be less than 1 (.98) and there was only one item in the 5th factor. Additionally, the scree plot was examined and it was decided that the five-factor structure was not suited to the data.

The four-factor structure was then found to explain 62% of the variance. The four factors being Computer/Internet Self-efficacy (three items, load values between .862 and .677), Self-directed Learning (five items, load values between .797 and .636), Learning Control (three items, load values between .802 and .478), and Motivation and Communication (seven items, load values between .76 and .55). The Cronbach Alpha reliability coefficient of the scale was calculated as .906, with coefficients for the sub-factors found to be .789 for Computer/Internet Self-efficacy, .816 for Self-directed Learning, .645 for Learning Control, and .870 for Motivation and Communication.

The factor structure of the scale was tested with Confirmatory Factor Analysis. CFA were performed using Lisrel. For the construct validity, compliance statistics were calculated for the four-factor model from the aforementioned EFA. The factor weights of the substances ranged from .42 (Item 10) to .82 (Items 2 and 7).

When the fit indices of the model tested with CFA were examined, it was seen that the chi-square value ($X^2 = 391.41$, $N = 266$, $SD = 129$, $p = .00$) was significant. However, as the sample expands, the likelihood of chi-square analysis results increases significantly. Therefore, $X^2/SD$ ratio is recommended in large samples. Table 3 shows the statistics on the compliance of the CFA results of the scale.

Attitudes of Students Towards e-Learning (ASL)

The original scale was developed by Wilkinson, Roberts, and While (2010). A revised version was then created by Haznedar and Baran (2012), after adapting and rearranging items from other scales in the related literature. The scale consists of 20, five-point, Likert-type items.

Validity and reliability studies were conducted for the sample in the current study. The KMO value was found to be .948 and Bartlett’s test was found to be significant ($p < .01$). In the EFA of the scale, a two-factorial structure was found and the variance ratio explained 62.17% of this structure. The first factor is named as ‘Familiarity to e-Learning’ (10 items, load values between .866 and .712), and the second factor is ‘Escape from e-Learning’ (10 items, load values between .758 and .520) on the original scale. Factors and items were found to have one-to-one correspondence with the original scale. The Cronbach Alpha reliability coefficient of the scale was calculated as .942, with coefficients for the sub-factors as .951 for e-Learning Familiarity and .901 for e-Learning Escape.

The factor structure of the scale was tested with CFA. Conformity statistics were calculated for the construct validity and for the two-factor model, which was the same as in the original scale. The factor weights of the substances ranged from .49 (Item 12) to .90 (Item 16).

When the fit indices of the model tested with CFA were examined, it was seen that the chi-square value ($X^2 = 625.59$, $N = 266$, $SD = 169$, $p = .00$) was significant. The $X^2/SD$ ratio was 2.35. Table 3 shows the statistics on the compliance of the CFA results of the scale.
### Table 3. Values Related to Goodness of Fit Indices of the Scale

<table>
<thead>
<tr>
<th>Fit Index Type</th>
<th>Observed Value</th>
<th>Acceptable Value</th>
<th>LROL Research finding</th>
<th>ASL Research finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>$X^2/SD$</td>
<td>$0 \leq X^2/SD \leq 2$</td>
<td>$2 \leq X^2/SD \leq 3$</td>
<td>3.00</td>
<td>2.35</td>
</tr>
<tr>
<td>NFI</td>
<td>$.95 \leq NFI \leq 1$</td>
<td>$.90 \leq NFI \leq .95$</td>
<td>.93</td>
<td>.96</td>
</tr>
<tr>
<td>NNFI</td>
<td>$.97 \leq NNFI \leq 1$</td>
<td>$.95 \leq NNFI \leq .97$</td>
<td>.95</td>
<td>.97</td>
</tr>
<tr>
<td>CFI</td>
<td>$.97 \leq CFI \leq 1$</td>
<td>$.95 \leq CFI \leq .97$</td>
<td>.95</td>
<td>.98</td>
</tr>
<tr>
<td>GFI</td>
<td>$.95 \leq GFI \leq 1$</td>
<td>$.90 \leq GFI \leq .95$</td>
<td>.86</td>
<td>.85</td>
</tr>
<tr>
<td>AGFI</td>
<td>$.90 \leq AGFI \leq 1$</td>
<td>$.85 \leq AGFI \leq .90$</td>
<td>.81</td>
<td>.81</td>
</tr>
<tr>
<td>SRMR</td>
<td>$0 &lt; SRMR &lt; .05$</td>
<td>$.05 &lt; SRMR &lt; .10$</td>
<td>.064</td>
<td>.05</td>
</tr>
<tr>
<td>RMSEA</td>
<td>$.00 &lt; RMSEA &lt; 0.05$</td>
<td>$.05 &lt; RMSEA &lt; .10$</td>
<td>.088</td>
<td>.10</td>
</tr>
</tbody>
</table>

Schermelleh-Engel, Moosbrugger, and Muller, 2003

In the study, when the fit indices of different types of values were examined, it was determined that the observed values were mostly within acceptable value limits (see Table 3). GFI ranges from 0 to 1 and is influenced by sample size and gives more accurate values in large samples (Schumacker & Lomax, 2004).

### Open-Ended Questions

As a qualitative measure, a structured interview questionnaire form was created by the researchers. The final version of the questionnaire was achieved through consultation with experts in the field of Education and Assessment. The questions in the structured interview form are as follows:

1. What do you think about receiving the Computer Literacy course through distance education?
2. What are your favourite aspects of distance learning?
3. What are your least favourite aspects of distance learning?
4. What do you think about the timing and duration of the live classes?
5. What do you think about the Moodle interface and course materials?
6. What do you think about the suitability of the instructional design and preferences of learning method?
7. What are your recommendations for students learning computer literacy through distance education?

### Data Analysis

For the quantitative data, frequencies and percentages were used to analyse the data, whilst a paired $t$-test was performed in order to determine whether or not there was any statistically significant difference on learners’ readiness towards online learning or students’ attitudes towards e-learning. Skewness and kurtosis values were computed in order to check the normality assumption. The skewness value was found to be between $.09$ and $.54$, and the kurtosis value was between $.18$ and $.86$ in this study. Given that these values were in the range of $-2$ to $+2$, it can be said that the distributions are considered normal (Tabachnick & Fidell, 2007). Moreover, the arithmetic mean, mode, and median values for all the factors show that the distributions do not depart from normal distribution (Table 4). After testing the assumptions, $t$-test analyses were conducted.
The qualitative data were analysed using content analysis. The data was prepared for analysis, and the themes defined based on the objectives of the study, the categories were identified and the coding process initiated. Each answer given for each question was read more than once. Data were then coded according to the categories and frequency tables created. Codes and categories were rearranged and classified until consensus was reached between the researchers. To ensure its quality and validity, the researchers carefully considered their clarity of thought process during the data analysis and interpretations. The coded answers were crosschecked along with the themes and codes to check that they adequately reflected the issue being investigated. To ensure the reliability of the codes generated in the data analysis process, some of the data were re-analysed by the same researcher after a period of ten months had elapsed. The percentage of internal consistency of the two coding processes was found to be .74. This result can be considered evidential for the required level of reliability. Finally, in the presentation of the results, significant ideas and statements of some of the participants are shown as supporting quotations in order to illustrate the findings from the qualitative dataset.

RESULTS

Quantitative Findings

Learners’ Readiness towards Online Learning

The pre-test was performed during the first phase of the study, and in the second phase the post-test was applied. In both the first and second phase, the Online Learning Readiness Scale was applied to the study group (Table 5).

Table 4. Descriptive statistics for the variables of the study

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Median</th>
<th>Mode</th>
<th>Std. Deviation</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Readiness for Online Learning Scale</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer / Internet Self-Efficacy (F1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-test</td>
<td>9.23</td>
<td>9.00</td>
<td>9.00</td>
<td>2.54</td>
<td>.00</td>
<td>-.21</td>
</tr>
<tr>
<td>Post-test</td>
<td>10.33</td>
<td>10.00</td>
<td>9.00</td>
<td>2.59</td>
<td>-.36</td>
<td>.18</td>
</tr>
<tr>
<td>Self-directed Learning (F2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>18.40</td>
<td>19.00</td>
<td>20.00</td>
<td>4.00</td>
<td>-.54</td>
<td>.08</td>
</tr>
<tr>
<td>Pre-test</td>
<td>18.98</td>
<td>19.00</td>
<td>17.00</td>
<td>3.55</td>
<td>-.40</td>
<td>.13</td>
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<tr>
<td>Student Control (F3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>9.40</td>
<td>9.00</td>
<td>9.00</td>
<td>2.51</td>
<td>-.06</td>
<td>-.31</td>
</tr>
<tr>
<td>Pre-test</td>
<td>9.61</td>
<td>9.00</td>
<td>9.00</td>
<td>2.63</td>
<td>-.17</td>
<td>-.23</td>
</tr>
<tr>
<td>Motivation &amp; communication (F4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>25.59</td>
<td>26.00</td>
<td>21.00</td>
<td>5.69</td>
<td>-.32</td>
<td>-.20</td>
</tr>
<tr>
<td>Pre-test</td>
<td>25.61</td>
<td>26.00</td>
<td>28.00</td>
<td>5.92</td>
<td>-.35</td>
<td>-.35</td>
</tr>
<tr>
<td>Post-test</td>
<td>30.60</td>
<td>30.00</td>
<td>30.00</td>
<td>9.93</td>
<td>.09</td>
<td>-.65</td>
</tr>
<tr>
<td>Familiarity to e-learning (F1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-test</td>
<td>35.13</td>
<td>35.00</td>
<td>35.00</td>
<td>9.42</td>
<td>-.51</td>
<td>-.23</td>
</tr>
<tr>
<td>Escape from e-learning (F2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>31.94</td>
<td>31.00</td>
<td>30.00</td>
<td>11.58</td>
<td>-.17</td>
<td>-.86</td>
</tr>
<tr>
<td>Pre-test</td>
<td>32.68</td>
<td>33.00</td>
<td>30.00</td>
<td>6.83</td>
<td>-.34</td>
<td>-.41</td>
</tr>
</tbody>
</table>

N = 266, p < .05
Table 5. Paired *t*-test of means for Online Learning Readiness Variables

<table>
<thead>
<tr>
<th>Sub-factors</th>
<th>Measurement</th>
<th>N</th>
<th>x</th>
<th>S</th>
<th>SD</th>
<th>t</th>
<th>p</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>Pre-test</td>
<td>266</td>
<td>9.23</td>
<td>2.54</td>
<td>265</td>
<td>-6.99</td>
<td>.000*</td>
<td>-.43</td>
</tr>
<tr>
<td></td>
<td>Post-test</td>
<td>266</td>
<td>10.33</td>
<td>2.59</td>
<td>265</td>
<td>-6.99</td>
<td>.000*</td>
<td>-.43</td>
</tr>
<tr>
<td>F2</td>
<td>Pre-test</td>
<td>266</td>
<td>18.40</td>
<td>4.00</td>
<td>265</td>
<td>-2.40</td>
<td>.017*</td>
<td>-.15</td>
</tr>
<tr>
<td></td>
<td>Post-test</td>
<td>266</td>
<td>18.98</td>
<td>3.55</td>
<td>265</td>
<td>-2.40</td>
<td>.017*</td>
<td>-.15</td>
</tr>
<tr>
<td>F3</td>
<td>Pre-test</td>
<td>266</td>
<td>9.40</td>
<td>2.51</td>
<td>265</td>
<td>-1.26</td>
<td>.207</td>
<td>-.08</td>
</tr>
<tr>
<td></td>
<td>Post-test</td>
<td>266</td>
<td>9.61</td>
<td>2.63</td>
<td>265</td>
<td>-1.26</td>
<td>.207</td>
<td>-.08</td>
</tr>
<tr>
<td>F4</td>
<td>Pre-test</td>
<td>266</td>
<td>25.58</td>
<td>5.69</td>
<td>265</td>
<td>-0.57</td>
<td>.954</td>
<td>-.00</td>
</tr>
<tr>
<td></td>
<td>Post-test</td>
<td>266</td>
<td>25.60</td>
<td>5.92</td>
<td>265</td>
<td>-0.57</td>
<td>.954</td>
<td>-.00</td>
</tr>
</tbody>
</table>

According to the repeated measurement results to determine the effect of the applied experimental process, it was found that the final test scores of Computer/Internet Self-Efficacy (*t*(_{265}) = -6.99, *p* > .05) and Self-guided Learning (*t*(_{265}) = -2.40, *p* > .05) differed significantly from the pre-test scores. The mean of the students’ pre-test scores for Computer/Internet Self-efficacy was found to be $\bar{x} = 9.23$, whereas the mean of the post-test scores was $\bar{x} = 10.33$. This finding indicates that the course taken with distance education had a significant effect on students’ gaining Computer/Internet Self-efficacy.

Similarly, the mean of the pre-test of Self-directed Learning scores was found to be $\bar{x} = 18.40$, and $\bar{x} = 18.98$ for the post-test. Accordingly, it can be said that the course taken via distance education was effective in improving the self-directed learning skills of undergraduate students. Nevertheless, no significant difference was found between the pre-test and post-test scores obtained from repeated measures of Student Control, Motivation for Learning, and Online Communication Self-efficacy measures. In order to identify the effect size and the significance of the differences between the groups, eta square ($\eta^2$) was examined (see Tables 4 and 5). According to Cohen (1988), if $\eta^2 < .02$ it is grouped as small, and so in this case the effect sizes found can be said to be small.

Attitudes of Students towards e-Learning

The Attitude Scale for e-Learning was applied to the study group in the first and second phases of the study. Findings and interpretations of the Attitudes toward E-learning variables in both phases are presented in Table 6.

Table 6. Paired *t*-test of means for E-learning Attitude Variables

<table>
<thead>
<tr>
<th>Sub-factors</th>
<th>Measure</th>
<th>N</th>
<th>x</th>
<th>S</th>
<th>SD</th>
<th>t</th>
<th>p</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>Pre-test</td>
<td>266</td>
<td>30.60</td>
<td>9.93</td>
<td>265</td>
<td>-2.12</td>
<td>.034</td>
<td>-.13</td>
</tr>
<tr>
<td></td>
<td>Post-test</td>
<td>266</td>
<td>31.94</td>
<td>11.58</td>
<td>265</td>
<td>-2.12</td>
<td>.034</td>
<td>-.13</td>
</tr>
<tr>
<td>F2</td>
<td>Pre-test</td>
<td>266</td>
<td>35.13</td>
<td>9.42</td>
<td>265</td>
<td>4.43</td>
<td>.000</td>
<td>.27</td>
</tr>
<tr>
<td></td>
<td>Post-test</td>
<td>266</td>
<td>32.68</td>
<td>6.83</td>
<td>265</td>
<td>4.43</td>
<td>.000</td>
<td>.27</td>
</tr>
</tbody>
</table>

There was a significant difference seen on the variables of e-Learning Familiarity (*t*(_{265}) = -2.12, *p* > .05) and Escape from e-Learning (*t*(_{265}) = 4.43, *p* > .05) in the pre-test and post-test measures. The mean of the students’ pre-test scores for Familiarity to e-Learning was $\bar{x} = 30.60$, while the mean of the final test scores increased to $\bar{x} = 31.94$. This finding indicates that the course taken through distance education had a significant effect on students’ familiarity to e-learning. The mean of the pre-test scores of the students’ Escape from e-Learning was $\bar{x} = 35.13$, while the mean of the post test scores decreased to $\bar{x} = 32.68$. Accordingly, it can be said that the course was effective in decreasing the students’ escape attitudes from e-learning.
Qualitative Findings

Views about Receiving the Computer Literacy Course through Distance Education

The majority of respondents ($n = 94$) to this question expressed their satisfaction about taking the course through the distance education medium. The reasons stated were that they found the distance learning method educational, efficient, useful, and appropriate for the course. Furthermore, they were able to find time for other courses and tasks ($n = 7$). In addition to these views, there were also students who were undecided between distance education and face-to-face education ($n = 10$), while students who thought negatively about distance education method ($n = 41$) did not find the method suitable, useful, or effective for them. Overall, the majority of the students were satisfied in taking the course via distance learning and it was revealed that they benefited from this medium of education.

The following are some of the thoughts mentioned by the students:

- ‘It is comfortable for me and easy to learn thanks to [video recordings]’.
- ‘Distance teaching is very comfortable, but face-to-face would be better. Because; we can go in anytime we want and I have always delayed entering because I usually sleep at the class time’.
- ‘It is much better for students like me, as a hearing-impaired student. I think the other lessons should be face-to-face and at some time through distance education’.
- ‘Distance learning method is very useful because when you cannot attend the live classes, you can still reach that information’.

Views About Most Favoured Aspects of Distance Learning

The benefits and opportunities provided by distance education was reported by 83 of the participants as the most favourable aspects, and included good communication with the lecturer, attending classes online from any location, and no loss of time in attending on-campus classes. One student expressed his consideration in terms of flexibility and comfort as, ‘I like to listen to the lessons in the home environment, and it is easier to adjust the time according to your own speed’.

The second important theme, according to 65 of the participants, was the educational materials and their accessibility. The most favoured aspect was the recording of live courses that they did not attend. With regards to this topic, one student explained that ‘There is no such thing as a missed class. It’s a good thing for a student to be able to watch it later’. They also emphasised that other materials are always accessible via Moodle. Detailed views and the assigned codes are presented in Table 7.

<table>
<thead>
<tr>
<th>Most favoured aspects of distance learning</th>
<th>Number of indices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefits and opportunities provided by distance education</td>
<td>83</td>
</tr>
<tr>
<td>Good communication with the lecturer</td>
<td>26</td>
</tr>
<tr>
<td>Attend classes online from any location</td>
<td>23</td>
</tr>
<tr>
<td>No loss of time attending classes on campus</td>
<td>13</td>
</tr>
<tr>
<td>Class duration and lectures</td>
<td>7</td>
</tr>
<tr>
<td>No obligation to join the live class</td>
<td>6</td>
</tr>
<tr>
<td>More convenient method than face-to-face</td>
<td>5</td>
</tr>
<tr>
<td>Using technology</td>
<td>3</td>
</tr>
<tr>
<td>Accessibility and course materials</td>
<td>65</td>
</tr>
<tr>
<td>Recording of live broadcasts</td>
<td>29</td>
</tr>
<tr>
<td>Access to information whenever wanted</td>
<td>19</td>
</tr>
<tr>
<td>Course materials</td>
<td>13</td>
</tr>
<tr>
<td>Assignments clear and easily accessible</td>
<td>4</td>
</tr>
</tbody>
</table>
The aspects that students liked in terms of distance education were in fact the main features of distance education. In particular, the availability of trainers and mobility in distance education means that this process was adequately supported.

Views about Least Favoured Aspects of Distance Learning

When looking at the least favoured aspects of distance education, the majority of participants stated that they did not find any unfavourable aspect of distance learning (n = 51). When the problems that were mentioned are examined, participants indicated that the schedule did not suit them (n = 27), that the distance education method did not suit them (n = 21), they experienced technical issues (n = 11), that they could not concentrate (n = 11), they found the assignments too challenging (n = 8), and they experienced problems with communication (n = 7). One student stated that distance education was inappropriate as, ‘The lecture was good, but I was bothered by having to look at the computer for about an hour’. With regards to this topic, another student stated that, ‘After about 14 years of face-to-face education, I took a course as distance education for the first time. I was unfamiliar with this method and experienced an indifference towards the course’. Regarding the topic of challenging homework, one student stated that, ‘Especially, the last two homework assignments were overly difficult, so I think it should be made easier’. Many of the issues found less favourable could be addressed. It would also be possible to facilitate the adoption of distance education by increasing the readiness of the students.

Views about Timing and Duration of Live Classes

Students were asked to provide feedback on the day, time, and duration of the lectures. The majority of participants (n = 97) indicated that the schedule for the live classes was deemed appropriate. As well as those who indicated that the start time of the live lesson was too early or too late (n = 28), there were others (n = 16) who stated that the start times should have been changed. One student expressed an opinion on the late start time of classes as, ‘It is not good having the course at home at night; it would be better if it was at school’. Another student stated that, ‘As we were unaccustomed to having a class at that time, we were not used to it and it’s hard to adapt [to this time]’. Finally, there were some students (n = 6) who stated that the length of the live class was a little long.

Views about the Moodle Interface and Course Materials

The students were asked about the learning management system (LMS) through which they connected to the distance education system, and about the materials available on the LMS, which is essentially the backbone of the distance course. It was seen that the majority of students (n = 121) favoured the LMS (Moodle) and found it to be good, successful, practical, and useful. With regards to the use of Moodle, one student said that ‘The interface is very simple, and it is very easy to access resources and assignments’, whilst another student expressed that ‘The Moodle system is easy to use and uploading homework is easy, it takes a short time’, and one stated that ‘I found it very easy to find what I search for on the [Moodle] website; it was very useful. I also had the opportunity to evaluate myself with the homework’. However, a few of the students (n = 11) said that Moodle was slow and not useful.

Students were asked about the teaching materials, and whether or not they were considered to be aligned with the learning course objectives. Except for a few students (n = 26), the majority (n = 134) stated that the teaching materials were aligned with the learning objectives. With regards to the teaching materials, one student stated that they ‘Help you to re-examine and are useful for computer-related practical exams’, whilst another stated that ‘It was especially useful to watch the live class recording again’, and another said ‘It was useful for me to reinforce what I had learnt’.

About the alignment of the examples, evaluation questions, and activities within the content; except for just a few students (n = 13), the majority (n = 134) found the examples, evaluation questions, and activities were aligned accordingly with the course content. As for the course homework and evaluation questions, a few of the students (n = 8) found them to be challenging.
Views about Suitability of Instructional Design and Learning Method Preference

Most of the students (n = 105) stated that the instructional design of the course was suitable, whilst 47 stated it was not suited to them. Some of the opinions expressed were:

- ‘It was absolutely suitable; especially for students with disabilities’.
- ‘I am more disciplined and more involved in face-to-face instruction’.
- ‘I like to make eye contact with my instructor so that I can understand better’.
- ‘No, because it is easier to interact with classroom teachers in face-to-face education and to socialise in class’.

When the students’ preferences were sought in terms of learning method, 91 of the students preferred face-to-face instruction and 46 preferred distance education. Moreover, 17 of the students preferred both instructional methods. Some of the students expressed the following:

- ‘I would prefer distance education, because I am more comfortable with distance education than face-to-face lessons as I’m hearing impaired. I’m stressed when not being able to hear the instructor; in short, it is difficult for me being in face-to-face education’.
- ‘Distance education is suitable for its timing and for learning; whereas face-to-face lessons are convenient for better communication with the teacher’.
- ‘Both have positive sides. Regarding learning, I would prefer face-to-face; however, I would prefer distance education because of time-saving’.

When the students were asked whether or not they would opt to take other courses through distance education, different thoughts emerged. A total of 108 students did not want to take any other distance course, and stated that not all courses are appropriate for distance education. However, 48 of the students stated that they did want to take other courses in the format of distance education, and mentioned they wanted online courses for Turkish Language and Literature, History of Revolution, English, Mathematics, Computer, and General Culture. About this topic, one student stated his feeling as ‘English. Because it is easier to learn such lessons in the virtual environment and it does not affect other courses’, whilst another said that ‘Yes I would like to take. I think it would be best for English courses; because many countries learn foreign languages in this way. There are also very useful applications for learning foreign languages on the Internet’.

Recommendations for Students to Learn Computer Literacy Lessons via Distance Education

Students were asked for their recommendations as to how students could be most successful on the Computer Literacy course delivered via distance education. Most of the students (n = 68) recommended participating in live lessons regularly or to watch their recordings. Other recommendations were about repetition of lessons (n = 16), practicing what was told in the lessons (n = 15), doing homework (n = 14), solving self-evaluation questions (n = 13), and reviewing materials available on the LMS (n = 11).

With regards to regular class attendance, one student stated, ‘I recommend attending each live lesson or following the recordings if you do not attend’. As to focusing on the live classes, one student stated that ‘They should not be distracted by looking at other websites on the computer’. Lastly, one student suggested ‘To send a message if they did not understand, to keep communication open by sending emails, to send evaluations by questionnaire, to pay attention to the assignments, and to ensure attendance without absenteeism’.

DISCUSSION AND CONCLUSION

In order to investigate the quantitative data of this study on the readiness and attitudes of 266 students taking distance education with e-learning, a normality test of the data was first performed. The paired t-test was used as a parametric test. The course was delivered through distance education and was found to have a significant effect on the students’ gaining of Computer and Internet Self-Efficacy, and was effective in improving the Self-directed Learning Skills of the undergraduate students. In considering this result, it should be taken into account that it is natural that students improve their computer and Internet usage
skills in distance education, and that they are taught about these subjects within the scope of a Computer Literacy course. Similarly, Topal (2016) observed a positive significant correlation between students’ levels of satisfaction and readiness. Additionally, the motivation of students who directed their own learning process was found to be high and more positively influenced. According to Demir’s (2015) study, results showed that self-directed learning was the most critical variable of achievement in online learning. Regarding self-directed learning, Kirmizi (2015) stated that online learners plan their study and have high expectations for their learning. Horzum et al. (2015) determined that readiness levels of students directly affects the motivation of learners, and indirectly affects their perceived learning. As a result, the experiences gained and the training related to distance education affected the level of readiness for e-learning (Ozturk et al., 2018; Sharma, Gulsecen, Ozen, & Kartal, 2015).

Moreover, the current study’s course, which was delivered through distance education, had a significant effect on students’ familiarity to e-learning. In addition to this, the course was considered effective in decreasing escape attitudes from e-learning. This may be due to both the course content and the method of teaching. The continual motivation of students in course lessons may be as a result of motivating students to attend and, most importantly, supporting their learning skills. Continuous communication with students and providing numerous resources may also support this end result. Similarly, Topal (2016) suggested increasing the satisfaction level of students by expanding the number and quality of materials utilised in online education; by providing more interaction; and by leveraging the power of new technological capabilities. The increase in e-learning attitudes of students actively participating in e-learning applications is in agreement with the studies of Aixia and Wang (2011), Cobanoglu, Uzunboyar, and Altun (2017), Rhema and Miliszewska (2014), and Zhu (2012).

According to the views ascertained in the current study about receiving a computer literacy course through distance education, the students expressed their satisfaction with taking the course through the distance education method; stating that they found distance learning as educational, efficient, useful, and appropriate for the course. As a result, they were afforded adequate time for other courses and tasks. Likewise, Harrington and Loffredo (2010) stated that students favour online education because the type of learning method is more suited to them, makes them use technology, and gives them the opportunity to be innovative. Fortune, Spielman, and Pangelinan (2011) stated that students preferred online learning with similar motivations when compared to on-campus students.

According to the students’ views in the current study about their most favoured aspects of distance education, they listed communication with the teacher, participation in lessons from any desired place and at any time, and course materials and their accessibility. Similarly, Queiros and de Villiers (2016) examined students’ views regarding online learning. Their findings showed special vital links among social presence (focusing on the interaction among people); technological aspects (access to and use of technology), and the utilisation of tools.

On the views about the students’ least favoured aspects of distance learning, the majority of the participants stated that they did not find any particular aspect of their distance learning unfavourable. Where problems were mentioned, they indicated that the schedule did not suit them, that the distance education method did not suit them, they experienced technical issues, could not concentrate, found the assignments too challenging, or experienced communication problems. The majority of participants indicated that the schedule for live classes was found to be appropriate. As well as those who indicated that the start of the live lesson was either too early or too late, some stated that the start time should have been changed. Problems experienced in distance education could be seen as normal as the students were not considered that technically competent. If they were thought to be weak at the beginning of the course in terms of their readiness for e-learning, it could be considered that they should have reached a certain level by the end of the course. Communication problems are often one of the issues attributed to distance education. In order to resolve this, lecturers must be sure to reach out to all of their students. If teachers are constantly at the centre of the class/communication, such problems may well arise. Referring to this, Sonwalkar (2009) argued that online education has a tendency to be instructor-dominated, with only limited student interaction. It is therefore necessary to pay attention to the formation of an adequately shared learning environment.
In the current study, the students were asked about the LMS they used (Moodle), through which they connected to the distance education system, and about the materials available on Moodle, which are the essential backbone for such a distance education course. It was seen that the majority of the students favoured the Moodle LMS, and reported that it was good, successful, practical, and useful. Students were asked about whether or not the teaching materials were aligned with the learning objectives; except for a few students, the majority stated that the teaching materials were aligned with the learning objectives. With regards to the alignment of the examples, evaluation questions, and activities with content, except for a very few students, the majority found them aligned accordingly with the content. As for the course homework and evaluation questions, a few of the students found them challenging. In a study by Sun and Chen (2016), the researchers emphasised efficient approaches for improving institutional success in transitioning to teach online effectively. They advised to give importance to well-structured courses, competent and motivated instructors, interaction between instructors and learners, forming an online learning community, and to ensure benefit is gained from appropriate technology utilisation.

Most of the students in the current study stated that the instructional design of the course was suitable, whilst other students stated it was not suited to them. When their preferences were asked in terms of the learning method, most of the students preferred face-to-face instruction, whilst some students preferred distance education, and a few preferred both. When they were asked whether or not they would like to take other courses through distance education, different thoughts emerged. Some of the students did not want to take any distance courses, stating that not all courses were appropriate for distance education; and some students wanted to take other courses via distance learning, mentioning courses such as Turkish Language and Literature, History of Revolution, English, Mathematics, Computing, and General Culture online. Students' preferences varied for distance learning. The remote nature of the course undertaken, the content, the method itself, their personal characteristics, and the quality of the teacher can all be influential in their choice. For the course in the current study, the students preferred both face-to-face and distance education.

In order to achieve success at the computer literacy course, the students in the current study recommended that future students participate in live lessons regularly or watch their recordings, to repeat the lessons, practice what was taught in the lessons, to do the homework, solve self-evaluation questions, and review materials available on the LMS. In order to finish a course, Capra (2011) recommended that the more an online teacher communicates and is accessible, the more obvious it is that the learner will be successful in their online classes.

The results of the current study, which were based on the opinions and attitudes of distance education students, may also instigate future research studies. The current research was limited to scales measuring readiness and attitude for e-learning, as well as open-ended questions. The study was conducted around an undergraduate Computer Literacy course and was therefore limited to the digital content of that course. The work was also limited by the teaching method applied. Students also had certain limitations because they took the course weekly for one hour online, and their lesson content was structured according to their own choice. Similar research could be designed to incorporate other student groups and other courses. In other courses given through distance education, the effect of other methods on student success and performance could be investigated by utilising different measurement tools.
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DATA MINING FOR THE E-LEARNING RISK MANAGEMENT

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ABSTRACT

The article shows the role of data mining methods at the stages of the e-learning risk management for the various participants. The article proves the e-learning system fundamentally contains heterogeneous information, for its processing it is not enough to use the methods of mathematical analysis but it is necessary to apply the new educational methods of data mining. It determines the basic types of e-learning risks for the elimination or minimization of which proactive manners are applied that aimed at testing and planning other actions. The article gives the rationales for the use of various data mining methods at the different stages of the risk management: 1) for quality authentication of the risks the classification based on using the method called “decision tree” is applied; 2) for making the analysis of risks the brainstorm method for mind map creation is used. The mind map displays the e-learning risk groups that are then rated on the prioritization criteria with the help of expert evaluation method; 3) for the assessment of probability of risk impact on organization of e-learning the expert evaluation method, cluster analysis and bow-tie analysis are used. The article shows that the data mining methods are able to not only classify educational risks but also identify the causes and anticipate possible impacts on the final outcome. Having a great deal of information obtained through the process of the e-learning risk management and using it in data mining, it is possible to determine the reasons and the taken actions depend more the minimization of risks and strengthen the effectiveness of the e-learning.

Keywords: e-Learning, educational risk, risk management, data mining.

INTRODUCTION

Internet and development of telecommunications technologies allow to exchange the real-time information, it determines the new generation of e-learning instruments. E-learning is considered as the new context for education (Dolzhenko, 2016), through the manipulation of a huge amount of information, describing continuum of educational interactions (any educational action of the trainee in the e-learning is monitored and fixed in multiple databases, log-files, personal accounts etc.), it brings the need in constant updating of data for using it anytime and without any problem. Thus, currently the most relevant questions are the analysis of this information, the possibility of new knowledge extraction from already presented in databases, containers etc. Data mining (Gorlushkina, 2015) allows to understand students, to find out the difficulties in training course organization, to identify the most effective techniques of presentation of training material etc. These data can be used by to make the effective solutions for running the educational process. But the problem arises concerning data extraction, processing and structuring.
Extraction methods of the hidden data are discussed in data mining science discipline appeared at the intersection of artificial intelligence, data analysis, automatic classification and statistical methods of data processing (Romero 2013; Dringus 2005; Monk 2005). Its integration into e-learning systems is examined under the conception of educational data mining (EDM). The development of e-learning systems can lead to multiple risks related to analysis of multivariable learning data.

The aim of the present investigation is to show that at different stages of e-learning risk management various methods of data mining can be used. These methods can not only classify learning risks but determine the reasons of its occurrence and predict the consequences of their influence on the final result that will predetermine risk minimization and raise effectiveness of e-learning.

DATA MINING METHODS

The term “Data mining” is defined as “…bunch of detection methods in data previously unknown, practically useful and interpretive knowledge of educational process and its participants to support decision making” (Khlopotov 2014). The term educational data mining (EDM) is defined as “…an area of science related to development of techniques for unique data type research coming from educational sphere and its usage for better understanding of students and environments they have” (Scheuer 2012). Educational data mining methods are based on statistics, machine learning and database theory. The main activities of this area are: data mining usage for Intelligence Tutoring Systems support, analysis of education processes, visual data mining and visual education process pattern. The analysis of the scientific literature in the field of using the methods of data mining showed that this problem is interesting to many modern researchers. For example, in (Ceylan 2015) the authors propose a searching model system related to student success in the form of classifiers, each of them is learned with different dataset with hundreds of thousands of lines in relation to sections. Received classifiers would serve as an advisory system for students who want to choose courses prior the registration in the semester. (Kamisli 2017) provides a social network analysis and mood analysis for students of the open and distance education systems by using tweets. With the help of statistical and data analysis methods, tweets analysis allowed to analyse students attitudes. In (Herlina 2017), the role of the K-Means algorithm for classifying students learning activities using e-learning was showed. This algorithm helped to form student activity and improving student abilities cluster. An approach based on minimal spanning tree for clustering e-learning resources is proposed in (Wu 2016). The developed clustering method can classify students into groups so that a homogeneous classification can increase the learning effectiveness. In addition, the authors believe that the clustering of e-learning resources would be valuable for decision making in terms of learning strategies and learning design for intellectual learning. The system proposed in (Apurva 2017) used the ontology-based document clustering approach, that is based on a two-stage clustering algorithm. Combining the clustering of documents with ontology would help to create better clusters that would not ignore the semantic connection between words. This proves that the clustering approach that uses the semantics of the documents for term weighting produces better results than the approach without semantics. (Rawat 2019) justified the use of cluster analysis for classifying a new student into the corresponding class and recommending relevant courses using various evaluation metrics. This advisory system should help students to improve their academic progress and, therefore, the overall learning process. (Hussain 2018) used machine learning algorithms to identify students with a lack of involvement in the course. The results showed that a decision tree classification gives better performance in the context of accuracy. The system model for clearing and drilling learning data (Liang 2017) allows to form a student profile, as well as student attitudes to learning and the endurance of academic behavior by using a similarity algorithm and Jaccard’s coefficient. In accordance with e-learning resources and student behavior, the authors presented an intellectual leadership model that would help to improve the e-learning platform and student knowledge. The authors (Panyajamorn 2018) have proposed effective e-content development method that would include effective indicators to identify potential students and improve their abilities. This method is based on data analysis, which included a quantitative research approach with the use of paired Student’s test to determine differences in estimates before and after testing; analysis of variance (ANOVA) for the analysis and search for the relationship between improvements in grades. (Wu 2018) uses a text data mining to automatically identify student interest in an open academic environment. The authors suggest a method for computer-aided engineering of student interests based on a combination of the content generated by the
student and its dynamic interaction with other educational resources. This method was used as a basis for the student theme model, in order to find out not only the interests of student knowledge (interest in creating a content), but the interests of the student collector (interest in collecting a content generated by others). The table 1 shows the educational data mining methods with short descriptions (Baker 2010; Bienkowski 2012; Romero 2006).

Table 1. The main educational data mining methods

<table>
<thead>
<tr>
<th>Method</th>
<th>The description of method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prediction: classification, regression and density evaluation</td>
<td>Model development in which the output of a single aspect of data (predictable variable) is based on the combination of other aspects (variable-predictors) (Herlina 2017)</td>
</tr>
<tr>
<td>Clustering</td>
<td>Finding points that are naturally connected and data separation on clusters. It is used when a data structure is unknown (Wu 2016)</td>
</tr>
<tr>
<td>Analysis of the relations</td>
<td>Finding out the relationship between different variables in the database set and for the algorithm encoding for future use. The different types of methodologies for analysis of the relations are used: search for strong rules, analysis of temporary patterns, correlation data mining, analysis of causes (Apurva 2017)</td>
</tr>
<tr>
<td>Data processing for assessing</td>
<td>Authentication and evaluation of data and judgment. Compilation, visualization and interactive interface to support decision making are used (Rawat 2019; Hussain 2018)</td>
</tr>
<tr>
<td>Outlier detection</td>
<td>Data discovery which deviate greatly from remaining values (Panyajamorn 2018)</td>
</tr>
<tr>
<td>Text mining</td>
<td>Finding and extracting useful patterns, models, rules, trends from unstructured documents. It includes classification, clustering, extraction of the concept, sentiment etc. (Wu 2018)</td>
</tr>
<tr>
<td>Model study</td>
<td>Study of pre-compiled models (developed with the help of EDM-methods of forecasting, clustering, knowledge engineering). Application of models to data and its use as the component of other analysis (Liang 2017)</td>
</tr>
<tr>
<td>Data conversion to the form acceptable to person</td>
<td>Data conversion to the form acceptable for person usage (Kamisli 2017)</td>
</tr>
</tbody>
</table>

Description of presented methods shows that data mining is a powerful tool for information extraction and its transformation to the form needed for subsequent use (Hanna 2004). Using of the methods can solve a lot of problems:

1. evaluation and deployment of the materials on the base of usage and performance data;
2. supporting consultations on complex issues;
3. performance measurement after the given consultation and advice;
4. assistance in searching for suitable concourse etc.

In addition, global trends, dynamic environment, difficulty of the problems requiring greater efficiency, adaptability, integration and coordination of all of relevant design process and implementation of the e-learning systems.

In this context, the probability of occurrence of events that could influence on achieving goals has appeared, in other words, the probability of occurrence of non-performance risk or appearance of a specific threat or expected losses (Matveenko 2012). The occurrence of the risk relates to uncertainty that is the lack of knowledge of facts and the lack of uniqueness. Since the e-learning system does not allow to avoid influence of uncertainty factors, the problem of risk management, linked to its registration and regulation, needs to be resolved (Chubarova 2005) by decision making focused on performing constant risk assessment and action planning in order to reduce any risk.
e-Learning Risk Management

The term “risk management” in the e-learning area means the idea that characterized quality of stable educational activity, more specifically, initial situation, preparation and decision-making processes under the delivery and receiving educational services (Chubarova 2005). In the e-learning, risks may be associated with general computer threats (Barik 2012) that include:

1. breach of confidentiality: an unauthorized party gets the access to the assets presented in the e-learning system;
2. violation of integrity: unauthorized access to materials used in the e-learning system;
3. denial of service: prevention of access privileges by violation of traffic during the e-learning system users activity;
4. virus attack: a malware changes the code in case to crash other programs;
5. problem with the requirements and organizational documents;
6. theft and unauthorized data changes;
7. lack of access to servers and personal computers.

As the result of the above-mentioned threats for various e-learning system participants (Authors, Students, Managers, Tutors and System Designer/Administrator) different types of educational risks may develop. Substantiated classification of risks allows the clear identification of each place in the general e-learning system where each risk is assigned its policies and techniques: identification, analysis, constant evaluation, monitoring and active control until the risks are resolved or turn into the problems that could be processed (Ruggeri 2013).

Figure 1 shows the main stages of risk management process that may be offered as building blocks of repetitive and dynamic process of risk management in education.

![Figure 1. Main stages and processes in the area of educational risk management](image-url)
Application of Data Mining Methods at the Stages of the e-Learning Risk Management

Consider the main stages of e-learning risk management and demonstrate the application of data mining methods for evaluation and minimization of educational risks.

Identification of Risks

Identification of risks is the repetitive process as the e-learning evolved within its service life new risks may occur or information about them will appear and the risks will be known (Khodyreva 2017). The risks should be properly described on the stage of identification. Description format is meant to be consistent for clear and explicit understanding of each risk in order to support the effective analysis and develop the response plan.

For the qualitative risk identification educational data mining method is used – classification, which aims to define category and class for each risk. As shown in Pena-Ayala (2014) works most of research in the area of EDM use different classification algorithms that are: decision trees, k-nearest neighbor algorithm and naive Bayes classifier (Bishop 2006).

K-nearest neighbor algorithm for classification of e-learning risks is used. Under this algorithm all of the risks are applied to the class that is most common among others, whose classes are already known. Put in the basis of method realization the multiple selection based on the voting among the experts: r-vote is the class number to which r-closest neighbor is related. Define class weight $G_r$ as approximate quantity of risks in the class (1).

$$w_r = \frac{n_r}{k}$$

where k-nearest neighbor belongs to class, to class, ..., to class, so that

$$n_1 + n_2 + ... + n_n = k.$$

Let us formulate several types of rules about reference educational risk to some class:

1. simple majority rule: new risk belongs to that class, which risks replace over half of place in selection (2):

$$w_r = \frac{n_r}{k} \geq 0.5$$

2. simple majority rule: new risk will belong to the class with the large number of elements in selection of k-nearest neighbor, in other words, to the class that obtains the largest number of votes (3):

$$r = \text{argmax} \{n_r\}$$

3. weighted majority rule: new risk will belong to the r-class which number is defined by the following formula (4):

$$r = \text{argmax} \left( \frac{w_r}{G_r} \right)$$

4) single sample mean rule: new risk belongs to class to which the mean distance is minimal (4):

$$r = \text{argmax} \ d(x, G_r)$$

Figure 2 shows the result of outlined rules usage for e-learning risk classification obtained by the experts using analysis of literature (Barik, 2012; Bozinoff 2014; He 2013; Ilyina 2016; Khodyreva 2017). All of the risks were classified as follows: author’s risk, tutor’s risk, manager’s risk, system designer’s risk, student’s risk, and other risks that may not belong to any of the mentioned groups.
Figure 2. Classification of e-learning risks
1. **Author’s risk** – all of the e-learning risks associated with implementation and presentation of learning material.

The authors have responsibility for development and implementation of learning material so a threat that the compile material can be referred or processed without the consent of the authors arises. Author’s responsibility is to protect learning material from any unauthorized use, modification or re-use of data in different contests related to e-learning. Author’s lectures, video clips, documents, learning activities and etc. can be changed/destroyed so it is in the author interests to make sure that users are getting educational content without any changes and in a full manner.

Besides, risks of educational content may arise in e-learning associated with a number of reasons: bad quality of e-learning materials; outdated and inaccurate information; absence of pattern and lack of visualization; uniformity of tests; lack of learning activities of different complexity and absence of examples of tasks execution.

2. **Teaching risk** – all of the e-learning risks associated with the use of different educational methods, examinations and final grades.

   - risk for student and teacher’s privacy related to usage of different forms of learning materials discussion, for example, via online-forum where the documents are retained on electronic file on a server;
   - risk which includes standardization of test questions and the list of questions that abridge teacher’s academic freedom;
   - risks linked with checking executed tasks associated with deception;
   - risks of learning material change while transmission to the students (He 2013).

The teachers have responsibility for learning material so they can develop educational content in accordance with requirements of the course.

3. **Manager’s risk.** In the e-learning system should be some governing board setting rules for its creation and functioning.

   The main managerial risks in the e-learning associated with dealing with legal issues: copyright, online-testing, sending of official documents etc. Managers should see about entry onto the course and cancellation of registration as the need arises, development of backup plan and testing of process of annealing, otherwise, when needs arise it would be hard to update data.

   Manager’s risk is the risk that divides responsibilities in such questions as:

   - saving passwords of all of the servers and routers;
   - recording of daily traffic;
   - surveillance of constant electrical power supply of server and other network based devices;
   - control of authorization, in other words access strategy (reading, recording and doing) for students and other participants for effective performance of the e-learning system.

4. **System developer risk.** In the e-learning system the courses classify into different modules. In the case of market demand requirement one educational model may be changed to another that leads to the solution of different problems for support and implementation of a new one.

   The quality hardware components for modeling, development and delivery of the e-learning components need: high performance web-servers and databases, high-speed Internet with quality LMS and also safe infrastructure that are able to support several users and networking applications.

   Developer risk associated with storing of passwords in the open code of the application and its transmission to students and teachers.

5. **Student risk.** The main participants of the e-learning are students who are learning and sharing their knowledge between each other. The student is obliged to know learning material but the risk of unsuccessful examination if the learning material was changed by hackers may arise.
There are following types of risks for a student:

- risk of storage of information for login (identification of users and passwords);
- risk of unsuccessful authorization for gaining access to the e-learning server if the information for login was not used correctly;
- risk of wrong usage of feedback mechanism;
- risks of phishing when on a counterfeit website students are encouraged to enter their confidential information.

6. Other risks in the e-learning:

- natural risks (problems of an energy source, problems with the cell phone reception, equipment undercapacity etc.);
- regulatory risks (threats fuelled by swindle, blackmail, theft etc.);
- unintended risks caused by computer errors, power cutoff, process errors, etc.

**Analysis and Risk Assessment**

Analysis and risk assessment of the e-learning are performed for the purpose of transformation gained from identification of the information into the one that allows taking decisions. In the process of the qualitative analysis of the risks a number of assessments of possible adverse effects caused by detected factors are produced. In the process of quantitative analysis indicator values of the probability of menacing events caused by the occurrence of risks are determined and specified.

E-learning system uses Data Mining methods for knowledge extraction by analysis of information that is available in a form of data created by users. The basic principle of data mining is unused data extraction that can be used in the future. Data mining passes through several stages:

1. data processing and selection. Internal and external databases provide data for relational description between them;
2. data update. When positions and values are identified, it is necessary to delete useless data and convert processing data into accurate.
3. data coding. In the process of data coding all of the data can be used for statistics, artificial intelligence or machine learning and the results will be attained quickly.

Given the specificities of the e-learning, ranking method was used for qualitative risk analysis, with its help grading of factors according to its influence on targeted indicator was performed. Each factor was associated with a weighting factor that makes quantitative evaluation of impact degree. The expert report was made by the group of L-experts, each of which arranged private criterion of risks in order of importance: from 1 (the most important private criterion) to n (the lowest private criterion in importance etc.). Then the transformation of ranks was made as follows: rank 1 – received m-appraisal, rank 2 – received m-1 etc. until the rank m that received appraisal 1. Let’s define received appraisals, where $i$ is expert, $k$ is criterion. The results of the expert survey can be compiled in a table 2.

<table>
<thead>
<tr>
<th>Experts</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$F_1$</td>
</tr>
<tr>
<td>1</td>
<td>$r_{11}$</td>
</tr>
<tr>
<td>2</td>
<td>$r_{21}$</td>
</tr>
<tr>
<td>…</td>
<td>…</td>
</tr>
<tr>
<td>L</td>
<td>$r_{L1}$</td>
</tr>
<tr>
<td>Σ of appraisals</td>
<td>$r_1$</td>
</tr>
</tbody>
</table>
Appraisals summarization of received criteria with the formulae (5) for the determination of a weighting factor (6) was made:

\[ \eta_i = \sum_{j=1}^{L} r_{ji} \text{, where } i = 1, \ldots, m \]  

\[ \lambda_i = \frac{\eta_i}{\sum_{i=1}^{m} \eta_i} \text{, where } i = 1, \ldots, m \]  

With the usage of the weighting factor risk matrix was received that, with combining two indicators (probability and operation) for defining the importance of the risk, defined many educational risks required increased attention. Array cells were “thresholds”: unacceptable, average and low risks that were then classified in order of influencing on effectiveness of the e-learning system organization. Using array computations the analysis of the e-learning risks was made in order to identify the root causes of its appearance. This analysis was made with the use of method of creative generation of ideas – “brainstorm” and the method of expert evaluation.

Mind Map, which was produced by psychologist Tony Buzan (Muller 2007) and presents convenient and effective imaging team of mentality and alternative recording of the clear reflection of association links, was used to visualize the brainstorm (Khakimov 2016).

Figure 3 shows the Mind Map that reflect the process of general systems thinking using schemes (Nozdrina 2012) (Fig. 3) for showing the groups of e-learning risk that then were ranked by the priority criterion by the method of expert evaluation.

The table 3 shows average of expert evaluation received by 100 respondents who needed to evaluate the rank of each level by ten-to-one scale, where 1 is low and 10 is critical risk. On the basis of these exponents expert evaluation of probability of risk influence on e-learning organization was rated.
Table 3. The results of the e-learning risks analysis through the expert evaluation method

<table>
<thead>
<tr>
<th>Risk</th>
<th>Parameter</th>
<th>Probability of risk occurrence</th>
<th>Probability of influence on the e-learning organization</th>
<th>Probability of influence on getting an education by a student</th>
<th>Probability of losing students</th>
<th>Degree of influence on the quality of educational services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching risk</td>
<td>Weight</td>
<td>0,2</td>
<td>0,15</td>
<td>0,1</td>
<td>0,6</td>
<td>1,8</td>
</tr>
<tr>
<td></td>
<td>Risk of evaluation results change</td>
<td>3,5</td>
<td>0,35</td>
<td>1,2</td>
<td>0,6</td>
<td>1,8</td>
</tr>
<tr>
<td></td>
<td>Risk of violation of academic freedom</td>
<td>2,45</td>
<td>0,65</td>
<td>1,05</td>
<td>0,3</td>
<td>0,4</td>
</tr>
<tr>
<td></td>
<td>Risk of checking the wrong task</td>
<td>1,65</td>
<td>0,85</td>
<td>0,15</td>
<td>0,2</td>
<td>0,4</td>
</tr>
<tr>
<td>Author’s risk</td>
<td>Risk of educational content change</td>
<td>2,45</td>
<td>0,445</td>
<td>0,9</td>
<td>0,3</td>
<td>0,4</td>
</tr>
<tr>
<td></td>
<td>Risk of educational content deletion</td>
<td>3,5</td>
<td>0,3</td>
<td>1,35</td>
<td>0,8</td>
<td>1,6</td>
</tr>
<tr>
<td>Student risk</td>
<td>Risk of misunderstanding of learning material</td>
<td>2,8</td>
<td>0,7</td>
<td>0,15</td>
<td>0,8</td>
<td>1,6</td>
</tr>
<tr>
<td></td>
<td>Risk of destruction of completed task</td>
<td>1,35</td>
<td>0,8</td>
<td>0,15</td>
<td>0,2</td>
<td>0,2</td>
</tr>
<tr>
<td></td>
<td>Risk of non-performance of the task</td>
<td>2,75</td>
<td>0,6</td>
<td>0,15</td>
<td>0,8</td>
<td>1,8</td>
</tr>
<tr>
<td></td>
<td>Risk of account hack</td>
<td>3,25</td>
<td>0,35</td>
<td>1,2</td>
<td>0,8</td>
<td>1,8</td>
</tr>
<tr>
<td></td>
<td>Risk of non-receiving a feedback</td>
<td>2,45</td>
<td>0,65</td>
<td>1,35</td>
<td>0,6</td>
<td>1,6</td>
</tr>
<tr>
<td></td>
<td>Risk of undeveloped competencies</td>
<td>2,75</td>
<td>0,45</td>
<td>1,5</td>
<td>0,3</td>
<td>0,4</td>
</tr>
<tr>
<td>System Developer</td>
<td>Risk associated with infrastructure change</td>
<td>2,45</td>
<td>0,55</td>
<td>1,5</td>
<td>0,6</td>
<td>0,8</td>
</tr>
<tr>
<td></td>
<td>Risk of errors when moving to a different platform</td>
<td>1,4</td>
<td>0,85</td>
<td>1,35</td>
<td>0,7</td>
<td>1,2</td>
</tr>
<tr>
<td></td>
<td>Risk of leakage of confidential information</td>
<td>1,35</td>
<td>0,8</td>
<td>0,15</td>
<td>0,1</td>
<td>0,6</td>
</tr>
<tr>
<td>Manager’s risk</td>
<td>Risk of copyright violation</td>
<td>1,55</td>
<td>0,75</td>
<td>1,2</td>
<td>0,2</td>
<td>0,4</td>
</tr>
<tr>
<td></td>
<td>Risk of document processing fault</td>
<td>3,15</td>
<td>0,3</td>
<td>1,2</td>
<td>0,6</td>
<td>1,6</td>
</tr>
</tbody>
</table>
For the interpretation of received results with the help of mathematical statistics:

1. Generalized expert opinion was derived and average value of risk was defined as (7).

\[ S_j = \frac{\sum_{i=1}^{m} a_{ij}}{m_{kj}} \]

Let be quantity of experts evaluate j-risk;
i is the expert number, \( i = 1, \ldots, m \);
j is the risk number, \( j = 1, \ldots, n \).

2. Average rank for risk universe was defined as (8).

\[ \bar{S} = \frac{\sum_{j=1}^{n} S_j}{n} \]

where \( n \) is the number of risks.

3. Deviation of average rank of j-risk from average rank of risk universe was defined as (9).

\[ d_j = S - \bar{S} \]

4. Kendall’s coefficient of concordance or coefficient of multiple correlation of ranks for the determination of compatibility of expert opinions was defined as (10).

\[ W = \frac{12S}{m^2(n^3 - n)} \]

where \( m \) is the number of experts in group,
n is the number of factors,
\( S \) is variations in rank matrix under the average one.

5. General assessment of coefficient of concordance by the calculation of Pearson’s chi-squared test was made (11) (Gafarova 2015).

\[ \chi^2 = \frac{\sum_{j=1}^{n} d_j^2}{\frac{1}{12mn(n + 1)} + \left(\frac{1}{n} - 1\right) \sum_{i=1}^{m} T_i} \]

where \( m \) is the number of experts,
n is the number of risks,
is the coefficient taking into account occurrence of related variants of i-expert that is defined as (12).

\[ T_i = 1/12 \sum_{q=1}^{Q} t_q^q - t_q \]

where \( Q \) is the number of bands (forms of duplicate elements) of i-expert evaluations;
t_q is the number of elements in q-band for i-expert (the number of duplicate elements).
The coefficient of concordance showed that among experts were groups with good consensus of opinions but these opinions are opposite and altogether have neutralized one another. For this reason additionally k-means clustering was used (Karun 2013; Kavitha 2017), the purpose of using of which is to split the e-learning risks into classes (fig. 4), each corresponding to specific risk group – unacceptable, average and low risks.

Cluster analysis made it possible to combine e-learning risks into classes (clusters) so in one class are the most similar risks and the risks of different classes are vary from each other. Cluster analysis identified a group of risks that has maximum effect on organizational efficiency of the e-learning.

To sum up, at the end of analytical work about the e-learning risk evaluation were received:
- the list of risks grouped by priority;
- the items list which required additional analysis due to the high probability of occurrence and increased level of influence on the e-learning organization. Received list of the e-learning risks requires additional constructive analysis. Bow-tie analysis is applicable for schematic description and analysis of “Hack of student account” (Fig. 5) and also for reasons and consequences that allow to evaluate probability, level of negative effect and correlation between risks.

Planning of Ways of Responding to Risks

Planning of ways of responding to the e-learning risks is the regulated procedure of development of a plan to minimize negative consequences of the risk impact. Four basic methods of response to risks can be marked: avoidance, minimization, transfer/insurance, acceptance (Sultanov 2016).

With the use of these methods for planning the ways of responding to e-learning risks model of dependence containing the list of measures to minimize received the e-learning risks was created. This helped to manage effectively e-learning risks.

Risk Management, Report and Control

At the stage of risk management were made the reports that showed the results of responding: risk was allowed; additional corrective actions for risk solution were taken.

At the stage of e-learning risk control database with received educational risks was formed. The database is being continuously updated and contains innovative models of risk management created with the usage of data mining and focused on e-learning assessment.
Figure 5. Bow-tie analysis for description and analysis of risk from reasons to consequences.
GENERALIZATION AND CONCLUSION

Due to the development of the e-learning monumental flows of heterogeneous data (Duke 2011) were showed that need to be analyzed. In addition, many factors or risks could have a negative effect on developing e-learning, the probability of its occurrence is to be esteemed and minimized, in other words – managed.

In our view, traditional methods of mathematical analysis cannot allow the variable solution of the e-learning risk management goals that combines with averaging over selection conception leaded to operations on fictitious variables and lack of analytical criteria for authenticity of relations and regularity in multi-dimensional data etc.

We believe that for the diverse data processing represented by quantitative and qualitative data, data mining can be applied, the main feature of which is the interpretation function of regularities that is the basis of creating the rules for the object entry into equivalence classes. In addition, they are used in solving problems whose regularities cannot be accurately described in the language of statistical or other analytical mathematical models.

Data mining methods not only identified the e-learning risks, but also determined the causes of their occurrence and predict the possible consequences of their impact on the final result. Therefore, having a large amount of received in the process of the e-learning risk management information and subject it in Data Mining, it is possible to determine the reasons and driving forces, measures, taken actions minimization of risks and strengthen the effectiveness of the educational process in e-learning system are depend, as well as to identify factors that do not have a statistically significant impact or impact negatively to the outcome.

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BOOK REVIEW

**Online Learning and Its Users: Lessons for Higher Education**

Written by Claire McAvinia

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Amasya University
Amasya, Turkey

INTRODUCTION

From the early usage of computers and the internet to the widespread adoption of online education, it has been expected that these novel practices would revolutionize education. The book, online learning and its users (McAvinia, 2016), addresses the expectations and disappointments by presenting and discussing the past, present, and future of online learning in Higher Education Institutions (HEIs) with a systemic perspective. It specifically focuses on the role of Virtual Learning Environments (VLEs) based on the literature and current evidence from the field. By users, the author refers to all stakeholders of online learning: lecturers, students, managers, and supporters. Online learning and its users are examined with a sociocultural perspective through the lens of Activity Theory (AT). The author discusses the past and present disappointments in spite of the expectations from online learning that it would change the traditional pedagogy. Based on the current findings from the field through the lens of AT, she proposes lessons for changing or transforming the pedagogy of online learning in HEIs including Massive Open Online Courses (MOOCs), rather than repeating or supporting the traditional practices. In this regard, the book calls for further systemic research addressing theoretical/pedagogical, organizational, and methodological issues impeding the revolution of online teaching and learning practices.

REVIEW OF THE BOOK

The first chapter of the book presents the historical development of online learning in HEIs starting from the early usage of computers and the internet. The author discusses this development process by basing her arguments on a comprehensive literature. The historical perspective not only focuses on the use of online learning, but also on the organizational and theoretical developments by covering the evolution of the roles of the staff at HEIs. From the theoretical perspective, how learning theories informed the use of VLEs and the challenges to revolutionize pedagogy of teaching in HEIs are discussed based on the relevant literature.
From the organizational perspective, how the role of learning technologists has evolved as the supporters of the adoption and mainstreaming of VLEs in HEIs is particularly examined together with the challenges.

The second chapter focuses on the challenges and disappointments in online learning, whose clues are given in the first chapter, based on the literature and history of disappointment. The author uses “disappointment” to describe the underuse of online learning and its disability to create a major change in teaching pedagogy. In other words, the author argues based on the literature that online learning has been used to repeat and support traditional practices rather than transforming them. She, then, categorizes the challenges as theoretical/pedagogical (e.g. the need for pedagogy-driven use of technology), organizational (e.g. commercial interest on technology usage), and methodological issues (e.g. excessive emphasis on case studies). For the evolution of teaching practices at HEIs through online learning, it is suggested to concentrate on these issues through the focus on activities of the users.

Based on the suggestion in the second chapter, in the next chapter, the author introduces AT and discusses its value as an analytical tool to achieve the expected revolution in the teaching practices in HEIs by transforming them through online learning. AT is specifically described in this chapter since the rest of the book is presented within its framework. It is extensively explained what potential AT has in addressing the above-mentioned pedagogical, organizational, and methodological issues impeding educational change and how AT can be used to change education based on the relevant literature on it and online learning. Particularly, the contradictions that might be observed between the elements of an activity are pointed as the key to the development of online teaching practices. By this way, the author also constructs a base for the next chapters, in which the lessons for the users of online learning are based on the evidence from a systemic study within the framework of AT.

In the next three chapters, the lessons for the users of online learning, namely, managers/supporters, lecturers, and students are presented by supporting them through the findings from the author's current study within AT as well as the relevant literature unlike the previous chapters, in which the arguments were completely based on the literature. In the next three chapters, the focus is on the activities of the users as to the use and mainstreaming of VLE in a campus-based HEI. The author presents the findings of the activity theoretic analyses to understand the activities of the users and contradictions in these activities. For each activity of the user groups; the subjects, objects, instruments, rules, community, and division of labor were identified as well as the contradictions occurred within and between the activities in the use and mainstreaming of a VLE in a HEI.

The repeat or facilitation of the traditional activities in teaching and learning is defined as the “cycle” and the development and transformation of these activities, instead of supporting them, is called “breaking the cycle”. The observed unshared objects and contradictions were used as the base for the lessons for each user group to break the cycle since they were adopted as the key points for the change in online learning and teaching. Thus, in the seventh chapter, she synthesizes the findings from the analyses of the activities of each user group within AT framework and determines the critical points to change online teaching and learning from the pedagogical, organizational, and methodological aspects. In this regard, this chapter also calls for further systemic studies on user activities regarding online learning, rather than relying solely on surveys or learning analytics since they just concentrate on one part of the activities though they have value.

The past and present of online learning is presented in detail in the previous chapters. In the eighth chapter, she draws attention on the future of online learning. She specifically focuses on MOOCs, again through the lens of AT, based on the literature since they are expected to revolutionize higher education just as expected from VLEs. She separately analyzes and models the activities in cMOOC and xMOOC, two main MOOC types, and discovers the activities and contradictions within the elements of them. Then, she proposes lessons for the development of both cMOOCs and xMOOCs so that they can change educational practices as desired by assuming that both VLE and MOOCs have similar pedagogical concerns.

In the last chapter, the author briefly synthesizes the overall issues in the book and concludes five lessons for the improvement of online teaching and learning in HEIs or, with the author’s words, for breaking the cycle. The concluded lessons are articulation of the expectations from online learning, planning for its collective development, appropriately resourcing support overheads, further research on institutional adoption of new technologies, and gaining more knowledge about students’ learning. As can be inferred, these lessons
cover pedagogical/theoretical, organizational, and methodological issues as often stated as the impediments of change in online learning throughout the book. Therefore, the author recommends taking actions in research and practice to address these lessons.

CONCLUSION

The book presents the literature of disappointments as a result of the expectations that online learning would lead to major changes in the pedagogy of higher education including campus-based teaching and distance education. Based on this review, the author recommends focusing more on teaching and learning activities with a systemic approach from sociocultural perspective rather than focusing on specific aspects of online learning. For this purpose, AT is introduced as an analytical tool to analyze activities of each user group and to reveal contradictions as the starting points of the desired revolution in HEIs. By doing so, the author presents the findings of a current study on the activities of the users of online learning through the lens of AT in a campus-based HEI and concludes several lessons as well as a call for future research from the pedagogical/theoretical, organizational, and methodological aspects. In this sense, the book contributes to the literature of online learning by specially drawing attention on the significance of the understanding of user activities in online learning so as to actualize the desired transformation of teaching and learning in HEI.

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BOOK REVIEW

Assessment Strategies for Online Learning
Engagement and Authenticity
Written by Dianne Conrad and Jason Openo

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INTRODUCTION

Assessment, evaluation and grading have been used to verbalise the result or the process of learning and teaching interchangeably. However, with the rise of the student-centered teaching paradigm, the difference in application and notion of these terms are becoming clearer. Assessment is formative and sheds light on the process while evaluation is summative and gives importance to results. The emergence of open learning makes academicians to reconsider these assessment means.

The advancement in technological means has led flexible learning tools to spread, especially online learning. Online learning’s widespread acceptance requires new ways of assessments which will both show the learning efforts of learners and encourage them to deepen their learning. The approval of the Community of Inquiry Model (CoI) necessitates social, cognitive and teaching presence, which results in engagement and authenticity in assessment.

Dianne Conrad and Jason Openo are successfully able to transfer their adult education and online learning background to write about online assessment, a topic in intricacy. Conrad and Openo are trying to get a close look at the ways of assessment in online learning in high education at social science by considering constructivist outlook. The main focus of the authors are assessments requiring and producing authenticity and engagement of students.

The book consists of ten chapters each of which underlines open learning and its assessment in online environment. The main emphasis of the book on assessment is to clarify the need for new assessment means and the vanity of old ways. The authors are stressing the importance of constructivist learning for engagement and authenticity in online learning assessment.
Chapter 1: defines what it means by uttering assessment-evaluation and combines the rise of online learning with the need of authentic assessments by adding that open and distance learning tends to go through and requires new assessments. Then they define the theoretical structure of ODL by mentioning Keegan, Moore, Medeme, Peters, Holmberg and Knowles.

In chapter 2: in order to shed light on the connection between online learning and adult education, Conrad and Openo first date the roots of adult education back to the lyceums of the US in 1800s, Chautauqua in 1870s and the agricultural extension efforts. Then, they express the principles of adult learning and the development of online learning to demonstrate their blood bond.

Having detailed philosophical orientations to teaching and learning (liberalism, progressivism, behaviourism, humanism, radicalism, cognitivism and constructivism), chapter 3: underlines the importance of reflection in learning and defines constructivism and connectivism as philosophies capable of explaining online learning and assessment.

Chapter 4: defines authentic assessment as a holistic approach to determine a learner's learning process. According to the authors, authentic assessment should be of real world, ill-structured and a product of higher order thinking skills. They name e-portfolios, reflective exercises, peer assessment, collaborative projects, self-evaluation and semantic mapping as authentic assessment tools. Community of Inquiry is seen as the main model behind the emergence of authentic assessment. Then, learning outcomes and rubrics are counted to be the essential tools for authentic assessments.

In chapter 5: Conrad and Openo claim that e-portfolios, journals, projects and group work are the most suitable tools for authentic online assessments. They assert that e-portfolios have a holistic look which requires the instructors to consider all aspects and developments of the learner. Moreover, e-portfolios indicate the recognition of prior learning (RPL). For them, learning journals enable learners to reflect on what they have learnt and it is a good tool for self-assessment.

Chapter 6: explains what “the age of open” has brought to the learning and assessment. It tells of alternative assessments, flexible learnings, badges and accreditation. It underlines the development and leading characteristics of MOOCs, OER and Open Access Journals in Open and Distance Learning. Conrad and Openo stress the fact that ODL requires authentic assessment.

Chapter 7: is about planning an authentic assessment and evaluation online strategy by considering constructivism and connectivism. Outcomes, strategy and the actual assessment of the course are the steps to be followed.

Conrad and Openo, in chapter 8: shed lights on the new possibilities and assessments derived from technological advancement: Flexible, flipped and blended learning. Blended learning take advantage of “internet to do things that cannot be done in person.” Clickers, wikis and blogs are commonly used tools that enable blended learning. The flipped classroom consists of out of classroom preparations and in the flipped classroom activities which strength the learners’ learning abilities.

Chapter 9: claims that self-assessment is one of the authentic, formative and constructivist means of assessment which leads to deep learning. But it also tells about the negative side of this tool if the learner doesn’t apply it properly.

Conrad and Openo, in chapter 10: envisage the unavoidable rise of online learning and express the need for constructivist -authentic online assessment means such as journal, group work, project, e-portfolios, peer-assessment, and self-assessment.

The appendix part of the book is about “other voices” on the alternative assessments from the field around the world.
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Abdulvahap SONMEZ is currently a PhD student in Open and Distance Learning Department at Anadolu University. He took his master degree in Postcolonial Literature and he is a graduate of English Language and Literature. His research interests cover mobile learning, culture of ODL and alienation.

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**REFERENCE**