Towards a New Definition of Blended Learning

Johannes C Cronje
Cape Peninsula University of Technology
Johannes.cronje@gmail.com
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Abstract: Most current definitions of blended learning refer to a blend of online and face-to-face instruction. It seems that few authors notice the irony that the definition of blended learning does not include the concept of learning at all. The problem with these definitions is that they are devoid of theory and thus lead to trial-and-error research. This paper argues that the definition of blended learning should be built around learning theory and should refer to a blend of direct instruction and learning-by-doing. The paper reports on research conducted to validate a model that puts behavioural and constructivist learning at right angles and considers if the two can occur simultaneously. The model is then placed in the context of a framework of knowledge management and from there a definition is derived that includes context, theory, methodology and technology.

Keywords: Blended learning; constructivism, behaviourism, objectivism, learning theory, context

1. Introduction

Arguably one of the most common definitions of the term Blended Learning is that of Graham who expresses it as learning systems that “combine face-to-face instruction with computer mediated instruction” (Graham, 2006, p.41). Variations of this definition abound also in papers published in this journal throughout the years (Charbonneau-Gowdy, 2018; Banditvilai, 2016; Soeiro, de Figueiredo and Ferreira, 2012; Onguko, 2014; Tshabalala, Ndeya-Ndereya and van der Merwe, 2014; Gynther, 2016; Nakayama, Mutsuura and Yamamoto, 2016; Kintu and Zhu, 2016; Nortvig, Petersen and Hattesø Balle, 2018; Uziak et al., 2018; Jakab, Ševčík and Grežo, 2017). Very few authors, however, explore any of the other elements that may form part of the blend in blended learning as defined in the earlier definition by Marcy Driscoll, who presents a much more refined definition that includes:

- To combine or mix modes of Web-based technology (e.g., live virtual classroom, self-paced instruction, collaborative learning, streaming video, audio, and text) to accomplish an educational goal.
- To combine various pedagogical approaches (e.g., constructivism, behaviorism, cognitivism) to produce an optimal learning outcome with or without instructional technology.
- To combine any form of instructional technology (e.g., videotape, CD-ROM, Web-based training, film) with face-to-face instructor-led training.
- To mix or combine instructional technology with actual job tasks in order to create a harmonious effect of learning and working (Driscoll, 2002, p.54).

This paper seeks to refine the common definition by specifically commenting on those pedagogical approaches that may be connected to learning theory. The problem driving this position paper is that the current definitions of blended learning concentrate on the blend and ignore the learning.

2. Background and literature survey

The origin of the term blended learning is generally traced back to a 1999 press release by EPIC learning in Atlanta (Friesen, 2012), who points out that, from the outset the term has been plagued by ambiguity, and concludes: “Blended learning, in other words, is almost any combination of technologies, pedagogies and even job tasks. It includes some of the oldest mechanical media (e.g., film) and theories of learning (e.g., behaviourism), as well as the newest” (Friesen, 2012, p.2). In 2006 Graham deplores the ambiguity of the term in that:

“these positions suffer from the problem that they define [blended learning] so broadly that they encompass virtually all learning systems. One would be hard pressed to find any learning system [or combination of methods] that did not involve multiple instructional methods and multiple delivery media” (Graham, 2006, p.4).
After an extensive analysis of the various definitions of the term Friesen proposes that “Blended learning’ designates the range of possibilities presented by combining Internet and digital media with established classroom forms that require the physical co-presence of teacher and students” (Friesen, 2012, p.1).

2.1 The missing ingredient

The problem with Friesen’s definition, however, is that it still does not acknowledge learning, unlike a definition in a previous issue of this journal which does, as it points out that: “The concept of blended learning is derived from two words, blend and learning. The word blend means combining things and learning denotes an assimilation of new knowledge” (Tshabalala, Ndeya-Ndereya and van der Merwe, 2014, pp.102–103).

The definitions of blended learning provided in this journal by authors who use the term in the titles of their work are equally diffuse. Table 1 provides an overview of definitions provided by such authors in the period from 2012 to 2018. The table has been arranged in order of pedagogical complexity, from no definition through technology-driven definitions, to pedagogical and strategic definitions.

Table 1 shows that a literature survey conducted in 2018 indicates that there still is very little consensus as to a universal definition of the term Blended learning (Nortvig, Petersen and Hattesen Balle, 2018). Another author (Charbonneau-Gowdy, 2018) simply refers to examples of what she considers to be blended learning. She requires the reader to develop an understanding of how she uses the term from a description of the project discussed in the article. The majority of authors rely on the classic combination of face-to-face and technology to frame their definitions, although there seems to be a taxonomy of complexity ranging from a simple statement of technologies to an acknowledgement of teaching and learning, context, pedagogy and finally value (Uziak et al., 2018; Nakayama, Mutsuura and Yamamoto, 2016; Kintu and Zhu, 2016; Onguko, 2014; Gynther, 2016). Some authors extend the metaphor of the blend to that of a recipe, by referring to ingredients and method (Banditvilai, 2016; Tshabalala, Ndeya-Ndereya and van der Merwe, 2014). Only one article goes as far as seeing blended learning as a strategy, although, ironically these authors do not provide a definition for blended learning at all (Soeiro, de Figueiredo and Ferreira, 2012).

From the analysis of articles in past issues of this journal it can be seen then that there is no clear definition of blended learning that places the focus on learning. What does become clear though is that, in their writing, the authors of these papers are fully aware that the complexities of blended learning go far beyond deciding between face-to-face and technology-mediated contact.

In considering the relationship between the blend and the learning, or the “combining of things (...and the) assimilation of knowledge” (Tshabalala, Ndeya-Ndereya and van der Merwe, 2014, p.102) it is necessary to consider two of the key arguments in our field – (1) the so-called “Clark-Kozma debate” (Clark, 1994; Kozma, 1994) and (2) the No significant difference phenomenon (Russell, 1999). Richard E Clark (1994) has argued since 1983 that the medium of instruction does not influence the quality of learning. He uses the now famous grocery truck analogy saying that the medium of instruction will no more influence the quality of learning than a delivery truck would influence the nutritional value of the food it delivers. Kozma (1994) however argues that certain affordances of technology may well enable forms of learning that others do not – in other words, you cannot drive a grocery truck to the moon. Tom Russell, in support of Clark, presents a bibliography of 355 academic works that indicate no significant differences (NSD) in student outcomes between various modes of delivering education (Russell, 1999).

Along these lines some authors argue that “despite the failure of some variables to show as significant factors to blended learning outcomes, learners showed a high affinity to engage in blended learning; which accounts for learner attitudes being contributors to learner satisfaction and intrinsic motivation” (Kintu and Zhu, 2016, p.192). Others draw specific attention to the affective domain. In a passionate conclusion Soeiro, de Figueiredo and Ferreira argue that “beyond what is often described as the coldness of technology, educators and students can help each other find technology-supported contexts that never existed and where people can learn (together) to listen with their hearts” (2012, p.348).
Table 1: Definitions of ‘Blended learning’ in EJL articles

<table>
<thead>
<tr>
<th>Category</th>
<th>Definition</th>
<th>Author</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>No definition</td>
<td>“there has not been complete agreement among researchers about the precise definition or meaning of the term ‘blended learning’”</td>
<td>(Nortvig, Petersen and Hattesen Balle, 2018, p.47)</td>
<td>Authors conducted a literature survey based on a search for “e-learning” OR “online learning” OR “blended learning” OR “hybrid learning” and concluded that no clear definition existed.</td>
</tr>
<tr>
<td>Hybrid</td>
<td>“Massive Open Online Courseware (MOOC’s) or their hybrids, so-called Blended Learning Programs”</td>
<td>(Charboneau-Gowdy, 2018, p.56)</td>
<td>Author uses MOOC as an example of what she means by Blended Learning and provides no formal definition.</td>
</tr>
<tr>
<td>Face-to-face and technology</td>
<td>“…platforms are also used for delivery and tracking of blended learning, i.e. a combination of traditional (face-to-face) and on-line resources”</td>
<td>(Uziak et al., 2018, p.1)</td>
<td>These two authors use the most basic definition that relies simply on the dimensions of contact and technology to deliver (and track) learning materials. No mention is made of the actual learning that may occur.</td>
</tr>
<tr>
<td></td>
<td>“…blended learning, which consists of face-to-face sessions and learning materials that are supported by information communication technologies (ICT)”</td>
<td>(Nakayama, Mutsuura and Yamamoto, 2016, p.43)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>“The design in this study involves a transition from traditional face-to-face teaching-learning to blended learning with technology”</td>
<td>(Kintu and Zhu, 2016, p.181)</td>
<td>These authors include the terms teaching and learning.</td>
</tr>
<tr>
<td></td>
<td>“In this paper, blended learning is defined as a deliberate combination of self-directed study of offline content deployed on tablets, with occasional face-to-face meetings, moderated through instructor-led sessions. This definition takes into consideration access to offline professional development (PD) content on tablets combined with teachers’ face-to-face interactions with their peers and instructors referred to as professional development tutors (PDTs). JiFUNzeni blended learning approach emphasizes the use of appropriate technologies for each context based on the contextual realities”.</td>
<td>(Onguko, 2016, p.78)</td>
<td>In addition to a clear description of what was done this author adds the dimensions of appropriateness and context.</td>
</tr>
<tr>
<td></td>
<td>“Blended learning courses integrate online with face-to-face instruction in a planned, pedagogically valuable manner, and do not just combine but trade-off face-to-face with online activity (or vice versa)”</td>
<td>(Vignare, 2007, p.38)</td>
<td>This author recognises pedagogy and value.</td>
</tr>
<tr>
<td>Ingredients</td>
<td>“The article underscores the concept that many “ingredients” can comprise a blended learning model, including instructor-delivered content, e-learning, webinars, conference calls, live or online sessions with instructors, and other media and events, for example, Facebook, e-mail, chat rooms, blogs, podcasting, Twitter, YouTube, Skype and web boards”</td>
<td>(Banditvilai, 2016, p.223)</td>
<td>These authors list methods of delivery as well as platforms used for such delivery, much as a recipe would have “ingredients” and a method.</td>
</tr>
<tr>
<td></td>
<td>“the mixture of traditional delivery including: lectures, group discussions, apprenticeships and experiential learning, together with e-learning methods, which accommodate various learning needs of a diverse audience in a variety of subjects”</td>
<td>(Tshabalala, Ndeya-Ndereya and van der Merwe, 2014, pp.102–103)</td>
<td></td>
</tr>
<tr>
<td>Strategy</td>
<td>“…we were exploring participatory strategies, personal and collaborative, in a blended- learning environment supported by Moodle”</td>
<td>(Soeiro, de Figueiredo and Ferreira, 2012, p.339)</td>
<td>Although these authors do not provide a clear definition of blended learning they refer to pedagogy as well as strategy.</td>
</tr>
</tbody>
</table>
More comprehensively though authors argue for a sensitivity to the context in which learning takes place: “thus in a context where there is lack of access to electricity, Internet is not guaranteed, and schools lack basic amenities including clean and safe learning spaces, learning materials such as textbooks and facilities such as desks, blended learning must be redefined with consideration of the contextual realities” (Onguko, 2014, p.78). In some contexts it could even be argued that technological solutions are better than face-to-face: “on the other hand, it illustrates how deaf students who do not want to expose themselves can benefit from the experience of community learning afforded by pedagogical strategies and tools that could never exist face-to-face” (Soeiro, de Figueiredo and Ferreira, 2012, p.347).

If there is to be no significant difference in learner performance, regardless of the mode of delivery then it holds that, in developing blended learning alternatives one should look rather at the theoretical underpinnings of teaching and learning than at the delivery mechanisms. One could therefore argue that a definition of blended learning needs not be too specific in defining exactly what delivery medium is used. It is the context, rather than the meaning, that makes a difference. A definition of blended learning should focus on learning.

### 2.2 Two dimensions of learning

Over time behaviourism and constructivism have evolved as two major, opposing dimensions of learning (Lowrey, 2013). The binary opposing nature of the two paradigms has been outlined by many authors, including Cronje (2006, p.390).

<table>
<thead>
<tr>
<th>Category</th>
<th>Objectivism</th>
<th>Constructivism</th>
</tr>
</thead>
<tbody>
<tr>
<td>The real world...</td>
<td>has entities that can be categorized on the basis of their properties and relations.</td>
<td>is structured by our individual minds on the basis of our interactions (this limits what we can know about the real world).</td>
</tr>
<tr>
<td>Reality is...</td>
<td>fully and explicitly structured in a way that is shared by all who perceive it. Because of this commonality, reality can be modeled and shared with others.</td>
<td>local (personal) to ourselves in a universe of multiple realities. Our realities are modeled by the way in which we personally construct them.</td>
</tr>
<tr>
<td>Symbols are...</td>
<td>representations of reality, and are only meaningful to the degree that they correspond to reality.</td>
<td>products of culture that are used to construct reality.</td>
</tr>
<tr>
<td>The human mind...</td>
<td>processes abstract symbols and fashions them so that they mirror nature.</td>
<td>perceives and interprets the world by creating symbols.</td>
</tr>
<tr>
<td>Human thought is...</td>
<td>symbol-manipulation and is independent of the human organism.</td>
<td>is imaginative, and develops out of perception, sensory experiences, and social interaction.</td>
</tr>
<tr>
<td>Meaning...</td>
<td>exists objectively and independently</td>
<td>is a construction that is the end result of</td>
</tr>
</tbody>
</table>

**Figure 1:** Contrasting views of Objectivism and Constructivism (Cronje, 2006, p.390)

The view of behaviourism/objectivism and constructivism as opposites was particularly strong in the 1990s. There were various calls for a move towards constructivism (Jonassen, 1991; Davis et al., 1993). More recently these two “opposing” dimensions have been researched specifically as they contribute both to face-to-face and online learning (Weegar and Pacis, 2012). It has been shown that, while early computer-based training programmes were primarily behaviourist in their design, “the use of technology in online courses has slowly shifted the theoretical balance from behaviorism to constructivism due to the increased use of educational technologies” (Weegar and Pacis, 2012, p.17).

More recently there is an increased call for the integration of behaviourist and constructivist principles (Elen, 2017). The problem with a model of linear opposition between the two paradigms is that, as the one goes up, the other goes down. If the balance is shifting from the one to the other then, at some stage, there will be a position that is neither behaviourist nor constructivist. Nevertheless it is argued that “often instructors are
choosing to utilize a combination of these two learning styles in an effort to best meet the learning styles for all students” (Weegar and Pacis, 2012, p.17).

To overcome this problem of a false dichotomy Cronje (2006) proposed a two-by-two matrix plotting the two extremes at right angles as shown in Figure 2. The resultant matrix contains four quadrants, construction, which is high in constructivist and low in behaviourist/objectivist elements, injection which is high in behaviourism but low in constructivism, where the “combination of these two learning styles” (Weegar and Pacis, 2012, p.17) is highest, and the immersion quadrant, which is low in overt evidence of either, and where “it is safe to conclude that the majority of our learning occurs informally” (Shipley, 2017, p.118).

Figure 2: The integration of two learning paradigms (Cronje, 2006, p.392)

The model has subsequently been tested by Elander, (2012) who found that it was indeed possible to identify courses that were high in both behaviourist and constructivist elements, as is shown in Figure 3. Elander demonstrated that the majority of instructional designers worked mainly in an objectivist/behaviourist paradigm, but that there were substantially more designers who took an integrated, and therefore blended approach, than those who worked in the immersion or construction quadrants only.

Figure 3: Four quadrants of blended learning demonstrated (Elander and Cronje, 2016, p.399)
3. Discussion: Elements of the blend

In response to Clark (1994), Kozma (1994) and Russell (1999) the selection of a specific medium is subservient to context, and the dimension of face-to-face or at-a-distance is a sub-set of context. Thus I argue that it is context that drives the decision of what and how to blend. The Cynefin framework (Figure 4) provides a good initial point of departure to establish context.

For Known knowledge cause and effect are repeatable, perceivable and predictable and legitimate best practice and standard operating procedures have been established. In this case direct (behaviourist) instruction is the most appropriate. Using problem-based learning in this field would lead to frustration and a waste of time (Clark, Kirschner and Sweller, 2012) the blended learning model would therefore concentrate on Instruction. In a contact environment this would amount to lectures and demonstrations and in a distance environment books (physical or digital) or (instructional) videos.

For Complex knowledge cause and effect are only retrospectively coherent, and pattern recognition is required. Here a constructivist approach is appropriate. Learners learn how to make sense of complexity. It is important to recognise that constructivist learning is more about learning to learn than about learning to acquire skills – as was pointed out in an earlier issue of this journal: “knowledge construction is highly exhibited and significant factors in this include learner interactions and management of workload” (Kintu and Zhu, 2016, p.192). This is the quadrant of abductive reasoning.

![Figure 4: The Cynefin framework (Kurtz and Snowden, 2003, p.464)](image)

Construction tasks, problem-based learning and open-ended learning environments would be appropriate here. In a low-technology environment physical puzzles would be useful and in a high-technology environment spreadsheets and other information-processing tools would be recommended.

In the Knowable domain that calls for analytical and reductionist thinking with cause and effect separated over time an Integrated use of behaviourist and constructivist learning would be appropriate. This is the domain of puzzles rather than problems. Puzzles have solutions known to the instructor but not to the learners, while problems may have endless solutions. The aim in this quadrant is to teach systems thinking. In a contact environment this is where discussions and debates are likely and in a distance environment it is the domain of chat groups and bland discussion forums.
The Chaos domain is the domain of experience. There is no perceived cause and effect relationship and interventions are aimed at regaining stability. Traditionally this is known as “being thrown into the deep end” or Immersed. In this quadrant there is no evidence of planned intervention of either a behavioural or constructivist nature. Yet this is where Shipley (2017) argues that most learning takes place. This is the domain of the field-trip, the experiential learning and the apprenticeship. In this context teaching is notably absent and learning is incidental and serendipitous. The technology involved here is the logbook, and the blog, and the methodological focus should be on assessment rather than instruction.

4. Conclusion and recommended definition

Thus far this paper has shown that, although in the early uses of the term Blended learning, homage was paid to dimensions of learning theory and pedagogy, the majority of definitions are restricted to mentioning a mixture of face-to-face and web-based instruction. This paper argues that more attention should be paid to Driscoll’s second bullet point: “To combine various pedagogical approaches (e.g., constructivism, behaviorism, cognitivism) to produce an optimal learning outcome with or without instructional technology” (2002, p.54).

To this end Cronje’s (2006) integrated model is proposed as a framework for designing blended learning. The framework resonates strongly with Kurtz and Snowden’s (2003) Cynefin framework and in fact each quadrant can be mapped directly from the one model to the other. From this a blended learning decision matrix can be developed that would resemble Table 2.

Table 2: Blended learning decision matrix

<table>
<thead>
<tr>
<th>Context (Kurtz &amp; Snowden)</th>
<th>Theory (Cronje)</th>
<th>Methods</th>
<th>Technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Known</td>
<td>Injection</td>
<td>Tutorial</td>
<td>Lecture</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Drill</td>
<td>Book Video</td>
</tr>
<tr>
<td></td>
<td>Construction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complex</td>
<td>Construction</td>
<td>Exploration</td>
<td>Open-ended learning environments</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Construction kits and tools</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Spreadsheets</td>
</tr>
<tr>
<td>Knowable</td>
<td>Integration</td>
<td>Puzzle</td>
<td>Games</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Discussion</td>
<td>Discussion tools</td>
</tr>
<tr>
<td>Chaos</td>
<td>Immersion</td>
<td>Experience</td>
<td>Blogs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Field trip</td>
<td>Logbooks</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Apprenticeship</td>
<td>Assessment tools</td>
</tr>
</tbody>
</table>

Table 2 is by no means exhaustive but serves as an example of how decision-making could take place around identifying an optimal blend of learning methodologies and technologies.

From the above discussion, it becomes clear a definition of blended learning that is based on the dimensions of face-to-face and technology-mediated instruction, does not provide an adequate theoretical underpinning for such decisions. A definition of blended learning should include context, theory, method and technology, which is why I propose the following definition of blended learning:

The appropriate use of a mix of theories, methods and technologies to optimise learning in a given context.

References


Peer Feedback in Learner-Learner Interaction Practices. Mixed Methods Study on an xMOOC

Josemaría Elizondo-García and Katherina Gallardo
Tecnológico de Monterrey, Mexico
josemaria.elizondo@tec.mx
katherina.gallardo@tec.mx
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Abstract: Although xMOOCs have shown benefits due to their accessibility to expert knowledge, the quality of their pedagogical proposal remains contested. It has not yet been proven that online education’s learner-learner interaction practices in xMOOCs generate an improvement in the quality of learning and academic achievement. Peer feedback is a practice that can enhance learning in an environment with diverse student profiles and limited instructor participation. The present mixed methods study was devoted to identifying the perceptions of xMOOC participants regarding learner-learner interaction and feedback practices. In the Energy Saving course on MexicoX platform, 1,176 participants answered an initial survey, 486 participants answered a final survey and 14 participants were interviewed after completing the course. Results show that most of the participants are willing to interact with their peers and participate in peer feedback activities. Although, in practice its value for summative assessment is an important factor that may predict involvement. It is found that diversity of expertise level is not an obstacle for participants to interact. Rather, participants consider that they may benefit from diversity by assessing their peer assignments and learning different alternatives and strategies in which a problem can be solved. Further, it is identified that peer assessment activities are more adequate for providing feedback than discussion forums, since the first promotes an environment in which participants can observe the performance of their peers showed in a more complex assignment. The findings of this study allow us to analyse inherent and external factors that configure learner-learner interaction and that affect peer feedback in xMOOCs. It is concluded that more research is needed in order to understand the effect of some factors that may affect peer interaction and peer feedback in xMOOCs and to propose better strategies to improve peer feedback effectiveness.

Keywords: feedback, peer feedback, peer review, discussion boards, learner-learner interaction, formative assessment, MOOC

1. Introduction

Since their creation and first implementation, massive open online courses (MOOC) have provided an opportunity to gather the knowledge of many people and generate learning. They have afforded open access to content in several disciplines by experts from prestigious universities. That is why MOOCs, since their inception, have been considered promising for distance learning. In recent years, studies have assessed the intrinsic educational value of MOOCs and the advancements they offer in the field of e-learning (Gamage, Fernando and Perera, 2015; Martín, González and García, 2013; Sánchez, 2016).

Although these courses are an innovation in online education, some authors consider that it has not yet been proven that they have a strong enough foundation to represent a jump in pedagogical quality, in terms of generation of learning in comparison with other online training models (Aguaded and Medina-Salguero, 2015, Ramírez-Fernández, 2015). Therefore, it is necessary to know MOOCs’ deficiencies, so efforts can be oriented to focus on the dimensions that require the most improvements. Two of these areas is learning assessment and peer interaction.

Their massive scale and the diversity of their participants turn MOOCs into a unique learning environment that deserves to be studied. The diversity of the profiles of MOOCs’ participants includes their culture, education level, interests and experience concerning the course’s topics and objectives, among other aspects (Chuang and Ho, 2016). This diversity, in consequence, requires being considered to generate appropriate evaluation processes. Further, the students-teachers ratio makes it practically impossible for students to receive from the teacher individual feedback on their performance (Ashton and Davies, 2015). Therefore, two important characteristics that define MOOCs are the diversity of participants’ profiles and the inability by instructors to evaluate and guide work individually.
2. Literature Review

2.1 Learner-learner interaction

According to Moore (1989), there are three types of interaction required for effective learning: learner-content, learner-instructor and learner-learner. Learner-learner interaction can be achieved through group activities and peer feedback. Some studies suggest that learner-learner interaction is essential for a better online learning experience and can improve the learners’ learning achievements (Gunawardena, Linder-VanBerschot, LaPointe and Rao, 2010). Although, this type of interaction is the one that participants prefer the least as it does not fulfill the need for time flexibility required by them (Kurucay and Inan, 2017). In xMOOCs, the two most common peer interaction activities are discussion forums and peer assessment.

2.2 Feedback in MOOCs

Richards and Schmidt (2010) define feedback as any information that generates a report on the outcome of a behaviour. In online learning environments, students are interested to know if they will be able to succeed or fail according to the achievement of their educational goals (self-regulated learning) and would like to receive more feedback elements instead of more evaluations (Daradoumis, Bassi, Xhafa and Caballé, 2013). Although instructors can provide better feedback than students, it has been found that students can produce more effective feedback by providing explanations to their peers in terms they understand best and according to their level of understanding (Brookhart, 2017). Furthermore, when students provide appropriate feedback, both the receiving and the giving parties benefit from it. Some studies have found similar and even higher levels of effectiveness in peer feedback than in teacher feedback (Ashton and Davies, 2015, Eksi, 2012; Ruegg, 2015).

Automatic multiple-choice tests to assess knowledge and understanding in the course are commonly used on all platforms. However, there are well-known limitations to this type of mechanisms to measure high-level skills such as analysis, synthesis, and evaluation (Suen, 2014). Although new technologies allow scalable ways to implement discussion forums and review student progress, they remain limited when evaluating and providing feedback for complex tasks such as written work (Admiraal, Huisman and Pilk, 2015; Admiraal, Huisman and Van de Ven, 2014; Piech et al., 2013). Further, the limited capability of the teacher to evaluate individual performance has led to an increased interest in developing alternative automatic evaluation practices and in researching them in order to be more valid and reliable, as well as to improve peer evaluation practices (Daradoumis, Bassi, Xhafa and Caballé, 2013; Reilly, Stafford, Williams and Corliss, 2014; Spector, 2014).

2.3 Peer feedback in MOOCs

Peer evaluation has been used extensively in MOOCs due to two advantages that no other mechanism has: it allows the evaluation of large groups because the evaluation and feedback are carried out by other participants instead of the teacher. Further, it allows the evaluation of products that could not be evaluated automatically (Kulkarni et al., 2013). Yurdabakan (2016) points out that this technique has been used for decades, which highlights some benefits noted in the literature prior to the emergence of MOOCs: peer evaluation emphasizes skills, encourages participation, increases the focus of attention towards learning, provides feedback to students, increases attendance and teaches responsibility, develops critical thinking, increases student learning and encourages collaborative learning.

Peer evaluation also helps students see the work from an advisor’s perspective. Evaluating the work of their peers exposes students to solutions, strategies, and points of view that they would not see otherwise (Kulkarni et al., 2013). Najafi, Rolheiser, Harrison and Haklev (2015) point out that peer review is an opportunity for participants to reflect on the knowledge acquired and to apply it. The positive effect of peer feedback increases as the feedback is based on the meaning of the task on not on its surface characteristics. Thus, peer review is more effective when based on higher order writing elements, rather than relying on matters of lower order (Comer, Clark and Canelas, 2014; Cho and Cho, 2011). This effectiveness increases when incorporating rubrics with precise terminology that can adequately guide the participants (Kulkarni et al., 2013, Ashton and Davies, 2015).

Although students benefit both from giving and receiving assessments and feedback, they hold divided opinions regarding peer review. While some firmly believe that this benefits their learning, others do not
consider it useful and prefer to not participate in it (Meek, Blakemore and Marks, 2017). That is, while some believe that it improves their learning, increases their motivation and leads them to develop critical thinking, other students consider it difficult, uncomfortable and time-consuming (Mulder, Pearce and Baik, 2014; Yurdabakan, 2016). Bali (2014) reported less participation in peer review activities when these are non-mandatory.

Moreover, many students consider that their classmates do not possess the necessary abilities to evaluate their work nor provide adequate feedback (Johnston, 2015). Meek, Blakemore and Marks (2017) state that it is difficult to say that the participants of a MOOC have peers since some of them are not familiar with the same knowledge areas or even share the same language. The authors also point out that it is not realistic to expect every student to carry out peer evaluation when some of them are not actively engaged with the course or have another level of commitment in relation to it.

2.4 Discussion forums

As a means of social learning, MOOCs rely on interaction with others, as is the case in discussion forums, in which participants can provide valuable feedback for the student and for other classmates who read them. Lee and Rofe (2016) designed an evaluation mechanism that would enhance peer learning in MOOCs, so they changed the dynamics of peer evaluation in a way that privileged feedback. The students were asked to present in the discussion forums the assignments that would be evaluated by peers and to provide feedback. In this way, students perceived areas of opportunity on which they could improve their work and thus submit a better product for evaluation. Also, these forums became a space where they could find many examples of how others performed the task. In this way, using discussion forums, the socialization of peer learning was leveraged. Peer review can be a good mechanism to encourage interaction among peers in cases that generate discussion to improve performance (Johnston, 2015).

Discussion forums in xMOOCs are affected by MOOC characteristics, as well as peer assessment practices. It has been found that MOOC’s participants consider that dialog between peers is not fluid and does not facilitate a speedy exchange of ideas (Liu, Kang and Mckelroy, 2015). As in other online environments, it has been found that participants have different roles while participating in discussion forums. Further, Wang et. al (2015) found that participants with the role of observers in discussion forums in MOOCs learn even when they do not type comments.

2.5 Factors that affect peer interaction

Some studies on peer interaction in xMOOCs focus on factors and strategies used for improving engagement and involvement. They suggest that by incorporating some of these elements peer interaction and peer feedback may be improved. Some elements are described below:

Social involvement. It is a factor that can be decisive in the achievement of the MOOC participants’ goals. A study by Kizilcec and Schneider (2015) showed that learners with the intention of taking the course with colleagues or friends were more likely to complete the course and obtain a certificate. These learners were more involved with the course materials (watch videos and perform the required tasks) than those who did not sign up with someone else.

Level of expertise. Mackness, Mak and Williams (2010) pointed out that the difference in the levels of expertise of the participants in a MOOC can hinder their openness, connection and interactivity. In their study it was identified that 8% of the participants who decided to stop participating in the forums gave as a reason the difference in the levels of expertise among the novices and the participants familiar with the concepts and technologies.

Anonymity. Peer review can be a good mechanism to encourage interaction among peers in cases that generate discussion to improve performance. This also considers that students will be more likely to accept feedback if their peers are like them in terms of knowledge of the subject and if the students know the name of their reviewers, even if they do not know each other outside the course (Johnston, 2015; Lu and Bol, 2007).

Training. Training videos are an effective alternative to promote more participation and better engagement in MOOCs (Ashton and Davies, 2015; Luo, Robinson and Park, 2014). Other types of trainings prepare participants
to offer accurate scores by asking them to grade an assignment evaluated previously by an instructor (Ashton and Davies, 2015; Kulkarni et al., 2013).

**Scoring the feedback.** In a study, students who received a grade on their feedback given to a peer offered more extensive and detailed feedback (Neubaum, Wichmann, Eimler and Krämer, 2014). By increasing the complexity and degree of responsibility of the participant, peer evaluation is one of the most challenging and promising types of evaluation instructors can include in a MOOC.

### 2.6 Approach

Although the advantages and benefits of the learner-learner interaction are recognized in virtual learning environments, there is not enough evidence from research to recognize these benefits on xMOOCs. Moreover, some suggestions and proposals have been made to improve peer interaction, but these do not usually consider the participants’ perceptions. Thus, there is a need to delve deeper into the experiences of these participants to identify the most appropriate conditions for xMOOCs in which participants could enhance their learning through interaction with their peers.

The learner-learner interaction processes proposed by xMOOCs are very limited by their learning model. Their instructional model tends to place greater emphasis on the learner-content interaction, ignoring the kind of learning that can occur in the learner-learner relationship and collaborative work. It is necessary to know more about the experiences of the participants to identify what are the favourable conditions in which they can improve their learning from the interaction with their peers.

Feedback has been considered an educational process with important benefits in learning, which can have a positive impact on its effectiveness. In addition, the benefits for participants of engaging in peer interaction and feedback activities in xMOOC have not been sufficiently explored. Based on this approach, the following research question was established: What perceptions do participants in xMOOCs have concerning the factors that affect peer interaction and peer feedback?

### 3. Method

#### 3.1 Context

The context in which the research was carried out was the first implementation of an xMOOC called Energy Saving, using the MexicoX platform. The theme of energy saving is incorporated into the current need for sustainable development and care of resources. Thus, it attracts a diversity of learners interested in knowing new and alternative measures to reduce and make more efficient the energy consumption in their home, in industry, in transport and, even, from within infrastructure.

In the first implementation of the Energy Saving course, 4,402 registered participants had enrolled. These are all those who have an account in the MexicoX platform and chose the Energy Saving course to access and receive information by e-mail about it. Of these, 1,459 completed at least one course activity, that is, they received a grade in at least one course activity. The duration of the course was six weeks and every week corresponded to a different theme.

The Energy Saving course included both typical peer interaction practices in xMOOCs, discussion forums and a peer review activity. A different discussion forum was attended by participants every week of the course. Every discussion forum started with three activating questions or sentences that participants would use to share their opinions and impressions. They were not explicitly asked to give feedback but to look over their peers’ comments and contribute to the discussion.

Further, the course included a peer review activity. During the third week students were asked to elaborate a three-action plan to save energy at home, in which they should include energy measurements and economic savings. Then, during the fifth week they shared a link with their plan. Participants had one week to review their peers’ assignment. They used a checklist to indicate whether required assignment elements were included or not. It was ensured that each assignment would be reviewed by five peers and every participant would review five assignments. Only those participants who reviewed their peers’ assignments received a grade on their assignment.
3.2 Design

To answer these research questions, a Mixed Methods design was chosen, with dominant and sequential status. Quantitative research was carried out first, followed by qualitative research. The dominant status focused on the qualitative part (Johnson and Onwuegbuzie, 2004). Given the mixed nature of this study, when defining the instruments, it was sought that the quantitative approach would allow knowing the general perceptions of the participants. On the other hand, the qualitative approach would allow capturing in detail the experience and beliefs that the MOOC’s participants have about the formative evaluation processes presented in them.

Within this Mixed Methods study a descriptive method was considered for the quantitative research. Regarding the qualitative part of the study, a phenomenological approach was chosen (Tójar, 2006) to conduct the study. A phenomenological approach focuses on understanding the meaning that events have for people as a centre of study. The main objective is the attempt to understand the object of the experience of the phenomenon (Wilding and Whiteford, 2005), which in this case is the learner-learner interaction in a MOOC.

3.3 Participants

Most of the course participants were Mexican (97%). The rest of the participants reside in Spanish-speaking countries such as Colombia, Ecuador and Argentina. 35% of the participants had a high school degree and 36% had an undergraduate degree, as the highest level of studies; 11% had a technical degree, and 11% had a master's degree. Regarding the discipline of studies of their technical career, undergraduate or graduate, 39% said that Engineering or Computer Science was their area of knowledge, while 15% indicated Business Administration and 8% indicated Natural Sciences. As their main occupation, 35% of the participants indicated that they were an undergraduate student, and 35.8% indicated that they were full-time employees. Additionally, 52% indicated that it was the first time they participated in a MOOC.

From the 486 participants who answered the final survey, 272 participants agreed to be contacted by e-mail to share their experience in the course. All these participants were contacted to request an interview. Interviews were conducted with those participants who replied the e-mail and agreed to have a meeting by video conference. In total, 14 were conducted.

3.4 Instruments

For the quantitative research, surveys at the beginning and the end of the course were conducted. The survey at the beginning of the course included five multiple-choice questions related to the dispositions and beliefs of the participants for peer interaction and feedback (see Appendix 1). The survey at the end of the course included eight questions, six of multiple choice and two open-ended, related to their participation and satisfaction in activities of interaction and feedback between peers in the Energy Saving course (see Appendix 2).

For the qualitative research, a semi-structured interview and an instrument for participant observation were designed. The semi-structured interview consisted of 15 questions designed with the intention of knowing the participants’ experience in the learner-learner interaction activities and the automatic and peer feedback activities (see Appendix 3). In addition, a participant observation guide was designed to keep track of the interactions in the discussion forums of the course and thus be able to demonstrate the experiences, relationships and constructions of knowledge that arose among the participants of the course. The observation in the discussion forums was made considering the characteristics of feedback presented by Shute (2008) and Nelson and Schunn (2009).

3.5 Procedure

The initial survey was conducted at the beginning of the course. It was one of the first activities that the participants carried out for the course, alongside the general instructions and the agenda of the course. The final survey was added in the last lesson of the course, so it was answered by the participants after concluding all the learning activities.

In the final survey of the course, a final question was included in which the participants indicated if they were willing to be contacted via e-mail to comment on their experience throughout the course. In this way, by e-mail, all participants were requested to attend a virtual interview with an approximate duration of 30 minutes.
Once their acceptance and confirmation were received, they were given a link to a virtual room to be interviewed at a time convenient to the participants.

### 3.6 Data analysis

First, a descriptive analysis of the quantitative data obtained from the initial and final surveys was carried out. This data also guided the orientation of the interviews conducted later. After observing the discussion forums and transcripts of the interviews, the analysis of the data obtained through the interviews and the discussion forums continued. The names of the participants interviewed were coded to protect their identity.

For the process of data analysis, the steps indicated by Apps (1991, cited by Tójar, 2006) for phenomenological studies were followed. This author follows the epistemological proposal of Husserl (1965), who considered the phenomenological reduction, and the imaginative variation to capture the essence of the phenomenon. The directions of Merriam and Tisdell (2015) to build and name the categories (or topics) were also considered.

### 4. Results

With the quantitative study, the dispositions and general beliefs of the participants were analysed, along with information on their participation in the interaction activities. For the qualitative study 14 interviews were conducted. The following categories emerged, which refer to factors both inherent to and external to the participants that configure the learner-learner interaction that have an impact on the feedback between peers in MOOCs: 1) Dispositions and interest to interact, 2) Instructional mediators, 3) Participants’ expertise, and 4) Utility of peer feedback.

The quantitative and qualitative results that describe each category of analysis are presented below.

#### 4.1 Peer interaction

**4.1.1 Interaction interests**

Below are some results obtained from the exit survey. Concerning participation rate in discussion forums, 44% of the participants indicated that they participated in all or some of the units. Further, 70% of the participants indicated that they agreed or strongly agreed with perceiving an improvement in their knowledge on the course’s subject by participating actively in the discussion forums.

![Figure 1: Participation in the discussion forums](image)

![Figure 2: I improved my knowledge on the course’s subject by participating in the discussion forums](image)
Regarding discussion forums, 64% of the participants indicated that they agreed or strongly agreed that they found the answers to their questions about the course’s subject by participating in the discussion forums. In addition, 28% indicated that they helped other participants with their questions through the discussion forums. However, the comments in the final survey indicate that some of the participants did not find answers to their questions in the discussion forums and that they could hardly establish a conversation, that is, an exchange of ideas.

![Figure 3: I solved my questions on the course’s subject in the discussion forums](image)

![Figure 4: I solved the questions of other participants in the discussion forums](image)

Based on the qualitative results, it was possible to study the interaction interests of the participants. It was identified that participants develop different roles and types of activities during interaction (analyse, reflect, share, etc.) The diversity of profiles presented in the sample of this study also reflects the diversity of purposes and roles during an interaction. While some participants access the discussion forums only as observers, there are others who prefer more active participation.

Those participants that consider their selves as novices opt for only to read comments rather than to bring answers to peers. A participant [P11] indicated: “I asked many questions, because it was a new theme for me. I opted to use it to solve my doubts.” So, roles of participation in discussion forums are determined for participants’ self-perception of expertise.

4.1.2 Dispositions to interact

Most of the participants (92%) indicated that they agreed or strongly agreed that they would be willing to dedicate at least one hour a week to provide feedback on the work of other participants. Also, 96% of the participants indicated that they agreed or strongly agreed that they thought providing feedback on the work of others helped them to improve their knowledge on the study subject.
Figure 5: Participants’ dispositions and beliefs on peer feedback
Time disposition and perception of feedback efficacy are not factors that hinder their participation in learner-learner interaction and feedback activities. It is important to point out that, even when most of the participants that concluded the course showed disposition to participate in discussion forums and peer review activities, some participants could prescind from participation in these activities and still obtain the course certification. From 733 participants who obtained an approving grade, 178 participants obtained a grade different than zero (0). Those participants submitted their assignment and assessed at least three other assignments.

4.2 Instructional mediators
One instructional mediator that was used in the course to improve the feedback practice was to include a video explaining how to evaluate the work of other participants, in preparation for peer review activity. Several participants, 82%, indicated that they watched this video. Through the interviews, other instructional mediators could be found in these courses, carried out through technological elements.

Regarding the clarity of the assignment instructions, there were some participants who considered that in the practice of peer evaluation some instructions were a bit ambiguous, so they were limited as to how to provide better feedback. Moreover, participants needed to use another service as Slide Share or Google Drive to upload the assignment and then copy the link in the MOOC interface, this condition was an obstacle for some participants that had not use this type of service.

In the interviews, participants suggested some improvements to facilitate participation in discussion forums. Participant [P8] said: “I think there could be a notification that can take you to an e-mail and let you know when someone replied to your comment. Otherwise, you need to keep checking the website.” In addition, participant [P14] indicated: “I think the forums should include a point, which would be ‘give your opinion on the subject or whatever, and do some research on the subject,’ and that would give you the opportunity to contribute something else”.

4.3 Participants’ expertise
When asked about their willingness to participate with others according to their level of experience, 91% of the participants agreed or strongly agreed that they would be willing to participate in discussion groups with participants with the same level of experience as theirs on the course’s subject. In addition, 96% of the participants agreed or strongly agreed to be willing to share knowledge or experience with participants who have less experience on the subject. Of these participants, 24% had previously reviewed written works by other participants in MOOC courses.
Although the participants indicated a willingness to collaborate with participants with different levels of mastery on the subject, it is important to indicate that they acknowledged the diversity in the levels of knowledge and mastery on the course subject and the degrees of responsibility of the participants. This was expressed by [P11] by declaring "The amount of knowledge that people had in the topics discussed in the forums was very noticeable. And in the practice part, I think some took it very seriously and some did not. There was a noticeable difference in the quality of the work of our classmates."

The expertise of the participants not only makes them more capable of providing more informed and precise comments. The participants also take advantage of their previous experiences to generate strategies that help them to advance successfully in the course. Some interaction strategies carried out in the course were started by initiative of the participants, who reported having previously acquired this type of experience. The participant [P4] commented: "What I did was to look up my partner's e-mail in the welcome forum and I shared the link I had told him about in the forum ... During my online master's program, that was something we were asked to do."

4.4 Utility of feedback

By asking the participants if they had been provided feedback in the discussion forums, participant [P10] mentioned: "The forums had very simple comments such as 'I agree with the subject and I think it's a good strategy for saving energy' and there were people who answered like that, obviously that is not a contribution". In addition, participant [P2] noted: "Yes, there is some feedback, but more like 'I agree with what you're saying.' Nobody really refuted anything, nobody told me: 'Hey, but look, there's also this...'" Through observation in the discussion forums, comments such as: "You are correct" and "Good point" could be found.

On the other hand, participants found benefits when reviewing the work to provide feedback. Participant [P9] said: "A lot of those comments from your classmates are very valuable, you have a point of view according to the way you are. Because other classmates think differently. They have a different experience, so they can exchange different ways of solving a problem, of arriving at different solutions." In addition, participant [P6] commented: "I think you can see other points of view, that is important, what each person is focused on, the strategies they implement and above all the way in which they work. That gives you a lot, how everyone thinks differently and presents their work in a different way. It gives you knowledge in terms of points of view, how everyone analyses the information and how the information is presented. Not all of us think of water, electricity and gasoline, for example; there are some people who thought of additional things. For example, solar water heaters, things that had not occurred to me, and maybe they are good options for energy saving, which was the main theme of the course".

The diversity of profiles of the participants allows them to get to know different perspectives or approaches to contextualize, understand and solve a problem. This represents an opportunity to acquire new knowledge at different levels. Diversity is considered by the participants themselves as an advantage of these courses because they have multiple experiences that contribute to their own understanding. Participant [P12] said: "The advantage is that they are not people from your own area. My way of seeing the problem is different. It helps you to be more global. For example, if you work in a company that distributes in Mexico, you can get to know different ways of how the processes of production, marketing, etc. are carried out in other places." Also, when asking participant [P9] what kind of advantages he finds when interacting with other participants, he commented: "Because people from different states and countries participate. I can get different points of view. There is a cultural exchange that is important to me."
When asked about the separation by groups of collaboration according to the characteristics of the participants, they did not consider it convenient, as that would eliminate these benefits provided by diversity. When asking if it would be convenient to make subgroups in the forums to improve the interaction, the participant [P3] commented: "It would be difficult to assign them because maybe I could tell you, I know of sustainability but maybe I'm not very immersed in the issue of energy saving. And maybe some would see it as a kind of discrimination."

5. Discussion

The results of this study support the discussion regarding the convenience of integrating working groups in MOOC courses and the criteria for integrating these groups. This is a recent debate, for which there are still few studies devoted to finding better proposals (Kizilcec, 2013). In this regard, it is worth mentioning that participants disagree on separating according to their level of expertise. Participants consider that by integrating working groups in MOOC the opportunity to know the experiences of other participants is reduced. In the present study, it is evident that the participants consider diversity an enriching learning opportunity, as it allows them to know different ways in which the same problem can be contextualized, understood and solved.

Furthermore, Mackness, Mak y Williams (2010) had reported that differences in expertise level of participants may hinder their openness, connection and interactivity. In contrast, results of the present study show that participants are willing to interact and provide feedback to participants with different levels of expertise. In the present study we found that limitations to interact and provide feedback are not due the differences in participants levels of expertise. Rather, some conditions that limit these processes refer to participants’ perception of their capacity to evaluate and to the relevance of the activities for obtaining knowledge that may be applied in their professional activities. These results are consistent with Meek, Blakemore y Marks (2016) results, which identify that participants have divided opinions about the benefits of feedback. While some believe that it improves their learning and increases their motivation, other students find it difficult, uncomfortable and time-consuming.

In the present study we found that participants identify other benefits of peer feedback in xMOOCs with respect to other virtual environments. Bali (2014) had identified that participants describe examples of their own country of origin in the discussion forums. Further, we found that the participants associate the usefulness of the feedback to the diversity of participants, since they receive different solutions to the problems presented. In this course, it was also identified that by providing feedback in peer evaluation practice, participants see products from their peers and recognize the characteristics of good practices. These results coincide with Kulkarni et al. (2013) who pointed out that feedback helps the student see the work from an advisory perspective. They also coincide with what Meek, Blakemore and Marks (2016) marked out, that evaluating the work of their peers exposes students to solutions, strategies and points of view that they would not otherwise see.

Results of the current work agree with those from Bali (2014) who reported that participation in peer review activities was affected by the non-mandatory character of these activities in the MOOC. It is shown that summative value of peer interaction and peer review activities is associated with the level of participation on these activities. This occurs even when most of participants indicate high disposition to interact and review. Further, these results agree with previous findings about the importance of training videos as an effective alternative to promote more participation and better engagement in MOOCs (Ashton and Davies, 2015; Luo, Robinson and Park, 2014).

Regarding peer feedback in discussion forums, the students criticized that some of the received feedback only stayed in the agreement or disagreement of what was proposed. This type of feedback was considered less effective by participants. These results agree with what Cho and Cho (2016) pointed out, the positive effect of feedback on performance increases as it is based on the meaning and not on surface characteristics of homework.

6. Conclusions

Results of the present study permit a better understanding of factors that affect learner-learner interaction in MOOCs. In order to promote peer interaction and peer feedback in MOOCs it is important to consider this learning environment’ conditions, thus to propose ideas that may counter its disadvantages and leverage its benefits. For instance, while massivity and diversity in online courses may be conceived as impediments to an appropriate interaction that promotes learning, benefits in participants’ learning can be found. Moreover, some suggestions from MOOC participants should be considered to improve their interaction in this learning environment.

These results allow to understand the importance of performance observation to improve the quality of peer feedback. It is known that feedback provided from one student to another is based on the observation of their performance. Peer review activities have the virtue of presenting to the reviewer a complete elaborated product that show student progress. That facilitates the opportunity to evaluate participant competences. Moreover, in discussion
Within the framework of these theories, MOOC designers create learner-learner interaction dynamics. However, with social construction of knowledge. Additionally, the technological functions of the platform should be supported interactions that arose from these dynamics could be designed and described based on other theories that are related with social construction of knowledge. Additionally, the technological functions of the platform should be supported by instructional considerations that allow the reformulation of these dynamics.

Future studies are suggested in order to verify which factors of socialization practices among peers are linked to better performance of the participants and an improvement in the quality of feedback comments. In addition, studies devoted to measuring the effectiveness of working groups in xMOOCs for collaborative learning and their relationship with the quality of feedback and learning achievements are encouraged.

Acknowledgements

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## Appendixes

### Appendix 1: Survey at the beginning of the course

**Interest and motivations to evaluate and interact with classmates**

<table>
<thead>
<tr>
<th>Category</th>
<th>Subcategory</th>
<th>Statement</th>
<th>Scale</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interaction</td>
<td>Peer discussion</td>
<td>1 I am willing to participate in discussion groups with participants that share my own level of experience on the course’s subject.</td>
<td>* Strongly agree * Agree * Disagree * Strongly disagree</td>
<td>Martín-Monje, Bárcena-Martín, and Read (2014) Johnston (2015)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 I am willing to share my knowledge or experience with participants who have less experience on the course’s subject.</td>
<td>* Strongly agree * Agree * Disagree * Strongly disagree</td>
<td></td>
</tr>
<tr>
<td>Feedback</td>
<td></td>
<td>3 I am willing to dedicate at least one hour a week to provide thoughtful commentary (feedback) on the work of other participants.</td>
<td>* Strongly agree * Agree * Disagree * Strongly disagree</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 I think that providing thoughtful comments (feedback) on the work of others helps me to improve my knowledge on the subject.</td>
<td>* Strongly agree * Agree * Disagree * Strongly disagree</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 I’ve evaluated works from other participants at previous MOOC courses.</td>
<td>* Yes * No</td>
<td></td>
</tr>
</tbody>
</table>

### Appendix 2: Survey at the end of the course

**Interest and motivations to evaluate and interact with classmates**

<table>
<thead>
<tr>
<th>Category</th>
<th>Questions</th>
<th>Answer choices</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interaction</td>
<td>1 I participated in the discussion forums in:</td>
<td>All the units * Most units * A few units * None of the units</td>
<td>Martín-Monje, Bárcena-Martín, and Read (2014)</td>
</tr>
<tr>
<td></td>
<td>2 I solved my questions on the course’s subject in the discussion forums.</td>
<td>Strongly agree * Agree * Disagree * Strongly disagree</td>
<td>Johnston (2015)</td>
</tr>
<tr>
<td></td>
<td>3 I solved the questions of other participants in the discussion forums.</td>
<td>Yes * No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 I improved my knowledge on the course’s subject by participating in the discussion forums.</td>
<td>Strongly agree * Agree * Disagree * Strongly disagree</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 Write a brief comment regarding your experience participating in the discussion forums.</td>
<td>Open answer</td>
<td></td>
</tr>
<tr>
<td>Feedback</td>
<td>6 I watched the video on Methodology in the Opening section, which explains how to evaluate the work of other participants.</td>
<td>Yes * No</td>
<td>Daradoumis, Bassi, Xhafa and Caballé (2013)</td>
</tr>
<tr>
<td></td>
<td>7 I provided thoughtful comments (feedback) on the work of other participants and pointed out whether the work complied with what was requested.</td>
<td>Yes * No</td>
<td>Johnston (2015)</td>
</tr>
<tr>
<td></td>
<td>8 Write a brief comment on your experience receiving thoughtful comments (feedback) made by other participants.</td>
<td>Open answer</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 3: Interview guide

In how many MOOC courses have you participated? What were your motivations to take the course?

Interaction
1. What has been your experience participating in MOOCs' discussion forums?
2. What are your interests in participating in discussion forums? Which role do you prefer to take in the MOOC discussion forums? (observe, write, debate, solve questions, etc.).
3. How do you feel about participating as a novice or expert? Is it easy to identify in the contributions if the participant is an expert or a novice?
4. Would you be interested in interacting personally with other participants with the same interests as yours?
5. What would you improve in the discussion forums to improve interaction?
6. In what way did you receive feedback in the course? What about the interaction with your colleagues made you feel your received feedback?

Feedback
7. What has been your experience giving and receiving feedback on written work in a MOOC?
8. What is your interest in providing and receiving feedback from your colleagues? What do you expect when receiving feedback?
9. How capable do you consider yourself to give feedback to your classmates' work?
10. Why would you or wouldn't you be willing to give feedback to your colleagues' work, for one hour a week?
11. What benefit did you get from the feedback of your classmates? Do you think that providing feedback on your classmates' work improves your knowledge on the subject of study?
12. Can you tell when an expert participant gives you feedback? Do you think that the benefits of the contributions are any different when they come from an expert?
13. Which characteristics would you prefer in a person with whom you will participate in processes of feedback or collaborative work?
14. Did the quizzes, the questions at the end of the videos, and the multiple-choice question in the challenge help you in your learning? What benefit did you get from those activities?
15. What's the difference between this kind of feedback and the one you can receive from your classmates?
Abstract: Electronic learning (e-learning) plays a significant role in improving the efficiency of the education process. However, in many cases in developing countries, technology transfer without consideration of technology acceptance factors has limited the impact of e-learning and the expected outcome of the education process. Therefore, this shift in learning method has been met with low enthusiasm from academic staff and students owing to its low perceived usefulness and perceived ease-of-use. The University of Kufa (UoK) in Iraq is considered a good case study because it has implemented the e-learning platform since 2013. The UoK platform is based on open-source Moodle owing to the latter’s advantages, such as low implementation cost, open community for support and continuous update and development. To identify and evaluate the challenges, this study uses a questionnaire survey that targets the level of adoption, implementation, familiarity and technology acceptance of staff and students. A total of 242 educators participate in the survey, and the data are subsequently analysed. Important information is extracted using data mining techniques, namely clustering and decision trees. One of the main crucial factors extracted from the analysis results is the perception that social media is easier to use compared with a dedicated e-learning platform such as Moodle. This factor may also discourage educators/learners from adopting an offered e-learning platform, regardless of actual usefulness, motivation and training programs. Therefore, this paper offers practical information regarding the main issues and a guideline to fully utilise e-learning for policy makers and e-learning developers, particularly in newly established institutions or developing countries.

Keywords: e-learning, technology acceptance model, Educational data mining, Moodle, social media, Facebook, clustering, decision trees

1. Introduction

Some educators have considered electronic learning (e-learning) as the most remarkable leap in the education process since the invention of writing (Tan, Chew and Mellor, 2016). This set of education means is believed to be the newest method of passing knowledge and expertise as a supplement and/or replacement to traditional classrooms owing to their flexibility and efficiency. Moreover, the need and importance of e-learning have grown because the education process and outcome expectancies have changed. For instance, modern institutions have realised that education is no longer the memorisation of knowledge but rather the ability to solve problems with novelty, developing independent and long-life learning and communication skills (Atanda and Ahlan, 2014). Traditional classes, which are limited by space and time, can also no longer satisfy the growing demands for knowledge. This entire set of new requirements has driven the development of e-learning tools.

E-learning has been a standard technique of education in developed countries for many years (Koponen, Tedre and Vesisenaho, 2011; Tan, Chew and Mellor, 2016). However, developing countries continue to struggle in reaping the benefit of such techniques (Atanda and Ahlan, 2014; Ansong, Boateng and Boateng, 2017; Canedo, Santos and Leite, 2018). This situation may be due to numerous reasons, such as lack of technical infrastructure, service availability, staff readiness and experts to build and manage such infrastructure, which has been the case for e-learning in many institutions including those in Iraq (Mahmod et al., 2017). However, the infrastructure or technology may not be sufficient for learners and educators to fully adopt e-learning and accept e-learning technology, thus remaining a major concern in many developing and developed countries (Kanwal and Rehman, 2017; Ansong, Boateng and Boateng, 2017; Haron and Sahar, 2010; Almazroi et al., 2016; Cidral et al., 2017). Therefore, determining the factors that play a crucial role in e-learning adoption and technology acceptance is an active research area. Student motivation, perceived usefulness, perceived ease of use, policy making and the method to break traditional outdated concepts of the education process or its expected outcomes are factors that may need to be tackled on different levels. Thus, experts are in dire need

for crucial information to redirect resources by identifying the main challenges/factors and their impact on the education process and determining how these factors are connected to one other.

Educational data mining techniques have been introduced to answer these questions and visualise, analyse and/or extract useful and accurate information from the extensive data of education (Romero and Ventura, 2010; Castro et al., 2007; Yang and Li, 2018). Moreover, numerous studies have employed questionnaires to evaluate e-learning utilisation or usefulness (Ansong, Boateng and Boateng, 2017; Kanwal and Rehman, 2017; Almazri et al., 2016; Mahmoud et al., 2017; Kalelioglu, 2017; Canedo, Santos and Leite, 2018). However, these studies either seem to focus on one factor that leads to the underutilisation of e-learning or require further study to confirm their findings and/or discover new factors given the different educational environment.

This paper mainly aims to offer insights into the main factors and challenges that influence the full adoption of a dedicated learning management system (LMS), which is Moodle in this case study. In particular, the study investigates the effect of perceived usefulness and ease of use of social media in education compared with those of Moodle. To analyse the educators’ responses to the questionnaire survey, which is conducted in the University of Kufa (UoK), accomplished data mining techniques are used. The UoK is considered a good case study for the status of e-learning adoption in Iraq and developing countries as well as institutions that suffer from the underutilisation of e-learning worldwide. This selection is due to the fact that e-learning, as a supplemental means to traditional classrooms, has been established in this university for over five years. The e-learning system is designed to have separate e-learning platforms for each faculty. There are 22 UoK faculties that comprise more than 40,000 unique users (staff/student) and 3,800 online blended courses. This number of users makes the UoK case study optimum for the early stages of e-learning implementation. This study’s main contributions are as follows:

- Measuring the status and the challenges currently faced by e-learning through designing and conducting a questionnaire for academic members
- Hypnotizing and investigating a new technology acceptance model
- Using data analysis techniques, such as clustering and decision tree, to analyse, highlight and discuss the role of each factor that causes low e-learning adoption
- Proposing possible solutions for researchers, policy makers and/or e-learning platform developers to address the identified main challenges

The rest of the paper is organised as follows. Section II reviews the background theory and related work. Section III presents the background and current status of the UoK e-learning platform in detail. Section IV describes the designed questionnaire and highlights its main results. Section V presents the use of data mining techniques to analyse and discuss results. Section VI discusses the main challenges and suggested solutions. Section VII drafts conclusions and suggestions for possible future work.

2. Background and Related work

2.1 Technology acceptance

Technology acceptance model (TAM) is a well-established model that links personal beliefs regarding a technology with its usage. Figure 1 illustrates the TAM (Fishbein and Ajzen, 1975). This model posits that the determining factors for technology acceptance or adoption include perceived usefulness, perceived ease of use and/or other external factors. In e-learning, perceived usefulness refers to the technology user’s (educator/student) evaluation of the level of their performance improvement if they use the technology. For an educator/student, this improvement includes reducing the required effort for the education process that yields to an enhanced positive outcome. The educator’s and the student’s perceived ease of use of e-learning will depend on their level of personal technology background and training.

Numerous studies in literature have been dedicated to evaluating either a partial or full aspect of this model. Table 1 shows a list of these studies that explain or predict e-learning acceptance through the relationship amongst TAM factors. For instance, regarding the relationship between external factors and attitude, Baturay, Gökçearslan and Sahin (2017) show that the educator’s attitudes regarding use of e-learning may vary based on the environment, atmosphere and culture. Dudaitė and Prakapas (2017) investigate the merits of an e-exam system by analysing students’ questionnaires and find that these merits include helping them remain attentive, active and curious. A fair number of these studies have likewise focused on Moodle’s perceived usefulness and/or other factors that impact the students’ intention to use the e-learning material. For
example, Marikar and Jayarathne (2016) show that 61% of sampled students in a Sri Lankan university improved their results. Furthermore, Costa, Alvelos and Teixeira (2012) reveal that most students perceive that Moodle is good for downloading materials, delivering assignments and checking course news.

Figure 1: Technology acceptance model (TAM) (Fishbein and Ajzen, 1975)

On other hand, Sánchez and Hueros (2010) investigate an adjusted hypothesis of TAM by analysing students’ questionnaires and find that technical support is directly linked with perceived usefulness and perceived ease of use. This finding translates into high usage by improving students’ attitude regarding Moodle. Uziak et al., (2018) also reveal that a correlation exists between students’ attitude and use of blackboard in presenting the materials and features of the offered courses.

Ansong, Boateng and Boateng (2017) explore technology organisation environment (TOE) factors that affect e-learning adoption in Ghana. By analysing the responses of 417 educators/students, they highlight a number of factors that impact adoption, including IT infrastructure, perceived ease of use, expected benefits, organisational compatibility and competitive pressure.

Kalelioğlu (2017) and Petrovic et al. (2013) try to investigate a social media website, namely Facebook, as a learning management system. They conclude that Facebook exhibits high technology acceptance because the perceived ease of use and usefulness of social network websites amongst young students may overcome any merits offered by other e-learning tools.

Table 1: Questionnaire studies explaining and/or predicting e-learning technology acceptance levels

<table>
<thead>
<tr>
<th>The study</th>
<th>Aim</th>
<th>Sample size</th>
<th>Targeted Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kalelioğlu (2017)</td>
<td>Acceptance based on perceived usefulness</td>
<td>18 students</td>
<td>Facebook</td>
</tr>
<tr>
<td>Dudaitė and Prakapas (2017)</td>
<td>perceived usefulness</td>
<td>60 teachers</td>
<td>Interactive Evaluation System</td>
</tr>
<tr>
<td>Marikar and Jayarathne (2016)</td>
<td>perceived usefulness</td>
<td>31 students</td>
<td>Moodle</td>
</tr>
<tr>
<td>Costa, Alvelos and Teixeira (2012)</td>
<td>perceived usefulness</td>
<td>278 students</td>
<td>Moodle</td>
</tr>
<tr>
<td>Petrovic, et al. (2013)</td>
<td>perceived usefulness</td>
<td>30 students</td>
<td>Moodle and Facebook</td>
</tr>
<tr>
<td>Sánchez and Hueros (2010)</td>
<td>TAM model</td>
<td>226 students</td>
<td>Moodle</td>
</tr>
<tr>
<td>Ansong, Boateng and Boateng (2017)</td>
<td>The Technology Organization Environment (TOE) framework</td>
<td>417 student/educator</td>
<td>Ghana university e-learning system</td>
</tr>
</tbody>
</table>

2.2 Educational data mining

Data mining techniques have been effectively utilised in e-learning applications for behaviour analysis amongst learners or in predicting e-learning process outcomes (Calders and Pechenizkiy, 2012; Castro et al., 2007; Romero and Ventura, 2010; Hanna, 2004; Kaur, Singh and Josan, 2015; Yang and Li, 2018). For instance,
classification and clustering algorithms are used to perform those tasks based on collected data from access operations, assignments, exams, voting and/or survey.

Decision tree is an effective and easy to comprehend classification technique that uses recursive binary splitting to build a predictive or descriptive model (Han, Pei and Kamber, 2011; Tan, Steinbach and Kumar, 2005). Despite the decision tree’s benefits, its size can dramatically increase, thereby causing overfitting problem. Pruning certain parts of the decision tree can overcome overfitting without affecting the accuracy of the classification technique (De Ville, 2006; Tuffery, 2011). Therefore, the present study adopts the reduced error pruning tree (REPTree) because this method utilises the pruning concept to produce a simple and accurate decision tree.

Clustering methods can be categorised into three main types: partitioning, hierarchical and density based (Han, Pei and Kamber, 2011; Tan, 2007). K-means is a partitioning method that produces K partitions, each of which is considered a cluster. This method starts with an initial partitioning and is subsequently applied with an iterative procedure to enhance the partitioning by relocating the objects’ position from one partition to another. K-means has exhibited high goodness, given that objects in a cluster are closer than those in multiple clusters, whereas objects in multiple clusters are farther from one another (Han, Pei and Kamber, 2011). Moreover, from a computational view, k-means can be faster than hierarchical clustering when a dataset has a large number of features. Therefore, k-means clustering and REPTree classification are used in the present study to analyse survey responses gathered from the academic faculty members of the UoK, see section V.

2.3 University of Kufa Platform for E-learning

The UoK was founded in 1987. This public institution is funded by the Ministry of Higher Education in Iraq and has expanded to 22 faculties, including engineering, science, medical, dental, education, linguistic, nursing, business and arts, since its establishment. These faculties are distributed over seven campuses located in the cities of Kufa and Najaf south of Iraq (University of Kufa, 2018). With the exception of its night courses, all undergraduate and postgraduate courses in UoK are free.

The UoK LMS was established in 2013 with the support from UNESCO in Iraq (Anon., 2010). Since then, the faculty members and students have been offered training (at least two workshops for educators and one workshop for students per year per faculty). The training for the faculty members aims to help them design their own e-courses, highlights the benefits of e-learning services and enables them to use the LMS to supplement their classroom activities, also known as blended courses (Nortvig, Petersen and Balle., 2018). Furthermore, each new faculty member must undergo intensive training courses in pedagogy that include utilising e-learning skills to improve education process efficiency and outcome. However, limited infrastructures are available to record lectures inside/outside class. For instance, only two studios are available in the whole university to video record lectures. In terms of technical support, at least one e-learning site manager is available per faculty who also acts as technical support.

The online ecosystem of the university includes separate e-library, website and registration systems. However, the LMS export users’ data from the registration system. Although the in-campus Internet service is available only to faculty members, the LMS is openly accessible for students through the campus network and in their homes through the internet.

This LMS is open-source-based, with advantages such as low implementation cost, open community for support and continuous update and development. This platform includes Linux operating system, LAMP (Linux, Apache, MySQL, PHP PERL and PYTHON), Moodle, performance and theme plugin. Firstly, Linux is a Unix-like operating system that is considered the most popular open-source operating system. Its availability and continuous updates motivate the technical community to adopt it for their platform. Ubuntu is one of the most widespread Linux distributions for the server environment. Thus, an Ubuntu server has been utilised to operate and manage the web server of the e-learning system. Secondly, the LAMP platform contains the requirements to implement a web server’s services, including virtual hosting and database managements. Thirdly, Moodle, the core of our platform is a popular and widely adopted e-learning management system (Quesada et al., 2013; Moodle statistics, 2018). This system is an e-learning platform developed to provide students, teachers and administrators with a secure and integrated system.
Figure 2 shows that the utilisation of this platform is continuously growing. However, the UoK still has not reached the point of full adoption of e-learning techniques. This study attempts to define the challenges faced by the full utilisation of this platform by analysing the experience of its users, who are the academic members.

### Hypothesized Acceptance Model

As previously mentioned in Section II.a, TAM states that perceived usefulness and ease of use influence the attitude of users towards a new technology and, therefore, its utilisation. However, the perceived ease of use and usefulness may occasionally be influenced by an existing technology, based on which the user will evaluate and compare any new technology. Based on this assumption, the following hypothesis is proposed:

**H1:** Perceived ease of use of a new technology is inversely proportional to the user’s familiarity with an existing technology.

Therefore, the proposed model introduces a variable to the TAM related to existing technology that offers some or all services offered by the new technology. This variable is familiarity, also known as perceived ease of use of an existing technology (Fig. 3). The existing technology in this study is represented by Facebook, which is widely used in UoK for sharing course materials and communicating with students.

![Proposed Technology acceptance model](image-url)
4. The Questionnaire

4.1 Questionnaire design

A questionnaire survey is designed from scratch and conducted to convey the personal experience and impression of current educators regarding the status and challenges faced of full e-learning adoption. Specifically, the questions target the perceived usefulness and perceived ease of use for the educators. Several questions also focus on the perceived usefulness for their students.

Table 2: The questionnaire and the range of each question response

<table>
<thead>
<tr>
<th>Question</th>
<th>Short term</th>
<th>Answer scale</th>
<th>Scale type</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Section 1 faculty member information</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In which faculty you are currently teaching?</td>
<td>Faculty</td>
<td>22 faculty (A.lecturer: 4, Lecturer: 3, A.prof: 2, Prof.: 1)</td>
<td>Categorical</td>
</tr>
<tr>
<td>What is your position as a faculty member?</td>
<td>Title</td>
<td>Master, PhD</td>
<td>Categorical</td>
</tr>
<tr>
<td>What is your qualification degree?</td>
<td>Degree</td>
<td>Experience 1-35</td>
<td>Categorical</td>
</tr>
<tr>
<td>How long has been a faculty member?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Section 2 Usage</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are you aware of the e-learning platform services?</td>
<td>Aware</td>
<td>0-1 (No-yes)</td>
<td>Categorical</td>
</tr>
<tr>
<td>Do you have an account in the e-learning platform?</td>
<td>Account</td>
<td>0-1 (No-yes)</td>
<td>Categorical</td>
</tr>
<tr>
<td>How many e-learning services you are using?</td>
<td>e-learning tools</td>
<td>Listing of 6 services</td>
<td>Categorical</td>
</tr>
<tr>
<td>What other technology tools you are using in your courses?</td>
<td>Other tech</td>
<td>(Powerpoint, word, email, none)</td>
<td>Categorical</td>
</tr>
<tr>
<td>Do you use social network websites as a replacement for e-learning platform?</td>
<td>Social network</td>
<td>0-1 (No-Yes)</td>
<td>Categorical</td>
</tr>
<tr>
<td>As an educator, have the e-learning tools been important for your job?</td>
<td>Need</td>
<td>0-10 (10: very important)</td>
<td>Numeric</td>
</tr>
<tr>
<td><strong>Section 3 Challenges</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How easy is the use of e-learning platform?</td>
<td>Using easy</td>
<td>0-10 (10: very easy)</td>
<td>Numeric</td>
</tr>
<tr>
<td>How easy is the access of e-learning platform?</td>
<td>Access easy</td>
<td>0-10 (10: very easy)</td>
<td>Numeric</td>
</tr>
<tr>
<td>How do you rank the availability of training on e-learning tools in your department?</td>
<td>Training availability</td>
<td>0-10 (very available)</td>
<td>Categorical</td>
</tr>
<tr>
<td>How well do the students accept and benefit from existing e-learning tools?</td>
<td>Student acceptance</td>
<td>0-10 (10: high acceptance)</td>
<td>Numeric</td>
</tr>
</tbody>
</table>

Table 2 shows the three sections of the survey. The first section is concerned with faculty members' personal information that reflects his/her field and experience. The second section focuses on the level of Moodle usage. For instance, the participant is asked whether he/she has a Moodle account, about what services are used and whether he/she uses social media instead of the e-learning platform. The final section focuses on the challenges for the perceived ease of use and usefulness, such as easy access, ease of use, training availability and the process of how educators perceive the students' acceptance of the technology and benefits from the e-learning system. In particular, this section aims to measure the variables related to Hypothesis H1.

Most of the questions are multiple-choice ones with a numerical or categorical scale for easy and fast survey accomplishment, thus encouraging many educators to participate in the study.

4.2 Sample and data collection

The electronic survey participants are UoK academic members across a wide range of disciplines. Table 3 shows the demographic characteristics of the participants, who belong to 22 faculties in the UoK, such as engineering, science, medical, law and business. The responses of the 242 academic members (out of 2,144) are collected through voluntary electronic survey using Google forms sent to their official emails. This sample accounts for 11.2% of the total university academic members. The participants also range from newly hired assistant lecturers to experienced professors with more than 20 years of experience. Their identities are authenticated using their official email address.

Although the questionnaire is limited in terms of excluding students, this study assumes that experienced educators exhibit more accurate impressions with a low acceptable margin of errors in evaluating e-learning usage than do less experienced educators. That is, the survey questionnaire is designed to reflect the academic
members’ experience and impression and the challenges that they or their students face. Meanwhile, the electronic survey ensures a high level of clean and valid data collection because it avoids digitization errors and over/under scale responses and offers identity authentication.

Table 3: The demography characteristics of the questionnaire participants

<table>
<thead>
<tr>
<th>Specialty (%)</th>
<th>Engineering and science</th>
<th>Medical sciences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humanitarian sciences</td>
<td>35.3</td>
<td></td>
</tr>
<tr>
<td>Medical sciences</td>
<td>21.5</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Qualification (%)</th>
<th>PhD</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>59.8</td>
<td>40.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Experience (%)</th>
<th>0 -10 years</th>
<th>11-20 years</th>
<th>21 years or more</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>52.4</td>
<td>39.6</td>
<td>8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Position (%)</th>
<th>Assistant Lecturer</th>
<th>Lecturer</th>
<th>Assistant Professor</th>
<th>Professor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>27.4</td>
<td>34.4</td>
<td>30.9</td>
<td>7.3</td>
</tr>
</tbody>
</table>

4.3 Results

In terms of the existing status of e-learning utilisation, the responses show that approximately 94% of the faculty members are aware of the existing capability of the e-learning platform in the UoK; in addition, 93% already have an e-learning system account. Figure 4 reveals that 47.3% of the faculty members use social network websites rather than the UoK platform for e-learning. According to face-to-face interviews with several participants, Facebook groups and Viber groups are the most adopted social media used by educators in UoK to communicate and share course materials with students.

![Figure 4: The responses from faculty members whether they are using social network as a replacement for the existing e-learning platform](image)

These findings are evident despite the fact that 77.6% perceive that e-learning training is fairly or very available, ranking 5 or more out of 10 (Fig. 6). Amongst the participants, 78% have already attended a training workshop on how to use the e-learning platform (Fig. 7.b). Moreover, 73.2% of the participants believe that e-learning has an important or very important role to play in the education process, ranking 6 or more out of 10 (Fig. 7.a). By contrast, less than 7% perceive that e-learning is not relevant in elevating their teaching outcomes, ranking 4 or less out of 10 (Fig. 7.a).

On the other hand, in terms of challenges, approximately 29.7% of the participants think that the existing e-learning platform is inaccessible, and 31.8% believe it is difficult to use (ranking it as 5 or less out of 10 in both cases) (Figs. 7.c and 7.e, respectively). However, when educators are asked regarding the students’ reaction,
64.8% of them think their students are not reaping the benefits of e-learning tools, given that the educators rank it 5 or below out of 10 (10 being excellent in accepting and benefiting from e-learning), see Figure 5. These contradicting responses raise a number of questions that the present study attempts to address by using data analysis techniques in the next section.

Figure 5: The academic members’ assessment to students’ acceptance and benefiting from the e-learning platform

Figure 6: Responses regarding the e-learning training availability at the University of Kufa
Figure 7: Summary of the main responses to the questionnaire
5. Data Analysis and Discussion

Cronbach’s coefficient alpha is used to check the internal consistency of the questions, as shown in Table 4 (Churchill, 1979). All the questions’ values are around 0.6 or above, which proves acceptable levels of internal consistency. In addition, the calculated squared multiple correlation shows that the social network question is the most independent amongst other questions, see Table 4.

Figure 8 shows the clustering of responses into two main groups as obtained using k-means clustering technique, as discussed in Section II. In contrast to the initial assessment, logical expectations and literature review (Chow, Tse and Armatas, 2018), training exhibits extremely little influence in shaping participant responses on the survey (Fig. 8.a). This finding is particularly true in our case study given the availability of training courses that already exist in the UoK (see Section 2.c). However, Fig. 8.b demonstrates that the use of social media seems to shape and divide all the responses of the survey participants into two groups. This result is attributed to the high familiarity and popularity of existing technology, including Facebook, which reflect on the users’ perceived usefulness and ease of use for Moodle. Specifically, competition with social media in terms of perceived ease of use and usefulness is difficult, particularly for faculty members who have already been using social media to load course learning materials and communicate with their students.

Table 4: The use of Cronbach’s Alpha test to check internal consistancy of the developed instrument questions

<table>
<thead>
<tr>
<th>Omitted Variable</th>
<th>Squared Multiple Correlation</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree</td>
<td>0.5</td>
<td>0.683</td>
</tr>
<tr>
<td>S title</td>
<td>0.506</td>
<td>0.684</td>
</tr>
<tr>
<td>Aware</td>
<td>0.134</td>
<td>0.677</td>
</tr>
<tr>
<td>Account</td>
<td>0.111</td>
<td>0.678</td>
</tr>
<tr>
<td>Training</td>
<td>0.142</td>
<td>0.677</td>
</tr>
<tr>
<td>Social network</td>
<td>0.0564</td>
<td>0.689</td>
</tr>
<tr>
<td>Need</td>
<td>0.132</td>
<td>0.668</td>
</tr>
<tr>
<td>Access easy</td>
<td>0.734</td>
<td>0.583</td>
</tr>
<tr>
<td>Using easy</td>
<td>0.73</td>
<td>0.589</td>
</tr>
<tr>
<td>Training availability</td>
<td>0.319</td>
<td>0.617</td>
</tr>
<tr>
<td>student acceptance</td>
<td>0.282</td>
<td>0.619</td>
</tr>
<tr>
<td>Other tech</td>
<td>0.148</td>
<td>0.67</td>
</tr>
<tr>
<td>E-learning tools</td>
<td>0.228</td>
<td>0.669</td>
</tr>
</tbody>
</table>

a. Distribution of cluster instances based on training question responses.
Moreover, Figure 9.a shows the decision tree built by using the REPTree technique, as discussed in Section II, to answer the use of social media as a target. This tree demonstrates that the use of social media is related to the impression of educators whether the use of the Moodle is perceived as very easy compared with familiar social media. A total of 72 participants (29.7% of the total participants) do not use social media because they believe the existing platform is very easy to use and access (on a scale of 1 to 10, they selected 8 or above). Moreover, even if the student reacts high to e-learning (answer range ≥ 7.5), an academic member may still use social media as a means of e-learning. However, if the students’ reaction to the e-learning platform is average or low, adopting social media becomes linked to the e-learning training, academic member position (newly employed faculty members are more willing to use e-learning) and accessibility. In conclusion to all these extracted links among the questionnaire variables, hypotheses H1 is accepted in the proposed e-learning TAM.

Figure 8: Clustering of questionnaire responses using k-means

b. Distribution of cluster instances based on social media question responses.

Figure 9: Decision tree is generated using REPtree based on a specific target response (a) use of social media instead of e-learning? (b) Level of student acceptance. Note that the value inside terminal nodes represents the answers; value associated with branches represents answer range; values above internal/terminal is the number of responses

On the other hand, Figure 9.b presents the second decision tree with student acceptance as a target. Academic members seemingly reflect their own personal impression as their own students’ impression regarding e-learning tools. This assumption is confirmed by existing literature from the developing country (Cidral et al., 2017). That is, if the academic member (61 participants) perceives that e-learning platform is easy to use,
accessible and subject to training, then his/her average response regarding student acceptance will be high (around 6.5). This confirms the outcome of Sánchez and Hueros (2010) and shows that attitude towards e-learning technology, namely Moodle, may be influenced and is not directly linked to the actual user experience. Meanwhile, other branches in the tree show that if the academic member uses a variety of e-learning services (e.g. lectures’ handout sharing, e-exam, assignments, forums, chats) and had access to the training, then the student acceptance is high (around 6.5). This finding is due to the full employment of e-learning services in their academic courses.

6. Challenges and Suggested Solutions

The questionnaire-obtained results, statistics and information extracted and presented in previous sections reveal that the challenges in our case study, which are also confirmed by other studies, can be classified into the following main categories.

Firstly, technical issues include infrastructure, technical support, extensive student accounts management, reliable bandwidth connection to the servers and server capability to handle scalable demands. These technical issues can be categorised as external factors in the TAM, which studies show have great influence on perceived usefulness and perceived ease of use (Mahmod et al., 2017, Sánchez and Hueros (2010). These challenges are normal in developing countries because of low investments or lack of consistent maintenance.

Secondly, the analysed results suggest that a nontrivial percentage of faculty members and students use social media as an e-learning platform. This phenomenon is reasonable given that they are more familiar with social media and perceive these as extremely easy to use. In addition, the use of social media may have certain benefits for the education process, such as accessible information for students and for students to easily communicate with their teachers and their peers (Kalelioğlu, 2017, Petrovic et al., 2013). Therefore, although e-learning specialised platforms may offer more services than does social media, educators and students are reluctant to use them. Thus, seeing trained academicians who prefer to use social network websites instead of the official e-learning platform is becoming less surprising. Some studies have suggested using both Moodle and Facebook because of their merits in terms of e-learning (Kalelioğlu, 2017, Petrovic et al., 2013). However, several negative issues have been discovered when Facebook is used as e-learning platform, such as difficulty in finding old uploaded files, lack of time limitation for submissions, confidentiality of student submissions and their grades and distractions (Kalelioğlu, 2017, Petrovic et al., 2013). Therefore, the following suggested solutions should be considered. (1) Improve the training program and incentive policy to motivate the targeted students and educators to use e-learning platforms. (2) Develop a specialised version of social networks to be appropriate for education purposes. For example, Facebook could develop an e-learning platform similar to Workplace, which is appropriate for a working environment. Edmodo is another example of an e-learning environment that resembles typical social media websites (Edmodo, 2018). (3) Existing e-learning platforms, such as Moodle, can be modified similar to social media websites.

Thirdly, publicity should be considered. The statistics imply the consistently negative attitude towards e-learning in the UoK. A large portion of the academic members lack the motivation to actually use e-learning tools because they are sceptic of whether this platform will assist in their current education tasks or if it is just another routine layer to be added, which is a common attitude amongst educators in developing countries. This issue can be tackled by designing policies and starting a publicity campaign that aims to highlight the impact of e-learning on the education process as well as the possible savings in time and resources it might offer for the academic members and the students. For example, promoting and motivating students have shown significant impact on the e-learning outcome in developing countries (Maldonado et al. 2009).

7. Conclusion and future work

This study shows that despite the availability of the e-learning technology, such as the case of UoK, e-learning utilisation may not reach the planned target and impact. This finding is assumed to be caused by the transfer of e-learning in developing countries, which focuses on technological infrastructure while ignoring the crucial factors that influence technology acceptance and the full adoption of e-learning. Critical information obtained from the faculty members’ questionnaire responses through data analysis techniques shows that the main factors and challenges faced by the full adoption of e-learning include lower perceived usefulness and ease of use compared with social media websites and the absence of planned promotions. Moreover, the findings confirm the proposed TAM, which posits that new technology usage and acceptance is relative to the user’s
(educator/student) attitude, experience and beliefs, particularly in case of an existing technology. Consistent with previous research, this study proves that social media, despite some of its merits for e-learning, is a negative influential factor that discourages educators from fully utilising any custom education management system platforms that offer enhanced learning capabilities. This outcome is attributed to the fact that the perceived ease of use and usefulness of Moodle fall short compared with those of familiar social media tools. Therefore, the proposed outline of possible solutions to handle these challenges includes modifying learning platforms to be similar to the social media environment and/or introducing new e-learning services to social media. Consequently, the study draws a new horizon for policy makers, researchers and e-learning platform developers. Recommendations for future work include further studies to confirm our finding through a student survey and implementation of the proposed solutions.

References


Tan, P.N., 2007. Introduction to data mining. India, Pearson Education.


Abstract: Some institutions of higher education in Kenya have adopted e-Learning with the aim of coping with the increased demand for university education and to widen access to university training and education. Though there are advantages that accrue from adopting e-Learning; its implementation and provision has not been smooth sailing. It has had to contend with certain national, organisational, technical and social challenges that undermine its successful implementation. This paper therefore aims to present a literature review of the challenges faced in the implementation and provision of e-Learning in universities in Kenya. The scoping review method was used to identify and analyze the literature of the e-Learning challenges. Some of the challenges revealed include: lack of adequate e-Learning policies, inadequate Information and Communication Technology (ICT) infrastructure, the ever evolving technologies, lack of technical and pedagogical competencies and training for e-tutors and e-learners, lack of an e-Learning theory to underpin the e-Learning practice, budgetary constraints and sustainability issues, negative perceptions towards e-Learning, quality issues, domination of e-Learning aims by technology and market forces and lack of collaboration among the e-Learning participants. These challenges need to be addressed to minimise their impact on implementation and delivery of e-Learning initiatives in institutions of higher education in Kenya. This analysis of the e-Learning challenges forms the basis for the ongoing research that seeks to explore and establish possible strategies to address some of these challenges.

Keywords: ICT, Distance Education (DE), e-Learning, e-Learning Challenges and Kenya

1. Introduction

In the last 20 years or so, more than ever before, we have witnessed a high demand for university education in Kenya which was necessitated by the increased number of high school graduates and working class students (Nyerere, Gravenir and Mse, 2012). This demand has in turn led to an increased number of universities and middle level colleges. According to the Commission of University Education (CUE) by November 2017 there were 31 state sponsored universities with six constituent colleges, 18 private sponsored universities with five constituent colleges, and 14 universities functioning with letters of interim authority (CUE, 2017). However, even with this increased number of institutions of higher education it is still not enough to cater for the increased demand for education. This is because Kenyan institutions of higher education have not expanded at the same rate to match this demand hence further widening the educational access gap. Some universities in Kenya have therefore embraced e-Learning with a view to bridge this gap while at the same time improve learning flexibility especially for the employed learners. Eight state sponsored and five private sponsored universities have e-Learning programs (Nyerere, 2016).

The Kenyan universities’ e-Learning departments grew through the various key developmental generations to having well tested and running e-Learning platforms (Wambugu and Kyalo, 2013). University of Nairobi (UoN) pioneered Distance Education (DE) in Kenya in the 1960s, with its teacher training correspondence programme. This programme was supplemented by regional and on-campus face-to-face tutorials coupled with seminars. Learner-tutor interactions included [and still do] brief meetings for induction, counseling, tutelage and learning at the learner support centres (formally known as extra-mural centres) which were [and still are] located in Nairobi, Nakuru, Nyeri, Kisumu, Mombasa, Kakamega, Kisii, and Garissa. Under the supervision of these learner support centres, weekend sessions were [and still are] organised to take place one day per month in selected teacher training colleges or high schools with amenities such as classroom, laboratories and libraries (Wambugu and Kyalo, 2013). By 2004, the UoN had developed its own Learning Management System (LMS) christened the Wedusoft (Omweanga and Rodrigues, 2006; Ssekakubo, Suleman and Marsden, 2011). The university then adopted and implemented the Chisimba LMS in collaboration with their development partners before moving to Claroline LMS (Ssekakubo, Suleman and Marsden, 2011).
Kenyatta University (KU) is another institution that has a mature e-Learning department which was recently rebranded “digital school”. KU follows the same model of e-Learning and has support centres in many parts of the country offering the same services as the UoN (Nyerere, Gravenir and Mse, 2012).

2. Research Problem

e-Learning has many benefits that include: widening access to the reach of many learners in a flexible manner, improving the effectiveness of learning and teaching via technology, increasing efficiency in e-Learning administration, reducing public spending in education and training, and increasing quality of research among others (Arkorful and Abaidoo, 2014). However, despite the numerous e-Learning benefits, promises and opportunities, e-Learning initiatives in institutions of higher education in Kenya are faced by a number of challenges that leave the stakeholders dissatisfied when they fail to meet their expectations. According to Wright, Dhanarajan and Reju (2009) and Ssekakubo, Suleiman and Marsden (2011), most of the e-Learning projects in third world countries either fail partly or wholly thus failing to deliver on their promise. Nyerere, Gravenir and Mse (2012) revealed that most of the e-learners (90.8%) were dissatisfied with the delivery of e-Learning and 85.6% of the e-tutors indicated that they were demotivated in executing their e-Learning responsibilities. These drawbacks in turn have led to a slow uptake of e-Learning in institutions of higher education in Kenya (Nyerere, 2016). This literature review therefore seeks to unearth the key challenges that are hindering the delivery of e-Learning in the Kenyan context.

3. Literature Review Method

This review employed the scoping review method; which is a broad and comprehensive approach to reviewing literature that quickly matches the main variables and key terms behind the review to the key sources of the literature (Dijkers, 2015). The review sought to compare and integrate findings from past studies using content analysis with the aim of identifying the major themes or constructs running across the available body of literature (Booth, Papaioannou and Sutton, 2012). The identified materials were then synthesised and a thematic narrative of the findings was made. According to Stepanyan, Littlejohn and Margaryan (2013) scoping review is useful in studying trends in a contemporary area such as e-Learning where concepts are still evolving. The reviewed papers were obtained from Google Scholar using the English language. Some other materials specific to the Kenyan context were obtained from specific websites. The search was restricted by use of the key terms presented in the Table 1 in conjunction with “AND” to identify materials published between the year 2000 and 2019. Though the queries returned a huge amount of papers and materials we narrowed the focus to the specific e-Learning challenges experienced in the Kenyan context. Some materials were discarded in favour of more current publications as well as on the basis of content and context relevance. In total 48 documents were reviewed as shown in Appendix I. The review followed the steps of the scoping review approach as stipulated by Arksey and O’Malley (2005) and summarised the results of every step as shown in Table 1 below.
Table 1: Scoping Review Steps, Activities and Outcomes

<table>
<thead>
<tr>
<th>Step/Activities</th>
<th>Outcomes</th>
</tr>
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<tbody>
<tr>
<td>1. Identify research question(s)</td>
<td>What are the challenges faced by universities, e-learners and e-tutors in the implementation and delivery of e-Learning in Kenya?</td>
</tr>
</tbody>
</table>
| 2. Identify key terms and use them to find pertinent studies | The following are the strings of key terms used for the primary search of materials.  
  1. e-Learning opportunities and challenges  
  2. e-Learning successes and failures  
  3. e-Learning advantages and disadvantages  
  4. e-Learning benefits and challenges  
  5. e-Learning in Kenya  
  6. e-Learning challenges in Kenya  
  7. e-Learning challenges in developing countries  
  A secondary search was done depending on the results of the primary search and the following were the key term used:  
  1. e-Learning pedagogical issues in Kenya  
  2. e-Learning theoretical issues  
  3. ICT and e-Learning policy framework in Kenya  
  4. Interactive and collaborative e-Learning in Kenya  
  5. ICT infrastructure and key services in Kenya  
  6. Quality Assurance in e-Learning in Kenya  
  7. Technology issues in e-Learning in Kenya |
| 3. Select the related studies                         | The literature review was conducted from a total 47 documents. The following is the breakdown:  
  1. 28 Journal articles  
  2. 13 Official publications  
  3. Four conference papers  
  4. Two books  
  5. One book chapter  
  NB: An extra four journal articles were used to inform the scoping review approach. |
| 1. Extract the major themes and constructs            | The major themes that were running throughout the available literature include:  
  1. There are some opportunities and benefits that accrue from e-Learning and hence the impetus for its adoption.  
  2. There are specific challenges that face e-Learning in Kenyan universities context. |
| 2. Integrate, summarise and report the findings        | The study integrated and summarised the finding in step 4 and made a narrative report that is presented in this paper |

4. Results and Discussion

This section presents the major challenge categories that are recurrent in the implementation and delivery of e-Learning in universities in Kenya as found from the literature.

4.1 ICT and e-Learning Policy Implementation Issues

Policy frameworks play a crucial role in guiding the implementation and provision of e-Learning (Nyerere, 2016). The presence or absence of such a framework determines whether or not e-Learning initiatives will fail or succeed. In the Kenyan context the initial government policy that dealt with DE in institutions of higher education was anchored on the Act of Parliament of 1966, that created the Adult Education Board. Over time, many other educational commissions and reports have underscored DE and e-Learning as a substitute method of delivering education (Farrell, 2007). The Sessional Paper No. 1 of 2005 contained another government policy initiative, which suggested the creation of a National Open University [not yet established] and the use of e-Learning to develop human resource capacity (Republic of Kenya, 2005). Similarly, the Government of Kenya Sessional Paper of June 2012 on Policy Framework for Education and Training also admitted that; although the Sessional Paper No. 1 of 2005 mentioned an e-Learning policy; such a policy framework was still absent seven years later. However, the 2012 Sessional Paper drew up an e-Learning policy framework to guide the practice in the country from the year 2012 going forward; though these guidelines have largely remained unimplemented at the national level to date.

The National ICT Policy of 2006 that had guided ICT implementation in Kenya for 10 years, was inadequate to address the e-Learning practice, since in itself it lacked a strategy on e-Learning. This inadequacy was later addressed in the National ICT Policy of 2016 which saw the inclusion of an elaborate section on e-Learning policy strategies. One such strategy states that the government will establish educational databases for sharing learning and teaching resources. The policy also advocated for e-Learning inclusion at all levels of education with the aim of increasing the quality of learning and training. It further stated that the government will advocate e-Learning and virtual campuses implementation particularly in universities and colleges. The policy also included other related strategies that are meant to promote the growth and expansion of e-Learning
capacity. Such strategies included expediting the public and private partnerships (PPP) with the aim of marshalling resources needed to fund e-Learning implementations and the designing of a unified e-Learning curriculum that will back the use of ICTs in learning and teaching.

However, even with these e-Learning strategies in the new National ICT Policy of 2016, we still don’t have a clearly defined national e-Learning policy framework to guide the practice. In the absence of a national e-Learning guiding policy the practice in Kenya had been driven by individual organisation’s policies. A study by Nyerere (2016) entitled “Open and Distance Learning in Kenya” showed that 11 out of the 12 universities surveyed have e-Learning policies; however, the problem is in operationalisation of these organisational policies in the absence of a national policy framework for e-Learning. The importance of national e-Learning policy is to offer a shared framework for the design, deployment and delivery of e-Learning in which individual organisations can base their organisational policies. It would also be instrumental in e-Learning resource deployment and quality assurance. Research by Tarus, Gichoya and Muumbo (2015), reported that the absence of operational e-Learning policies was a key impediment to the effective deployment of e-Learning in some of the Kenyan state sponsored universities. Furthermore, the study observed that, although some institutions had e-Learning policies they were unable to implement them due to financial limitations and lack of the relevant ICT infrastructure. In some universities the e-Learning policies were still in the draft version for years without being operationalised.

4.2 Lack of and/or Inadequate ICT Infrastructure

The Government of Kenya Sessional Paper of June 2012 on Policy Framework for Education and Training recognised ICTs as the main conduit for e-Learning. The delivery of e-Learning depends on a flourishing ICT infrastructure which is far from satisfactory in Kenya. The country is characterised by a large digital divide between the urban and rural areas when it comes to key ICT infrastructure and internet access which averages to 69% (Ndungu, Lewis and Mothobi, 2019). The Kenya Digital Economy Blueprint, 2019 report also observed this divide reporting that there are 580 sub-locations in Kenya with below 50% GSM (Global System for Mobile communication) coverage while about 160 sub-locations do not have a mobile signal whatsoever. It further says that there are about 2,000 sub-locations with below 50% 3G network coverage, half of which are out of reach of the 3G services completely. Moreover, it goes on to say, that broadband network services cover a small geographical area equivalent to 17% of the landmass leaving 83% of the country without broadband coverage. The same was noted for the fibre optic cables that equally has a landmass coverage of 17%. However, the report observed that the digital divide has been diminishing, albeit very slowly. Earlier on Nyerere (2016) reported that universities in key urban areas had good ICT infrastructure; for example, University of Nairobi, United States International University, Jomo Kenyatta University of Agriculture and Technology, Nazarene University of Africa, St Paul’s University, Kenyatta University, among others. While universities in suburban or medium sized towns such as Maseno University, Karatina University and Egerton University had moderate ICT infrastructure and universities in rural settings such as Moi University, Garrissa University and Masinde Muliro University of Science and Technology among others had low ICT infrastructure.

This digital divide has been slowly diminishing with public and private sector initiatives such as the laying of the fibre optic infrastructure that has increased Internet bandwidth causing faster communications and enhanced use of e-Learning (Communication Authority of Kenya, 2018). Further, since ICTs are powered by electricity; the rural electrification programme (REP) and the last mile electricity connectivity initiative are other government effort geared towards the expansion of the national ICT infrastructure. For example, by the end July 2015, the government was seeking to connect 314,200 non-commercial customers, primary and secondary schools on the national power grid during the first phase of the programme (Kenya Power and Lighting Company, 2017). The number of connections under the REP increased from 1,269,500 customers in 2016/17 financial year to 1,332,100 customers in 2017/18 financial year (Kenya National Bureau of Statistics Economic Survey, 2019, p.160). Internet Service Providers’(ISPs) penetration in the country is another consideration to make when reviewing the country’s ICT infrastructure; the July-September quarterly Communication Authority’s report of the 2018/19 financial year entitled “Public Sector ICT Survey Report”; indicated an increase in mobile phone subscription to 46.6 million users up from 45.5 million users in the previous year. This growth was attributed to the market expansion by the ISPs as well as availability of affordable mobile phones. In the same period the report indicated that mobile data [Internet] subscription stood at 42.2 million users, an increase from 41.1 million users in the previous year. This increase was attributed to the continued fall of smartphone prices (Communications Authority of Kenya, 2018). However, even with these initiatives, the coverage and accessibility of ICT infrastructure and services in the country is
still not satisfactory and there is need to bridge the digital divide further in the wake the geographical and economic disparities observed so far in the deployment of ICT infrastructure in the country (Awour and Kaburu, 2014; Mutisya and Makokha, 2016; Ndungu, Lewis and Mothobi, 2019).

At the institutional level some universities are characterised by low levels of ICT and e-Learning infrastructure as a result of the high costs associated with acquiring, implementing and sustaining the ICT infrastructures needed for the provision of a thriving e-Learning environment (Nyerere, 2016). This in turn limits access to e-Learning since the available ICT infrastructure is not scalable to accommodate the ever-growing number of e-learners seeking university education as well as to accommodate the high number of ICT resources needed (Sabi, 2014). Kashorda and Waema (2014) in their study entitled “E-Readiness Survey of Kenyan Universities” conducted in 30 universities, found out that there was a low ratio of personal computers (PC) to students. The study reported that there were only 16,174 computers in the laboratories to serve a population of 423,664 students enrolled in those universities. Though this challenge inhibits access to e-Learning; the same study however observed that it was compensated [though not eliminated] by the large number of students (200,000 = 53%) who owned laptops. The same study argued that the internet is needed for a vibrant e-Learning environment, which was measured by use of two indicators: availability and affordability. Their study therefore recommended that individual institutions should take up the responsibility to draw up policy strategies to increase Internet access to the increased learner enrolment rates, in order to take advantage of the efforts by the Kenyan government aimed at continuously improving the ICT regulatory framework. The study also recommended that, because the universities are already connected to the national fibre backbone network, they should adequately invest in local area networks (LANs) and Wireless LANs to allow learners connect their mobile devices and access learning services (Kashorda and Waema, 2014).

4.3 Lack of ICT and Pedagogical Skills/Training on the Part of e-Tutors and e-Learners

The Government of Kenya Sessional Paper of June 2012 on Policy Framework for Education and Training noted that there is inadequate ICT capacity for e-tutors which is a challenge to the delivery of e-Learning. To address this challenge, the sessional paper proposed the following policy actions: compulsory ICT training for all teachers and education managers by 2015, ensuring ICT competencies are acquired by all pre-service teacher trainees, continuous training of teachers to maintain the ICT competencies and developing and implementing ICT Education and Training Strategic Plan. Unfortunately, as noted earlier; the policy strategies and recommendations of this sessional paper largely have remained unimplemented.

With respect to the specific institutions, there were two aspects to capacity building: technical training and pedagogical training. The National ICT Policy (2016) also recognised the need to develop the capacity of various institutions providing ICT related training with the aim of increasing trained personnel and improving the quality of their technical skills. Nyerere, Gravenir and Mse (2012) and Tarus, Gichoya and Muumbo (2015) in their respective studies also reported the lack of e-Learning technical competencies as well as the e-content creation skills on the part of the e-tutors as a key hindrance to the enactment of e-Learning in state sponsored universities in Kenya. They further observed that even where there is training on the part of e-tutors, the focus is on the technical functionalities of the system as opposed to the e-Learning pedagogical training which is the real challenge. However, Isaacs & Hollow (2012) in their e-Learning Africa (2012) Report; argued that there is a pessimism and an aversion encapsulated in Kenyan e-tutors that ICTs will replace them in their jobs. Thus, ICT training and integration of ICTs in provision of education has been misunderstood by some e-tutors as opposed to arousing the desired interest. Elsewhere Tarus and Gichoya (2015), emphasised the need for the e-learners to also be inducted and trained in ICT and e-Learning skills in order for them to learn in this entirely new setting.

Finally, in the 2013 E-Readiness Survey of Kenyan Universities the ICT human capacity showed a slight improvement from stage 2.9 in the 2008 survey to stage 3.0 (Kashorda and Waema, 2014). This is one stage below the highest achievable stage of 4.0 which means there is room for improvement on e-tutor ICT skills and training.

4.4 Financial Constraints and Sustainability Issues

Manro, Sighn and Joshi (2012) and Sabi (2014) in their respective e-Learning studies noted that costs are a major challenge in implementing and delivering e-Learning in third world countries. They observed that the implementation and sustainability costs for a dependable ICT infrastructure is very high for many universities in the developing countries [Kenya included] causing them to trail the developed countries when it comes to
technological developments. On the other hand, Kashorda and Waema (2014) argued that a high degree of ICT implementation and use enhances learning, teaching and research. It also supports universities in achieving their academic and managerial objectives. Nonetheless, a higher level of ICT implementation implies increased costs for universities which mainly work under tight financial constraints. Tarus, Gichoya and Muumbo (2015) also reported that many state sponsored universities find themselves constrained by financial resources, which sometimes, among other reasons, causes e-Learning not to be prioritised in their budgets as a main investment.

According to a study of e-Learning practitioners in Africa, it was reported that among the immediate priorities for action was funding (Hollow, 2009). Some cost impediments reported were: initial, maintenance, training, e-content development and bandwidth costs. Complicating the issue of cost further is the ever-changing technological innovations and their varying costs, thus making it difficult for the institutions to keep up with these changes. However, according to the e-Learning Africa (2012) Report it is worth to note that bandwidth costs have been reducing since the laying of the undersea fibre optic cable in Kenya and with the new ISPs joining the market. However, while this may be true for some institutions; the bandwidth costs remain significantly high for some institutions.

4.5 e-Learning Quality Issues and Negative Attitudes Towards e-Learning

Quality is seen as the degree of excellence and in the e-Learning context Njoroge and Kibaru (2012) viewed it as the outstanding, excellent, valuable and positively impactful service to the e-learner. According to Gaskell and Mills (2014) the quality of e-Learning delivery has at times been challenged and questioned; where e-learners and e-tutors have had to contend with negative perceptions from their conventional learning counterparts and prospective employers regarding the general quality of the e-Learning programs undertaken as well as qualifications achieved. Njoroge and Kibaru (2012) noted that e-Learning quality in Kenyan Universities is hard to measure because it has many stakeholders each with conflicting interests; who range from; e-learners, e-tutors, institutions, CUE, the government and the employers. The other challenge with quality is that it is evaluated against the e-Learning technologies, courses and programmes as opposed to the inputs, processes and educational objectives. As observed earlier; e-Learning benchmarking remains a key challenge in universities in Kenya in the absence of adequate guiding national e-Learning policy. Thus the matter of e-Learning benchmarks and standards was left to the individual universities. Previously the state sponsored universities were autonomous and hence they defined their own standards for operation. The private sponsored universities were regulated by the then Commission for Higher Education (CHE) whose mandate ceased with the enactment of the Universities Act 2012 which brought both the state and private sponsored universities under the regulation of CUE in 2013 (Republic of Kenya, 2016). Even with CUE in charge, there still lacks a comprehensive national quality assurance (QA) strategy to drive the e-Learning agenda. Besides, the inadequate QA policies are not specific to e-Learning but are more generally applicable to conventional learning programs (Nyerere, 2016). Further, Hadullo, Oboko and Omwenga (2017) pointed out that although there are e-Learning models and frameworks for assessing e-Learning quality, some of them work well in the developed world as opposed to the Kenyan context and hence the need for customised quality framework.

4.6 Domination of Educational Aims and Goals by Technology

e-Learning has been argued to be technology-led, a fact that has led to the observable trend whereby institutions overemphasise the technologies used to deliver e-Learning as opposed to the learning process and outcomes. Such an ideology of e-Learning is described as techno-positivist by Njenga and Fourie (2010). It is the compulsive enthusiasm and euphoria about the possible promises, benefits and opportunities that e-Learning purports to deliver, while disregarding the concerns of the intended users and the negative impacts of technology on users. It also ignores the current research findings about e-Learning use and the associated inventions. This techno-positivist ideology denies the e-Learning practitioners and researchers alike the opportunity to interrogate the intentions, capabilities, advantages and constraints of ICTs. It also denies them the opportunity to study and assess the implications of these new technologies on the e-pedagogy. This ideology is mainly propagated by technology vendors (Shank, 2015) and sold to education administrators with a view to increase the sales of their technologies. This in turn leads to the domination of educational aims and institutional development strategies by technology and market forces; thus forcing the attention in e-Learning to be on the ‘e’ as opposed to the ‘learning’. Technologies by themselves cannot improve learning but appropriate choice of such technologies and how they are used is what changes the learning process. This is perhaps better captured by Cuban (2001) in his book “Oversold and Underused Computers”, where he argues
that many universities in the 1990s [to date] acquired new technologies and fitted them in old universities for which the tutors and learners did not use to deliver on educational aims and goals.

This problem is replicated in universities found in the third world countries; where most of the e-Learning technologies in use have been borrowed from the developed countries. These technologies were designed following the needs and requirements based on developed countries’ contexts which are clearly very different from the third world’s contexts. Trying to fit these borrowed technologies to universities in the third world contexts causes further challenges. This borrowing has been necessitated to a certain extent by the high financial resources and ICT infrastructural requirements needed to run top e-Learning solutions; which remain elusive to many universities in third world countries as observed earlier. Thus institutions do not develop their own e-Learning platforms but instead use open source software for which they don’t have to pay license fees (Ssekakubo, Suleman and Marsden, 2011). The commonly used e-Learning software in Kenya include Moodle, WebCT (Web Case Tools) and Blackboard. Njenga and Fourie (2010) advised that prior to investing in e-Learning, universities should undertake their own feasibility studies to establish how their e-Learning technological choices will further their academic objectives in respect to their intended users while at the same time maintaining their competitive advantage.

4.7 Lack of Adequate e-Learner Support and Collaboration

Khetan and Gupta (2013) observed that learners learn more effectively and efficiently by taking part in the learning process, interacting amongst themselves, discovering ideas and facts on their own and by experiencing knowledge firsthand. However, this is not the case with most present-day e-Learning systems; since they are content-centred and they fail to offer an individualised learning context based on learners’ cognitive capabilities and interests. They further argued that, the most outstanding common characteristic of many e-Learning systems is that they encourage an inert e-learner; a fact attributed to the lack of synchronous interactive capabilities that are the trademark of learner-tutor and learner-learner interaction.

Further, Wu, Tennyson and Hsia (2010) observed that many e-Learning environments lack campus-based interaction and flexible tutorial support leading to learner isolation, frustration, confusion as well as low enthusiasm on the subject matter. Muuro, et al. (2014) also found out that many e-Learning initiatives in Kenya are characterised by lack of e-tutor’s feedback, learner collaboration and campus social context. Their study further found out that e-tutors failed to initiate collaborative activities among the e-learners with 41.3% of e-learner respondents citing that their e-tutors did not engage them in collaborative tasks. In situations where the e-learners were engaged in collaborative activities 47% cited lack of e-tutor feedback as a great challenge, a problem that Nyerere, Gravenir and Mse (2012) attributed to lack of e-tutor training and low motivation on the part of the e-tutor. Nyerere, Gravenir and Mse (2012) further noted that e-Learning systems in use today in universities in Kenya only employ asynchronous modes of delivery and interaction where most e-tutors upload the course content in form of lecture notes, tests and assignments on the universities’ e-Learning portals. E-learners in turn download these notes, tests and assignments from the institutions’ e-Learning portals. They study the lecture notes and attempt the assignments individually because the systems are not designed for collaborative group working. These asynchronous systems are characterised by inadequate interaction, communication and collaboration. According to Gaskell and Mills (2014), one of the performance measures in the online teaching and learning process is e-learners’ feedback and e-tutors’ feedback. When this feedback is lacking the possible result is e-learner isolation which leads to other problems like high dropout rate, unmet pedagogical needs, and negative perceptions among peers and employers who consider e-Learning as second-rate education.

4.8 Lack of a Guiding e-Learning Theory(ies)

Theories play a crucial role in guiding practice across all disciplines. An analysis of the existing e-Learning literature reveals a theoretical gap in e-Learning, what is available are only extensions of the classical learning theories (CLTs) that include the application of ICTs to learning (Mayes and de Freitas, 2004; Kibuku and Orwa, 2018). There is also a lack of a sufficient body of academic literature specially related to e-Learning theory(ies). According to Andrews (2011), Pange and Pange (2011) and Ruth and Kaspar (2017), most of the existing e-Learning literature and papers presented in conferences are descriptions of practice (pedagogy), experiences, successes and challenges in e-Learning. As Peraton had remarked earlier in 1981; that “DE had managed very well without a theory”, close to four decades later we still don’t have one despite the observed growth in DE from early generations to the present-day e-Learning practice (Nichols, 2003, p.1).
World over, including in Kenya, the CLTs that include behaviorism, cognitivism, and [social] constructivism have been borrowed and applied in the practice of e-Learning under the guise that e-Learning is learning just like conventional learning with the only difference being the ‘e’; where the ‘e’ is argued to be a conduit or a vehicle for delivering learning (Kibuku and Orwa, 2018). Andrews (2011) also argued that e-Learning has been seen to represent just another site for learning; however, a blanket use of CLTs in e-Learning is not fair since conventional learning is different from e-Learning. Serdyukov (2015) underscored the key differences between the two which include: the course structure, content format, content presentation, learning context and processes, instructional tools, e-learner objectives, e-learner perceptions, cognitive learning styles, interaction and communication amongst e-Learning participants, team collaboration, e-learner autonomy, motivation and interest as well as e-learner relations with team members, with the e-tutor, and the society in which he/she exists. Furthermore, these CLTs were stipulated in the 20th Century; long before we had e-Learning with its modern technologies of the 21st Century. Thus there is need for a theory specifically developed to underpin e-Learning (Pange and Pange, 2011). Most recently in 2005 the connectivist theory was stipulated to address learning in the 21st Century with its digital technologies (Foroughi, 2015). Unfortunately, connectivism just like the CLTs has certain gaps and shortcomings and as such cannot adequately address all that happens in e-Learning. For example, it heavily emphasises technology at the expense of the e-tutor, the e-learner and the learning outcomes (Kibuku and Orwa, 2018). Suffices to say that the application of technology in learning and teaching has always been “technology-led rather than theory-led” (Ravenscroft, 2001, p.134). This was perhaps best captured by Watson (2001, p.252) in a study entitled Pedagogy Before Technology who stated that “the cart has been placed before the horse”.

The pedagogical models of e-Learning that have been in use in the delivery of e-Learning include: open learning, learning communities and distributed learning (Dabbagh, 2005). Suffices to say that these e-Learning pedagogical models were designed to match the needs and resources of institutions in the developed countries, which were already enjoying the full benefits of mature ICT infrastructures and technological advancements. To borrow them and try to fit them in the Kenyan context will pose further problems since it is characterised by the afore mentioned challenges of ICT infrastructure, inadequate policy frameworks, limited funding and lack of and/or limited ICT capacity.

5. Conclusions, Recommendations and Future Research

From the foregoing review of literature, it is apparent that these challenges inhibit the implementation and provision of e-Learning in Kenya’s institutions of higher education and thus influence the full realisation of the benefits and opportunities that can arise from the adoption of e-Learning in the country’s higher education sector. However, not all challenges are experienced by all the universities in Kenya and where we have common challenges between universities, the experience is not uniform. That is to say that the degree to which they hinder the implementation and provision of e-Learning varies from one institution to the other. According to the e-Learning Africa (2012) Report; in Kenya, the following challenges to e-Learning rank high in this order: limited bandwidth, lack of appropriate ICT training, lack of priority in ICT funding, ICT sustainability and pressures due to poverty. However, each of the identified challenge presents an improvement area in e-Learning and as such need to be addressed. This research recommends that these challenges should be addressed so as to minimize their impact on the implementation and provision of e-Learning in Kenya. National and organisational e-Learning players and researchers need to rise to the occasion and seek ways to address these challenges. The review of these challenges forms the basis upon which further research is underway to solve some of these challenges. This paper is therefore part of an ongoing PhD research; that seeks to establish how the interplay of these problems impacts the implementation and provision of e-Learning in Kenya. It is exploring the extent to which lack of a guiding theory in e-Learning may have contributed to [some of] the identified challenges especially the inadequate/lack of learner support, interactivity and collaboration in e-Learning. The research is also seeking to establish the contributions and shortcoming of the CLTs as applied to e-Learning. The main aim of the research is to develop an e-learning theory for interaction and collaboration using the Constructivist Grounded Theory (GT) Methodology proposed by Charmaz (2014), and it is now in the data collection and analysis stage.

Acknowledgements

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References


## Appendix I: Literature Review Materials

<table>
<thead>
<tr>
<th>Key Word(s)</th>
<th>Title of Reviewed Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>e-Learning in Kenya</td>
<td>Towards an Education Framework: Synchronous and Asynchronous e-Learning Cases</td>
</tr>
<tr>
<td>Open and Distance Education as a Strategy of Improving Higher Education in the 21st Century in Kenya - A Case Study of University of Nairobi</td>
<td></td>
</tr>
<tr>
<td>e-Learning, Opportunities, Benefits, Advantages, Successes, Challenges, Disadvantages and Failures in Kenya</td>
<td>e-Learning in Public Institutions in Kenya: Implementation Challenges</td>
</tr>
<tr>
<td>Challenges Affecting Adoption of e-Learning in Public Universities in Kenya</td>
<td></td>
</tr>
<tr>
<td>Challenges of Implementing e-Learning in Kenya: A Case of Kenyan Public Universities</td>
<td></td>
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<tr>
<td>e-Learning in Kenyan Universities: Preconditions for Successful Implementation</td>
<td></td>
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<tr>
<td>The Role of e-Learning, the Advantages and Disadvantages of its Adoption in Higher Education</td>
<td></td>
</tr>
<tr>
<td>e-Learning, Opportunities, Benefits, Advantages, Successes, Challenges, Disadvantages and Failures in Developing Countries</td>
<td>Recurring Issues Encountered by Distance Educators in Developing and Emerging Nations</td>
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<tr>
<td>Issues of Adoption: Have e-Learning Management Systems Fulfilled their Potential in Developing Countries?</td>
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<tr>
<td>e-Learning in Africa: Challenges, Priorities, and Future Direction</td>
<td></td>
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<tr>
<td>A Conceptual System Architecture for Cloud-Based e-Learning Systems for Higher Education in India</td>
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<tr>
<td>Opportunities and Challenges for Adopting Cloud Computing at Universities in Developing Countries</td>
<td></td>
</tr>
<tr>
<td>Sustainable e-Learning: Towards a Coherent Body of Knowledge</td>
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<tr>
<td>e-Learning Pedagogical Issues in Kenya</td>
<td>Pedagogical Models of E-Learning</td>
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<tr>
<td>Delivery of Open Distance and e-Learning in Kenya</td>
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<tr>
<td>Does Online Education Need a Special Pedagogy?</td>
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<tr>
<td>Pedagogy Before Technology: Rethinking the Relationship between ICT and Teaching</td>
<td></td>
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<tr>
<td>The Theory of Connectivism: Can It Explain and Guide Learning in the Digital Age?</td>
<td></td>
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<tr>
<td>Formulating an e-Learning Theory: A Grounded Theory Approach</td>
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<tr>
<td>A Theory for e-Learning</td>
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<tr>
<td>Is e-Learning Based on Learning Theories?</td>
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<tr>
<td>The e-Learning Setting Circle: First Steps towards Theory Development in E-Learning Research</td>
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<tr>
<td>ICT and e-Learning policy in Kenya</td>
<td>A Policy Framework for Education and Training</td>
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<td>Universities Act 2012 Rev 2015/16</td>
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<td>The Draft National ICT Policy 2016</td>
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<td>Kenyan ICT Infrastructure</td>
<td>Public Sector ICT Survey Report 2018</td>
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<td>E-readiness Survey of Kenyan Universities 2013 Report</td>
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<td>Economic Survey 2019</td>
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<td>The Last Mile Connectivity</td>
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<tr>
<td>Digital Economy Blueprint. Powering Kenya’s Transformation</td>
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<tr>
<td>Quality Assurance in e-Learning in Kenya</td>
<td>Universities Authorized to Operate in Kenya</td>
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<tr>
<td>The Quality and Reputation of Open, Distance and e-Learning: What are the Challenges?</td>
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<tr>
<td>A Model for Evaluating e-Learning Systems Quality in Higher Education in Developing Countries</td>
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<tr>
<td>Implementing Quality e-Learning: Which Way for Higher Education Institutions in Kenya?</td>
<td></td>
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<tr>
<td>Technology Issues in e-Learning in Kenya</td>
<td>The Myths about e-Learning in Higher Education</td>
</tr>
<tr>
<td>The e-Learning Handbook: Past Promises, Present Challenges</td>
<td></td>
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<tr>
<td>Oversold and Underused: Computers in the Classroom.</td>
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</table>
Teaching and Instructional Design Approaches to Enhance Students’ Self-Directed Learning in Blended Learning Environments

Dina Adinda and Najoua Mohib
LISEC EA2310, University of Strasbourg, France
d_adinda@unistra.fr
najoua.mohib@unistra.fr
DOI: 10.34190/EJEL.20.18.2.005

Abstract: Thanks to the combination of face-to-face and online learning which involve the use of Information and Communication Technology (ICT), blended learning has become a popular approach to support learning in higher education. The main purpose of this study is to identify the teaching and instructional design approaches adopted by lecturers within blended learning environments, and to analyse their effects on students’ self-directed learning. The sample involves 18 lecturers and their undergraduate students (n = 294) undertaking a blended course in one French university. This research utilised a mixed method approach for data collection, including questionnaires and observations. Firstly, lecturers were invited to declare their teaching approaches and the configuration of their blended learning environments by completing two online questionnaires. Secondly, both face-to-face and online observations were conducted with the lecturers to identify the specificity of their instructional design activities. A pre-post questionnaire was also used to measure students’ self-directed learning level. Data collection took place over a period of 6 months during the academic year 2017-2018. The results show that lecturers who adopt student-centred teaching approaches are not necessarily designing their blended learning courses as a student-centred learning environment. Also, the results reveal that students’ self-directed learning is significantly developed only in three out of seven student-centred blended learning courses. Additionally, the results show that lecturers of the students who improved their self-directed level provided online peer review and online forum discussion activities. The findings indicate that further research is needed both to validate the direct relationship between these kinds of pedagogical activities and the self-directed learning, and to determine how blended learning environments can better support collaboration and interaction.

Keywords: Blended learning, teaching approaches, instructional design, self-directed learning, undergraduate students, online discussion forum.

1. Introduction

Since digital technologies are continually being created and disseminated, the demands of the labour market are also evolving continuously. Consequently, education should provide skills needed for 21st century individuals to develop as persons, citizens, and professionals. Rimini and Sipezia (2016) reported for the OECD that self-direction is one of the crucial skills to enable individuals to face the challenges of the digital world. The importance of self-direction has been long ago put forward by Knowles (1975, p. 18) who defined it as a process “in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcome”. For Knowles (1975), people who get into this process learn more and better than those who do not. This idea is still supported by some researchers (Bagheri, et al., 2013) who point out the necessity to help students to improve their self-directed learning skills in order to be successful, both in academic work and in life. With this comes the question: how to improve students’ self-directed learning?

The international literature suggests that blended learning could be considered as a good way to achieve this goal. Although blended learning is defined as combining online and face-to-face instructional strategies (Garrison and Kanuka, 2004; Graham, 2006), many researchers have underlined its benefits for students. Blended learning environments are supposed to enhance students’ engagement (Page, et al., 2017), to increase their motivation (López-Pérez, Pérez-López and Rodríguez-Ariza, 2011), and to improve as well their self-regulated (Barnard, et al., 2009) and self-directed learning skills (Akgunduz and Akinoglu, 2016; Uz and Uzun, 2018). All these positive impacts seem to be one of the reasons for its implementation in higher education (Kintu, Zhu and Kagambe, 2017; Ibrahim, et al., 2017). It is a widely held view that the benefits of blended learning are due to the possibilities given by technology. Lam (2014), for example, argued that the use of multimedia tools in a blended learning environment promotes students’ self-direction in learning. However, Van Laer and Elen

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(2016) and Ibrahim, et al. (2017) found that researches on blended learning mostly examine the impact of technology, leaving aside the pedagogical aspect. The purpose of this study is to explore more fully this issue by analysing the effects of teaching and instructional design approaches on students’ self-directed learning in a blended learning context. While a number of researchers highlight the advantages of blended learning, Poon (2003) states that the quality of learning achievement depends, to a large extent, both on the teachers’ conception of teaching and learning and the type of teaching-learning environment provided. The key research question in this paper is: “what are the effective teaching and instructional design approaches that enhance students’ self-directed learning within a blended learning environment?” The next section presents the literature review followed by the methodology (participants and research design) and the findings. The paper ends with a discussion and a conclusion.

2. Literature review

2.1 Blended learning instructional approach

Blended learning can be defined as an instructional teaching approach that combines online and face-to-face teaching and learning sessions (Boelens, et al., 2015). This definition is generally shared by other researchers (Horn and Staker, 2015) although various definitions depending on the context exist (Graham, 2006). For Garrison and Kanuka (2004), the effective combination of the two instructional methods is the main challenge. Some researchers (Peraya, et al., 2012; Horn and Stakers, 2015) highlight the importance of articulating online and face-to-face teaching to enable students to control their activities. While Graham (2013, p.23) claims that theoretical frameworks are helpful to “guide practice”, Lebrun, et al. (2014, pp.64-71) suggest a typology of 6 configurations of blended learning environments: “scene”, “screen”, “cockpit”, “crew”, “metro” and “ecosystem”. All these configurations have been classified into two instructional design approaches: teacher-centred and student-centred learning. Table 1 gives a description of each configuration.

Table 1: A typology of blended learning environment (Peraya and Peltier, 2012; Peraya, Charlier and Deschryver 2014)

<table>
<thead>
<tr>
<th>Instructional design approach</th>
<th>Configuration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher-centred approach (SCA)</td>
<td>1. Scene</td>
<td>Content-oriented configuration. The online environment is composed principally of textual resources, which are used to support the face-to-face course.</td>
</tr>
<tr>
<td></td>
<td>2. Screen</td>
<td>Content-oriented configuration. The online environment is used to support the face-to-face course. The resources provided online are composed of textual and numerous multimedia resources.</td>
</tr>
<tr>
<td></td>
<td>3. Cockpit</td>
<td>The online management tools are used to allow students to manage their learning. Several reflexive activities are also provided.</td>
</tr>
<tr>
<td>Student-centred approach (SCA)</td>
<td>4. Crew</td>
<td>This model focuses on building knowledge and supporting interpersonal interaction.</td>
</tr>
<tr>
<td></td>
<td>5. Metro</td>
<td>This model fosters students’ freedom of choice. It provides a possibility for students to access external resources, offers mentoring, and supports interaction among students.</td>
</tr>
<tr>
<td></td>
<td>6. Ecosystem</td>
<td>This model is characterized by the exploitation of a large number of technological and educational possibilities. It provides, for example, a possibility for students to choose their own learning path.</td>
</tr>
</tbody>
</table>

This typology has been developed through a European project “HY SUP” (2009-2012) that aimed to both describe the blended learning environments designed in Higher Education (Belgium, France, Luxembourg, Switzerland) and to analyse the impact of blended learning practices on the learning-teaching process. Peraya, Charlier and Deschryver (2014) have identified 5 pedagogical dimensions (see Table 2) for each blended learning environment as follows: “combination” which refers to inter-mixing online and face-to-face strategies (1), “mediatisation” defined in terms of e-learning and instructional design (2), “mediation” related to the effects of media on behaviours (3), “teacher and student mentoring” including cognitive, metacognitive and motivational components (4), and “degree of openness” or “flexibility” that makes it possible for students to select the way of learning and the resources they need and to interact with the external actors (5).
Table 2: Pedagogical dimensions and components of blended learning environments (Peraya and Peltier, 2012; Lebrun et al., 2014)

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Constitutive components</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Combination</td>
<td>Students’ participation in face-to-face sessions</td>
</tr>
<tr>
<td></td>
<td>Students’ participation in the online platform</td>
</tr>
<tr>
<td>2. Mediation</td>
<td>Provision of learning tools</td>
</tr>
<tr>
<td></td>
<td>Provision of management, communication, and interaction tools</td>
</tr>
<tr>
<td></td>
<td>Resources in multimedia format</td>
</tr>
<tr>
<td></td>
<td>Works in multimedia form</td>
</tr>
<tr>
<td></td>
<td>Synchronous communication and collaboration tools used</td>
</tr>
<tr>
<td></td>
<td>Possibility provided to students to comment and annotate documents</td>
</tr>
<tr>
<td>3. Mediation</td>
<td>Reflexive and relational objectives</td>
</tr>
<tr>
<td>4. Teacher and student</td>
<td>Methodological supports provided by the teacher</td>
</tr>
<tr>
<td>mentoring</td>
<td>Metacognitive supports provided by the teacher</td>
</tr>
<tr>
<td></td>
<td>Peer-support</td>
</tr>
<tr>
<td>5. Degree of openness or</td>
<td>Freedom of choice of learning methods</td>
</tr>
<tr>
<td>flexibility</td>
<td>Use of resources and external actors</td>
</tr>
</tbody>
</table>

The six “HY SUP” typology is very popular in the French-speaking research area and gave rise to several publications (see project website HY-SUP) revealing that student-centred approaches have positive effects on students’ engagement and motivation in the blended learning context. However, Peraya, Charlier and Deschryver (2014) recognize that further researches need to be conducted to know more about the impacts of the 6 configurations of blended learning environments on the learning process. For example, no evidence has been given yet to declare with Jézégou (2014) that student-centred blended learning approach (“crew”, “metro”, “ecosystem” configurations) encourage students to take control of their own learning. If this typology is very interesting to keep, it is focused only on the instructional design approach. Therefore, it is also important to take into account the teaching approaches regarding their potential effects on students’ learning outcomes (Gerbic, 2011).

2.2 Teaching approaches

For Kember (1997) and many others (Trigwell, Prosser and Taylor, 1994; Trigwell, Prosser and Waterhouse, 1999; Prosser, et al., 2005), teaching approaches are related to conceptions of teaching, which are influenced by their beliefs about teaching and their perception of their teaching environment. These approaches can be distinguished in two ways: “teacher-centred/content” and “student-centred/learning” (Kember, 1997). All these categories are summarised below in the Table 3.

Trigwell, Prosser and Waterhouse (1999) established a relationship between teachers’ approaches to teaching and students’ approaches to learning. For these authors, teacher-centred approach is related to a surface approach, whereas student-centred approach is associated with a deep approach to learning. Similarly, Kember, Leung and Mcnaught (2008) observe that teachers’ approaches focused on transmitting knowledge and information are more likely to promote surface learning approaches, whereas teachers’ approaches focused on supporting a greater level of students’ interaction and discussion tend to promote deep learning approaches. On the one hand, when the teachers focus on their teaching, they pay more attention to knowledge transfer and students’ notes. On the other hand, when they focus on students, they provide opportunities for active learning in which students are actively involved in their learning, not only to listen and receive knowledge transferred, but also to engage in “higher-order thinking tasks” like discussion, solving problems, analysis, synthesis, evaluation (Bonwell and Eison, 1991, p.5), and to think about their own actions or activities (Prince, 2004). According to Kane (2004), active learning also supports critical thinking, fosters autonomy, and ensures that students become the actor of their learning. In fact, many studies establish a close link between student-centred teaching approaches and self-directed learning (Plush and Kehrwald, 2014; Horn and Staker, 2015).
Table 3: A model of teachers’ approaches (adapted from Kember, 1997; Kember and Kwan, 2000)

<table>
<thead>
<tr>
<th>Teachers’ approaches</th>
<th>Conceptions of teaching</th>
<th>Teaching activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content-centred or Teacher-centred approach (TCA)</td>
<td>Imparting information</td>
<td>Teachers’ objective is to transfer all the information that students need. Examples of activity: lecture-based teaching or &quot;chalk and talk.&quot;</td>
</tr>
<tr>
<td>Content-centred or Teacher-centred approach (TCA)</td>
<td>Transmitting structured knowledge</td>
<td>Teachers’ objective is to transfer the information and to help students to understand it (students are informed of the lesson plan; teachers use examples and analogies). Examples of activity: lecture-based teaching with a structured guide.</td>
</tr>
<tr>
<td>Learning-centred or Student-centred approach (SCA)</td>
<td>Facilitating understanding</td>
<td>Teachers’ objective is to help students to learn by themselves and to “become more effective as a teacher.” Examples of activity: debate, tutorial, project-based learning, working in small groups.</td>
</tr>
<tr>
<td></td>
<td>Conceptual change/intellectual development</td>
<td>Teachers’ objective is to promote the evolution of students’ understanding and perspective of the subject matter. Their aim is to become “more effective in facilitating students’ learning.” Examples of activity: debate, reflexive discussions, problem-based learning.</td>
</tr>
</tbody>
</table>

2.3 Self-directed learning

The term of “self-directed learning” is grounded in two concepts: self-determination and self-regulation (Carré, 2003). In this perspective, learning involves motivation, control, and goal setting. The self-determination (hereafter SDT) is a core concept widely used in educational research to explain learner motivation defined as a process in which an individual seeks to satisfy one of his/her three fundamental human innate needs: competence, relatedness, and autonomy (Deci and Ryan, 2000a). Self-directed learning (hereafter SDL) and self-regulated learning (hereafter SRL) are usually used as synonyms (Loyens, Magda and Rikers, 2008; Saks and Leijen, 2014). Cosnfroy and Carré (2014, pp.2-3) argue that both concepts are “close neighbours” and may be complementary in terms of their characteristics (learners, approaches, and scope). Although similarities are more emphasised than differences (Loyens, Magda and Rikers, 2008), there are some specific definitions due mainly to the various theoretical frameworks (Noël and Cartier, 2016). From the social cognitive perspective, self-regulation "refers to self-generated thoughts, feelings, and actions that are planned and cyclically adapted to the attainment of personal goals” (Zimmerman, 2005, p. 14). As a result, self-regulated students use processes such as goal setting, self-evaluation and learning strategies, that can be taught (Zimmerman, 2002). Similarly, Cosnfroy and Carré (2014) explain that SDL can be described as a process in which learners are able to diagnose their learning needs, formulate their learning goals, identify their resources for learning, choose and implement their learning strategies, and evaluate learning outcomes. As stated by Loyens, Magda and Rikers (2008), followed by Cosnfroy and Carré (2014), SDL both requires SRL and implies more student control, especially at the beginning of the learning process. To sum up, to become a self-directed learner, students need to practice self-regulation as well as self-determination (Deci and Ryan, 2000b).

The SDL concept has attracted widespread interest both in the research domain and as professional practices (teachers, adult educators, policy-makers, ...) over the past few years. SDL is currently considered as playing a crucial role in learning processes especially in deep-level processing (Candy, 1991). The existing researches on SDL have demonstrated correlations with performance outcomes and academic achievement, especially in online environments (Dabbagh, 2007; Lounsbury, et al., 2009; López-Pérez, Pérez-López and Rodríguez-Ariza, 2011). It is argued that open and distance environments are designed to foster self-direction by giving a student the freedom to choose how and what to learn as well as encouraging social interactions between learners (Carré, et al., 2011). Recent research suggests also that blended learning environments help students to develop their self-directed learning skills (Sriarunrasme, Techataweewan and Mebusaya, 2015; Uz and Uzun, 2018). However, there are few studies of lecturers’ approaches to teaching in blended learning context and their relationship with approaches of instructional design.

2.4 Research objectives and hypothesis

A number of authors (Loyens, Magda and Rikers, 2008; Van den Akker, et al., 2013) point out that the teachers’ role is to support students to become self-directed learners. As mentioned earlier, two approaches, “the teacher-centred” and “the student-centred” ones, can be identified both for teaching (Trigwell, Prosser and
Taylor, 1994) and blended learning instructional design (Peraya and Peltier, 2012). This study seeks to examine which teaching and instructional design approaches may help students to increase their self-directed learning skills in a blended learning context. Hence, it could conceivably be hypothesised that: firstly, lecturers who adopt student-centred teaching approaches are more likely to design their blended learning courses as a student-centred learning environment; and secondly, student-centred teaching approaches associated with blended student-centred approaches enhance students’ self-directed learning.

3. Methodology

3.1 Participants

The sample consisted of 18 lecturers and 294 undergraduate students enrolled in a blended learning course offered by a French university during the 2017-2018 academic year. A total of eight academic disciplines were represented: sociology, foreign languages, mathematics, economics, law, physics, educational sciences, and communication. All participants (lecturers and students) were briefed on the main aim of the study and signed informed consent forms in accordance with the guidelines of the university’s Research Ethics Committee. The participants were assured that their response would remain confidential and anonymous. They were also free to withdraw from the study at any stage.

3.2 Research methods

This study used a mixed methods design that combines both quantitative and qualitative approaches. The goal of the mixed methods approach was to gain a deep understanding of the impact of the pedagogical approaches used in blended learning on students’ self-directed learning. Qualitative and quantitative data were collected, through questionnaires, to identify the lecturers’ teaching and instructional design approaches that impact positively the students’ self-directed learning in a blended learning context. Both offline and online classroom observations were also conducted in order to examine the instructional activities offered in the student-centred blended learning environments. The data collection and procedures are described in more details in the following section.

3.3 Data collection

3.3.1 Data Collection from Lecturers

Different instruments (questionnaires and observations) have been used with all the lecturers (n=18). Lecturers were asked, just before their first course, to fill out an online questionnaire: The Approach to Teaching Inventory (ATI) (Trigwell, Prosser and Ginns, 2005). This questionnaire (ATI) seemed to be relevant for this study case because it was developed in order “to explore the relations between a teacher’s approaches to teaching and the approaches to learning of students in the classes of those teachers” (Trigwell and Prosser, 2004, p.416). Another reason which explains the choice of this instrument is that Prosser and Trigwell (2006) consider that teachers’ approaches to teaching are contextual and it can differ from one context to another. In other words, teachers may adopt different approaches in different circumstances (Prosser, et al., 2005). Consequently, it is essential to identify teachers’ approaches in a specific course to understand the intentions and strategies they adopt for their teaching. The original 22-item ATI consisted of 11 items on “conceptual change/student-centred teaching approaches” scale and 11 items on “information-transmission/teacher-centred teaching approach” scale. Each of them, constructed by two subscales ("teaching intention" and "strategy"), was rated on a 5-point Likert scale (from 1: only rarely to 5: almost always). Although ATI is a popular instrument, only a Canadian French translation has been found for the original 16-item ATI (Trigwell and Prosser, 2004). For this work, the original 22-item ATI was translated into French by native speakers with expertise in education. The overall reliability generated for this French version of ATI was 0.815 Cronbach’s alpha. However, the Pearson test conducted to determine the validity of the instrument showed that the correlation of each item to their respective scales was generally strong except for item 2 (r=0.180). The removal of this item didn’t affect the validity of the instrument and the overall Cronbach’s alpha of the 21-item ATI remained good (α= 0.747).

Immediately after the first questionnaire was collected, the lecturers completed a second online questionnaire: the Self-Positioning Tool (SPT) (Deschryver and Charlier, 2012). The SPT has been developed in the HY-SUP European research project to identify configurations of the blended-learning environment, which can be used to analyse the effects on students’ learning and teachers’ professional development. Each lecturer was invited to examine his blended-learning course using the SPT. This questionnaire consisted of 12 closed questions. 6 questions referred to personal data (age, sex, experience, ...), the courses (number of students, level of study,
face to face time) and the learning platform. The 6 other questions aimed to measure the 14 blended learning components described above in the literature review, in order to determine which configuration of blended learning teachers have implemented. These 6 questions were evaluated on a 4-point scale (frequency or attitude). The SPT is only available in French. The validity of the instrument has already been demonstrated by Deschryver and Charlier (2012).

Both online and face-to-face observations were also conducted with the 18 lecturers by the authors over a period of one semester. On the one hand, each face-to-face class was observed twice for 50 minutes. The first observation was scheduled during the pre-test with the students (see section 3.3.2) whereas the second one took place one week before the post-test. An observation instrument was developed especially for this study and showed a good internal consistency (α = 0.747). The instrument comprised four dimensions (directive mentoring style, supporting mentoring style, proactive/reactive interventions, context) and 15 items.

On the second hand, online observations were carried out near the middle of the semester. All the courses were hosted on Moodle. The following aspects were examined in depth: the tools (wiki, forum, chat, ...), the resources (videos, power point slides, articles, ...) and the pedagogical activities (discussion, debate, peer assessment, ...) including the instructions of the lecturers, that were provided for the students to learn. The information collected through both face-to-face and online observations aimed to discern the aspects that can support students’ self-directed learning in a student-centred blended learning environment.

3.3.2 Data Collection from Students

To examine the effects of the teaching and instructional design approaches on students’ SDL in a blended learning environment, a pre- and post-test were conducted using the Self-Directed Learning Readiness Scale (SDLRS) (Guglielmino, 1977). The SDLRS has been designed to measure the degree to which individuals perceive their skills and attitudes necessary for self-directed learning along 8 factors: “self-concept as an effective learner”, “openness to learning opportunities”, “initiative and independence to learning”, “acceptance of responsibility for one’s own learning”, “love of learning”, “creativity”, “Ability to use basic study and problem-solving skills” and “positive orientation to the future” (Field, 1989). The instrument is a 58-item questionnaire with a 5-point scale Likert type response options, ranging from “almost never true” to “almost always true”. The questionnaire has been validated in various contexts and translated into many languages. In the current study, the French-translated version was used. The study was carried out over a semester period and a paper questionnaire was given twice to the students, once during the first face-to-face course (i.e. pre-test) and again before the last one (i.e. post-test). The Cronbach’s alpha coefficient obtained for the overall items of the scale is 0.843, indicating good internal consistency of reliability.

4 Findings

The data gathered from the lecturers through both the questionnaires (ATI and SPT) and the observations (face-to-face and online courses) have been analysed qualitatively whereas the students’ responses were examined by a paired sample t-test.

4.3 Teaching and blended learning instructional approaches

Lecturers’ responses (n= 18) to ATI and SPT questionnaires have been gathered in one table; Table 4 shows that lecturers’ approaches to teaching and to design blended learning may be divergent or convergent. By taking into account the teachers’ teaching approaches and the blended learning instructional approaches, 4 combinations emerged: the student-centred (7 lecturers; B, C, D, F, K, L, P), the teacher-centred (4 lecturers; E, G, H, J), the student/teacher-centred (4 lecturers; A, I, M, N) and the teacher/student-centred (3 lecturers; O, Q, R). These results demonstrate that lecturers who adopt a student-centred teaching approach are not necessarily designing their blended learning courses as a student-centred learning environment. Among the 11 lecturers who use a student-centred teaching approach, 4 of them adopt a teacher-centred blended learning approach while 7 of them adopt a student-centred blended learning approach. Accordingly, the first hypothesis is not fully confirmed.
Table 4: Results from the Approach to Teaching Inventory (ATI) (Trigwell, Prosser and Ginns, 2005) and the Self-Positioning Tool (SPT) (Deschryver and Charlier, 2012)

<table>
<thead>
<tr>
<th>Lecturers ID</th>
<th>Teachers’ teaching approach</th>
<th>Blended learning configuration</th>
<th>Blended learning instructional approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Student-centred</td>
<td>Scene</td>
<td>Teacher-centred</td>
</tr>
<tr>
<td>B</td>
<td>Student-centred</td>
<td>Metro</td>
<td>Student-centred</td>
</tr>
<tr>
<td>C</td>
<td>Student-centred</td>
<td>Metro</td>
<td>Student-centred</td>
</tr>
<tr>
<td>D</td>
<td>Student-centred</td>
<td>Metro</td>
<td>Student-centred</td>
</tr>
<tr>
<td>E</td>
<td>Teacher-centred</td>
<td>Scene</td>
<td>Teacher-centred</td>
</tr>
<tr>
<td>F</td>
<td>Student-centred</td>
<td>Metro</td>
<td>Student-centred</td>
</tr>
<tr>
<td>G</td>
<td>Teacher-centred</td>
<td>Screen</td>
<td>Teacher-centred</td>
</tr>
<tr>
<td>H</td>
<td>Teacher-centred</td>
<td>Scene</td>
<td>Teacher-centred</td>
</tr>
<tr>
<td>I</td>
<td>Student-centred</td>
<td>Screen</td>
<td>Teacher-centred</td>
</tr>
<tr>
<td>J</td>
<td>Teacher-centred</td>
<td>Screen</td>
<td>Teacher-centred</td>
</tr>
<tr>
<td>K</td>
<td>Student-centred</td>
<td>Metro</td>
<td>Student-centred</td>
</tr>
<tr>
<td>L</td>
<td>Student-centred</td>
<td>Metro</td>
<td>Student-centred</td>
</tr>
<tr>
<td>M</td>
<td>Student-centred</td>
<td>Cockpit</td>
<td>Teacher-centred</td>
</tr>
<tr>
<td>N</td>
<td>Student-centred</td>
<td>Cockpit</td>
<td>Teacher-centred</td>
</tr>
<tr>
<td>O</td>
<td>Teacher-centred</td>
<td>Crew</td>
<td>Student-centred</td>
</tr>
<tr>
<td>P</td>
<td>Student-centred</td>
<td>Metro</td>
<td>Student-centred</td>
</tr>
<tr>
<td>Q</td>
<td>Teacher-centred</td>
<td>Metro</td>
<td>Student-centred</td>
</tr>
<tr>
<td>R</td>
<td>Teacher-centred</td>
<td>Ecosystem</td>
<td>Student-centred</td>
</tr>
</tbody>
</table>

In addition, the 6 configurations of blended learning environments, as described above by Peraya, et al. (2012) have been mentioned by the lecturers. Table 5 below indicates that the most represented configuration is "Metro", which referred to a student-centred blended learning instructional approach. As well as to support students’ active participation in online and face-to-face session, Deschryver and Charlier (2012) state that this configuration of blended learning environment aims to provide students’ freedom of choice by giving them the possibility to access external resources, offering human mentoring and supporting active interactions through peer reviews, peer-mentoring or mentoring from tutor/lecturer. The supports provided can be managed in the online platform or in face-to-face sessions through various actions (online forum discussion, wiki, group project, online or offline individual peer review, etc.).

Table 5: Frequencies of blended learning instructional approaches from the lecturers’ responses to the Self-Positioning Tool (SPT) (Deschryver and Charlier, 2012)

<table>
<thead>
<tr>
<th>Blended learning instructional approach</th>
<th>Blended learning configuration</th>
<th>Frequency (N=18)</th>
<th>Percentage per type</th>
<th>Percentage per approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching-centred (A, E, G, H, I, J, M, N)</td>
<td>Scene</td>
<td>3</td>
<td>17%</td>
<td>46%</td>
</tr>
<tr>
<td></td>
<td>Screen</td>
<td>3</td>
<td>17%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cockpit</td>
<td>2</td>
<td>12%</td>
<td></td>
</tr>
<tr>
<td>Student-centred (B, C, D, F, K, L, O, P, Q, R)</td>
<td>Crew</td>
<td>1</td>
<td>5%</td>
<td>54%</td>
</tr>
<tr>
<td></td>
<td>Metro</td>
<td>8</td>
<td>44%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ecosystem</td>
<td>1</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N = 18</td>
<td></td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

In order to examine the second hypothesis that student-centred teaching and blended learning instructional approaches would enhance students’ self-directed learning, the following analysis is focused only on the student-centred approach, i.e. lecturers who declare that they adopt both student-centred approach to teaching and to design their blended learning course. Table 6 describes the specific instructional activities adopted by the 7 student-centred lecturers that have been observed by the authors of the present paper. All the blended learning courses refer to the “Metro” configuration, which is defined by Deschryver and Charlier (2012, p.59) as
a “learning configuration focused on various forms of support and tending toward openness”. According to these authors, the specificity of the “Metro” blended learning configuration is the possibility to access external resources and human mentoring provided by lecturers and to receive peer supports. According to the description presented below, all courses identified as “Metro” allow students to choose and to access external resources.

Table 6: Results from the face-to-face and online observations of student-centred lecturers (n=7)

<table>
<thead>
<tr>
<th>Lecturers ID</th>
<th>Teachers’ Teaching approaches</th>
<th>Blended Learning configuration and Instructional approach</th>
<th>Specific instructional activities (online and face-to-face observations)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Student-centred</td>
<td>Metro (SC)</td>
<td>Students are free to choose and to access external resources to enrich their knowledge and to complete the exercises on Moodle. The knowledge transfer in face-to-face sessions are mostly managed through discussions and project presentations. Teaching is based on both individual and group project-based learning.</td>
</tr>
<tr>
<td>C</td>
<td>Student-centred</td>
<td>Metro (SC)</td>
<td>Students are encouraged to access external resources to enrich their knowledge and to complete the exercises on Moodle. Most of the course contents are delivered online. The face-to-face sessions are intended for a question and answer section or discussions to support students’ critical thinking, reflexivity and their understanding of the subject learned. However, in some conditions (such as students’ passive participation in the discussion), the lecturer also transfers the knowledge in a traditional lecture format.</td>
</tr>
<tr>
<td>D</td>
<td>Student-centred</td>
<td>Metro (SC)</td>
<td>Students can participate in an event organised by external persons (optional activity). An online news and announcement is used to provide information about the learning activities (task deadlines, academic calendar, …). Small groups discussions and peer review activities are organised during face-to-face sessions.</td>
</tr>
<tr>
<td>F</td>
<td>Student-centred</td>
<td>Metro (SC)</td>
<td>Students are free to choose and to access external resources. An online discussion forum is available for communication. The students are encouraged to ask questions and to read the answers posted by the lecturer before face-to-face sessions. The face-to-face sessions are intended for a question and answer section or discussions to support students’ critical thinking, reflexivity and their understanding of the subject learned.</td>
</tr>
<tr>
<td>K</td>
<td>Student-centred</td>
<td>Metro (SC)</td>
<td>Students are free to choose and to access external resources. Teaching is based on project-based learning. To accomplish the task given, students are encouraged to ask questions via an online discussion forum in which the lecturer provides instructions and detailed information. The face-to-face sessions are intended for discussions to support the progress of the project, students’ critical thinking, and their reflexivity. Peer review activities are organised regularly, in face-to-face and online platforms, to assess the quality of the project submitted.</td>
</tr>
<tr>
<td>L</td>
<td>Student-centred</td>
<td>Metro (SC)</td>
<td>Students are free to choose and to access external resources provided by the lecturer on Moodle. Teaching is also based on both individual and group project-based learning. The transfer of knowledge in face-to-face sessions is managed through the exercises, the question and answer section, and presentations. Peer review activities are organised during face-to-face sessions.</td>
</tr>
<tr>
<td>P</td>
<td>Student-centred</td>
<td>Metro (SC)</td>
<td>Students are free to choose and to access external resources. An online discussion forum is available for communication with the lecturer and fellow students. It is used to discuss and debate students’ understanding of the subject matter. Peer review activities take place in the online discussion forum and during face-to-face sessions.</td>
</tr>
</tbody>
</table>

Table 7 indicates that seven categories of instructional activities can be distinguished: (1) face-to-face discussions to encourage students’ reflexivity, critical thinking and understanding (2) face-to-face peer review to enhance collaboration and interactions between students, (3) face-to-face presentations to assess the value of students’ knowledge, (4) online discussion forum to support both interaction and tasks achievement or to
provide information, (5) online peer-review to enhance collaboration and interaction, (6) online news and announcement to provide additional information and (7) project-based-learning for problem solving and collaboration.

Table 7: Common and divergent specific instructional activities of student-centred lecturers (n=7)

<table>
<thead>
<tr>
<th>Specific instructional activities</th>
<th>Lecturer B</th>
<th>Lecturer C</th>
<th>Lecturer D</th>
<th>Lecturer F</th>
<th>Lecturer K</th>
<th>Lecturer L</th>
<th>Lecturer P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face-to-face discussions</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Face-to-face peer review</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Face to face presentations</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Online discussion forum</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Online peer review</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Online news and announcement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Project based learning</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

4.4 Students’ self-directed learning in student-centred blended learning courses

The following analysis deals only with the students (n = 152) who were enrolled in the courses taught by the 7 student-centred lecturers (B, C, D, F, K, L, P). All of students responded to both pre and post-test questionnaires. A paired sample t-test was performed to determine the significance of the difference between pre and post-test in order to identify students’ progress regarding their level of SDL skills.

Table 8: Paired samples T-test results of Students’ Self-Directed Learning Readiness Scale (Guglielmino, 1977)

<table>
<thead>
<tr>
<th>Lecturers ID</th>
<th>Pre-test</th>
<th>Post-test</th>
<th>p-value</th>
<th>Students’ t-test results</th>
<th>Number of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>216.8</td>
<td>216.4</td>
<td>0.530</td>
<td>ns</td>
<td>16</td>
</tr>
<tr>
<td>C</td>
<td>210.9</td>
<td>210.6</td>
<td>0.565</td>
<td>ns</td>
<td>62</td>
</tr>
<tr>
<td>D</td>
<td>226.1</td>
<td>226.1</td>
<td>0.500</td>
<td>ns</td>
<td>8</td>
</tr>
<tr>
<td>F</td>
<td>214.0</td>
<td>218.1</td>
<td>0.075</td>
<td>t=1.505; p&lt; .10, df 18</td>
<td>19</td>
</tr>
<tr>
<td>K</td>
<td>208.7</td>
<td>215.9</td>
<td>0.011</td>
<td>t=2.577; p&lt; .05, df 13</td>
<td>14</td>
</tr>
<tr>
<td>L</td>
<td>198.4</td>
<td>201.1</td>
<td>0.209</td>
<td>ns</td>
<td>18</td>
</tr>
<tr>
<td>P</td>
<td>201.5</td>
<td>232.6</td>
<td>&lt;.001</td>
<td>t=-7.684; p&lt; .001, df 14</td>
<td>15</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>152</td>
</tr>
</tbody>
</table>

Referring to the average pre-test results of each lecturer, it is shown that the majority of students scored ‘average’ and ‘below’ on the SDLRS. As noted in Table 8, all student groups had not made progress in SDL. The collected data shows that 3 out of 7 student groups had made significant improvement: namely students of lecturers F (p-value = 0.075 < 0.10), K (p-value = 0.011 < 0.05) and P (p-value <0.001). Consequently, the second hypothesis of this study is partially supported.

According to the face-to-face and online observations that allow identification of the specific instructional activities in the blended courses (see Table 7), it appears that lecturers who use peer review activities (D, L) and discussions (B, C, D) only in face-to-face settings do not contribute to enhancing their students’ self-directed learning level. On the contrast, students of the lecturers who have offered the same activities online (peer review for K; discussion for F, K, P) showed progress in their self-directed learning. In addition, it is interesting to note that lecturers of the students who improved this ability used an online peer review (K, P) and an online discussion forum (F, K, P). For lecturer F, for example, students were invited to ask questions about the lecture content and to read the answers posted by the lecturer on the forum before discussing the subject matter in face-to-face meetings. On the other hand, lecturer K used the forum as a communication tool for him and his students for project-based learning. During face-to-face sessions, he regularly arranged peer-review activities to check students’ progress regarding their project. Lecturers K and P managed also peer-review activities. However, this activity did not only take place during face-to-face meetings but also along with online learning sessions. Furthermore, for lecturer P, the online discussion forum was also used to debate and discuss topics as well as furthering students’ understanding of concepts learned. In brief, among the three lecturers who used the discussion forum for their course, it appeared that this communication tool was used in various ways: from a simple online communication tool between students and their lecturer to an online debating place for students.

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It can thus be suggested that the online peer review and the online discussion forum in a blended learning environment may help to enhance students’ self-directed learning level. This is discussed in the next section.

5 Discussion and conclusion

This study aimed to examine the teaching and the instructional design approaches that enhance students’ self-directed learning within a blended learning environment. Returning to the first hypothesis posed at the beginning of this study, it is possible to state that lecturers who adopt student-centred teaching approaches do not always design student-centred blended learning. It was also shown that teaching approaches and blended learning instructional approaches do not converge all the time. These results match those observed by De Kock, Sleegers and Voeten (2004) and Smit, de Brabander and Martens (2014) who argue that learning environments are seldom entirely teacher-centred or student-centred, but take on hybrid forms. As a result, the first hypothesis of this study is not fully confirmed. Regarding the second hypothesis, the data obtained through face-to-face and online observations show that student-centred blended learning environments focus on building knowledge, supporting interpersonal interactions, providing the possibility of accessing external resources, and offering technical and human supports. Whereas social interaction between learners is supposed to support self-directed learning in an online learning environment (Carré, et al., 2011), this study has found that students have significantly developed this ability only in three out of seven student-centred blended learning courses. Consequently, the second hypothesis is partially supported.

This research has also shown that supporting students’ critical thinking, reflexivity and their understanding of the subject learned is not enough to help them to become self-directed learners. Indeed, it seems to be important to manage online interaction to enhance students’ self-directed learning in a blended learning environment. The online peer review and the online discussion forum seem to provide potential for student learning. This also accords with previous studies (Trautmann et al., 2003; Baran and Correia, 2009) which pointed out that online peer review activities enable students to take responsibility for their own learning. The benefits of the use of an online discussion forum have also been underlined by Amand, Muliira and Fronda (2013). Their work has shown that the online discussion forum supports peer-review and feedback, which help students to diagnose their learning needs and determine their learning plan. According to Biasutti (2017), discussion forums support learning by enabling students to interact and confront their ideas and by activating processes of inferencing, evaluating and organizing. All these results may indicate that the potential positive effect of the online peer review and the online discussion forum on the development of students’ self-directed learning can be explained by the interactions provided through the reflexive activities as well as the formative feedback. By using the online peer-review or the discussion forum, lecturers offer collaborative learning through multiple channels available on the online platform. In this present study, the discussion forum was using a simple online communication tool between students and their lecturer as a place for debate for students. As a matter of fact, the peer review activities and the discussion forum have been integrated into a learning scenario, not only to increase students’ active participation online, but also to enhance active learning in face-to-face sessions. However, further work is required to establish this.

Finally, a number of important limitations need to be considered. First, the size of the sample is not large enough to get generalisable results for broader blended learning contexts. Second, students should have been interviewed in order to understand how they use the tools and the resources provided by lecturers in their learning environment. To conclude, further research needs to examine more closely the relationships between student’s self-directed learning and the online peer review and discussion forum activities. In the meantime, this work highlights the importance of pedagogical design and convinced us that online and face-to-face interaction and collaboration between students should be strongly articulated when it comes to designing a blended learning environment.

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The Impact of Computer Self Efficacy on Student Engagement and Group Satisfaction in Online Business Courses

Colleen Carraher Wolverton, Brandi N. Guidry Hollier and Patricia A. Lanier
Department of Management, B.I. Moody III College of Business Administration
University of Louisiana at Lafayette, Louisiana
wolverton@louisiana.edu
brandi.guidryhollier@louisiana.edu
patricia.lanier@louisiana.edu
DOI: 10.34190/EJEL.20.18.2.006

Abstract: As countless regional, national, and international accrediting bodies continue to employ student engagement measures as mechanisms for quality assurance, universities become more intent on achieving this important gauge of student success. Specifically, the growth in enrollment in distance learning programs adds a unique level of complexity leading researchers to search for ways to increase engagement in the online course environment. Organizations continue to value teamwork and many instructors have incorporated group work into their online courses to teach students this important skill. The present study examines the impact of student engagement on group satisfaction. Furthermore, this research places student engagement at the center of a structural equation model to determine both predictors and outcomes of this important element of student learning. Specifically, this analysis examines whether students’ perceptions of computer self-efficacy impact student engagement and group satisfaction in online business courses. Our findings indicate that computer self-efficacy leads to student engagement and, further, that student engagement influences group satisfaction. Importantly, the relationship between student engagement and group satisfaction is mediated by group expectations. Discussions of findings can be utilized to understand the factors that lead to student engagement and its outcomes in online courses.

Keywords: Student engagement, online information systems courses, course design, groups, expectations, computer self-efficacy

1. Introduction

As many regional, national, and international accrediting bodies continue to employ student engagement measures as mechanisms for quality assurance, universities become more intent on achieving this important gauge of student success. There exists some lack of consensus in the literature regarding the conceptualization of this multi-faceted term; however, for the purposes of this research, a definition of engagement is adopted and is reflective of the variable’s complex nature. Engagement is defined as “a positive, fulfilling, work-related state of mind characterized by vigor, dedication, and absorption” (Schaufeli, et al., 2002, p.74). Student engagement is correlated with multiple measures of student success. Specifically, increased levels of student engagement have been linked to student retention (Tinto, 1975), graduation rates (Lee, 2014), classroom motivation (Flynn, 2014), and course achievement (Kuh, et al., 2006). Moreover, the growth in enrollment in distance learning programs adds a unique level of complexity to the pursuit of increased student engagement and these important learning metrics.

Online enrollments are consistently growing at a faster pace than overall enrollments in higher education, particularly in public institutions (Babson College, 2016). Specifically, the number of AACSB accredited schools offering fully online MBA programs increased 48% from 2011 to 2016 (Nelson, 2017), and currently, more than half (283) of all AACSB-accredited business schools offer online MBA programs. Unfortunately, despite the continued growth in demand for distance education, attrition rates are frequently 10%–20% higher for online courses than for traditional classroom settings (Holder, 2007; Nash, 2005). Researchers have cited issues of communication (Rausch and Crawford, 2012), isolation (Bocchi, Eastman and Swift, 2004), reduced motivation (Phipps and Merisotis, 1999; Street, 2010) as well as lack of student engagement (see, for example, Christophel, 1990; Klein, Noe and Wang, 2006) as possible reasons for these higher attrition rates. Furthermore, research indicates that sustained student engagement is a primary factor in ensuring student success in an online learning environment (Carraher Wolverton 2018; Fredrickson, 2015; Phipps and Merisotis, 1999; Street, 2010). Thus, given the accrediting bodies’ mandates and the growth in online education, this study seeks to provide a better understanding of what drives student engagement and its influence on student groups in an online learning environment.
environment. To this end, computer self-efficacy and perceptions related to group expectations and satisfaction were examined.

2. Literature review

While several studies have addressed the causes of higher attrition rates in online learning contexts (see for example, Angelino, et al., 2007; Chyung, 2001; Jones, Moeeni and Ruby, 2005; Liu, et al., 2010; Schwarz and Zhu, 2015), the distance learning research stream has yet to conclude whether this can be attributed to students' perceptions of self or their work group. In other words, does a student’s perceptions of their technological abilities influence their level of engagement in an online course? Furthermore, in what way does student engagement impact their perceptions related to group expectations and satisfaction in this environment?

2.1 Computer Self-Efficacy

This research draws upon Bandura’s (1986) social cognitive theory and his conceptualization of self-efficacy, and the work of Compeau and Higgins (1995) in establishing the foundation for the use of computer self-efficacy (CSE) to represent a student’s individual performance perceptions. With consideration of Bandura’s theoretical model, Compeau and Higgins (1995) define CSE as “a judgment of one's capability to use a computer” (p.192), which has since been expanded into various contexts (i.e., Carraher Wolverton, et al., 2019; Dang, et al., 2016; Paradice, et al., 2018).

Researchers began studying this construct in the context of online learning environments approximately a decade ago. Lim (2001) found CSE was significantly correlated with student satisfaction in online learning. Moreover, CSE has been shown to exert a positive and significant impact on online learning readiness of students (Achukwu, et al., 2015), and a positive influence on performance expectations in blended e-learning system environments (Wu, Tennyson and Hsia, 2010). However, there are conflicting findings regarding the relationship between CSE and student engagement. In their 2012 study of online students, Sun and Rueda found that although situational interest and self-regulation were found to be significantly correlated with three factors of engagement (behavioral, emotional, and cognitive), CSE did not appear to be associated with any of the engagement constructs.

Contrarily, Pellas (2014) reported that CSE, metacognitive self-regulation, and self-esteem in online courses were positively correlated with several aspects of student engagement including cognitive and emotional factors. Also, learning engagement has been shown to be positively related to computer self-efficacy Chen (2017). More specifically, Laird and Kuh (2005) discovered that a higher level of computer self-efficacy is related to a higher level of information and communications technology (ICT) engagement. Finally, several studies suggest that a student’s belief about their abilities related to the use of technologies is a critical factor in determining the level at which they will engage in learning environments that are technologically integrated (see, for example, Tzeng, 2009).

These contradictory findings present inconsistencies in the literature, and this study seeks to further clarify this relationship.

2.2 Student Engagement

As student engagement has been linked to various measures of student success (e.g., student learning and student satisfaction), evidence and examples of this construct are often required as part of the accreditation reporting process. Thus, institutions of higher learning frequently examine aspects of engagement with a focus on improving learning outcomes (Kuh, et al., 2006). In response, researchers have suggested several methods for increasing student engagement in an online setting. For instance, Nelson Laird and Kuh (2005) and Thurmond and Wambach (2004) demonstrated that collaborative work and information technology play an important role in promoting student engagement. In addition, research indicates that the use of visual programming tools (Dekhane, Xu and Tsoi, 2013), case studies (Taneja, 2014), and simulations (Riordan, Hine and Smith, 2017) improve levels of student interaction and engagement in online courses.

Additionally, generational research on the personality characteristics of our current student bodies suggests that these individuals equate their student experience with higher levels of digital engagement (Preville, 2018). Some researchers suggest that to leverage student engagement and enthusiasm, online instructors need to possess an appreciation of the differences in how students learn and the variables that contribute to these differing
characteristics (Coy, Marino and Serianni, 2014). Therefore, online learning environments can create barriers or opportunities for student engagement based on individual student traits. Regardless of the method suggested, tool employed, or theory proposed, all researchers agree that student engagement is an important, and often elusive, objective in online learning environments.

2.3 Group Performance Interactions

Likewise, group activities have been found to exhibit positive outcomes in distance learning courses, such as improved performance, critical thinking, and interaction (Bliss and Lawrence, 2009). Collaborative work results in positive outcomes in online contexts, with some research reporting increased student engagement as a result of shared learning efforts (see, for example, Nelson Laird and Kuh, 2005; Robinson and Hullinger, 2008). In addition, researchers indicate that instructors often find distance learning students eager to work in teams, and instructors even experience complaints when a course does not offer adequate opportunities for group work (Williams, Duray and Reddy, 2006). Further, limiting the interaction amongst students in an online setting frequently results in feelings of isolation that may lead to attrition (Yuan and Kim, 2014). Muilenburg and Berge (2005) studied social interaction in online learning environments and found that a strong correlation exists between learning satisfaction and social interaction. Thus, employing team-based approaches to distance learning has the potential to improve levels of satisfaction, especially as student interaction increases (Williams, Duray and Reddy, 2006). Yet, it is also important for this outcome to ensure students have realistic expectations for group interactions. In fact, Zhu and Schwarz (2015) found that group expectations impact both group satisfaction and student engagement. Therefore, since extant research finds that group work is highly beneficial to the online learning experience (see, for example, Palloff and Pratt, 2005), it is essential to better understand the relationships among/between variables which impact these group interactions.

Thus, given the proven importance and often conflicting findings of these constructs, this study also seeks to determine whether a student’s level of engagement directly impacts group expectations and satisfaction. This is critical, as student engagement constitutes one of the principal elements of effective instruction and effective learning in online course settings (Fredrickson, 2015). Additionally, many accrediting bodies are utilizing various measures of engagement (e.g., student, university, and community) as indicators of university effectiveness (Dostaler, Robinson and Tomberlin, 2017). Given these internal and external emphases, it is essential to further our understanding of student engagement in all classroom settings.

3. Data collection

We collected data from students in online business courses at a public university in the southeastern United States. The students completed the online survey for additional bonus points in their related courses.

Eighty-three students completed the survey, for a response rate of 62%. According to the “10 times” rule, the sample size should be at least 10 times the number of incoming paths to the construct with the greatest number of incoming paths (Barclay, Higgins and Thompson, 1995; Chin and Newsted, 1998; Hair, Ringle and Sarstedt, 2011). Therefore, the sample size is sufficient.

Most of these respondents were female (59.6%), with 40.4% male respondents. A slight majority of the respondents (52.6%) were under 25 years of age. The other respondents were 30 years of age (26.3%) or between 25 and 30 years of age (21.1%).

4. Measures

The purpose of this study is to determine whether computer self-efficacy (CSE) impacts student engagement and determine its impact on group satisfaction and group expectations. Computer self-efficacy represents an individual trait regarding an individual’s beliefs about their abilities to competently use computers (Compeau and Higgins, 1995). The original CSE measure from Compeau and Higgins (1995) has been adapted in multiple contexts such as post-adaptive usage (Tams, Thatcher and Craig, 2018), IS security deterrence (Paradice, et al., 2018), and online education (Carraher Wolverton, et al., 2019; Dang, et al., 2016).

We utilized group expectations and group satisfaction as dimensions of successful group interactions. The group expectations measure and the group satisfaction measure were adapted from Premkumar and Bhattacharjee (2008). Utilizing these interactional constructs, this research sought to better understand the relationships between the student’s level of satisfaction with their group, their expectations about their group, and their level
of engagement in the course. Further, the multidimensional student engagement measure from Schaufeli, et al. (2002) was used. This measure has been adapted for use in online education in extant studies (Schwarz and Zhu, 2015).

5. Data analysis

The first step in analyzing the measurement model involves an examination of the adequacy of the measures. Examining the individual item reliabilities, represented by their loadings to their respective construct, ensures that the items are measuring the constructs as they were designed. As Chin, Marcolin and Newsted (2003) state, “standardized loadings should be greater than 0.707” (p.325).

As some items exhibited a coefficient alpha below the .70 threshold (Nunnally, 1978), they were removed from further analysis. Thus, the analysis was able to ensure that the sampling domain had been adequately captured (Churchill, Jr., 1979) without including items that make progressively less of an impact on the reliability (Carmines and Zeller, 1979).

6. Analysis and results

6.1 Data Analysis

Data were analyzed using structural equation modeling. Given the small sample size (n=83) and the corresponding lack of statistical power in utilizing a covariance-based approach (Westland, 2010), the partial least squares (PLS) approach was selected, specifically Smart PLS 3.0 (Ringle, Wende and Becker, 2015) software. We chose to utilize PLS because it provides advantages for datasets with small sample sizes (e.g., Barclay, Higgins and Thompson, 1995; Chin, Marcolin and Newsted, 2003; Chin, 1998; Gefen, Straub and Boudreau, 2000).

To test the hierarchical component model (Lohmöller, 2013), researchers employed the two-stage HCM analysis as recommended by Hair, et al. (2017) and Wetzels, Odekerken-Schröder and Van Oppen (2009).
### Table 1: Loadings and Cross-Loadings of Hierarchical Component Model

<table>
<thead>
<tr>
<th></th>
<th>Computer Self-Efficacy</th>
<th>Engagement</th>
<th>Engagement-Absorption</th>
<th>Engagement-Dedication</th>
<th>Engagement-Vigor</th>
<th>Group Expectations</th>
<th>Group Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSE_1</td>
<td>0.813</td>
<td>0.344</td>
<td>0.132</td>
<td>0.366</td>
<td>0.374</td>
<td>0.178</td>
<td>0.127</td>
</tr>
<tr>
<td>CSE_10</td>
<td>0.783</td>
<td>0.297</td>
<td>0.201</td>
<td>0.297</td>
<td>0.273</td>
<td>0.225</td>
<td>0.073</td>
</tr>
<tr>
<td>CSE_2</td>
<td>0.795</td>
<td>0.245</td>
<td>0.138</td>
<td>0.189</td>
<td>0.313</td>
<td>0.197</td>
<td>0.030</td>
</tr>
<tr>
<td>CSE_3</td>
<td>0.826</td>
<td>0.393</td>
<td>0.152</td>
<td>0.363</td>
<td>0.490</td>
<td>0.156</td>
<td>0.027</td>
</tr>
<tr>
<td>CSE_4</td>
<td>0.760</td>
<td>0.232</td>
<td>0.194</td>
<td>0.097</td>
<td>0.346</td>
<td>0.147</td>
<td>-0.053</td>
</tr>
<tr>
<td>CSE_7</td>
<td>0.797</td>
<td>0.373</td>
<td>0.233</td>
<td>0.383</td>
<td>0.348</td>
<td>0.420</td>
<td>0.246</td>
</tr>
<tr>
<td>CSE_8</td>
<td>0.772</td>
<td>0.301</td>
<td>0.055</td>
<td>0.345</td>
<td>0.343</td>
<td>0.305</td>
<td>0.039</td>
</tr>
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<td>ENGA_1</td>
<td>0.260</td>
<td>0.753</td>
<td>0.750</td>
<td>0.645</td>
<td>0.634</td>
<td>0.487</td>
<td>0.338</td>
</tr>
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<td>ENGA_2</td>
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<td>0.328</td>
<td>0.304</td>
<td>0.408</td>
<td>0.196</td>
</tr>
<tr>
<td>ENGA_3</td>
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<td>0.667</td>
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<td>0.575</td>
<td>0.450</td>
<td>0.338</td>
<td>0.217</td>
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<tr>
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<td>0.466</td>
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<td>0.084</td>
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<td>0.718</td>
<td>0.621</td>
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</tr>
<tr>
<td>ENGD_3</td>
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<td>0.953</td>
<td>0.766</td>
<td>0.636</td>
<td>0.323</td>
</tr>
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<td>0.587</td>
<td>0.656</td>
<td>0.328</td>
</tr>
<tr>
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<td>0.773</td>
<td>0.516</td>
<td>0.665</td>
<td>0.854</td>
<td>0.463</td>
<td>0.115</td>
</tr>
<tr>
<td>ENGV_1</td>
<td>0.466</td>
<td>0.773</td>
<td>0.516</td>
<td>0.665</td>
<td>0.854</td>
<td>0.463</td>
<td>0.115</td>
</tr>
</tbody>
</table>
### 6.2 Measurement Model

The first step in a PLS analysis is the analysis of the measurement (or outer) model. Following the procedures outlined by Wright, et al. (2012), the first step was the creation of a first-order measurement model. The analysis began by investigating the loadings and cross-loadings of all items to ensure that they each loaded on their respective constructs (see Table 2). All loadings were greater on the intended construct than on any other constructs. Consequently, upon determining that none of the items loaded higher on any construct other than the intended construct, all items were included. Next, researchers evaluated the reliability, discriminant, and convergent validity of the first-order measurement model. Utilizing the item loadings, internal composite reliability (ICR) was calculated to evaluate the measure’s reliability, finding that all the dimensions exceeded the .70 threshold and were all above 0.88 (bottom of Table 2). Moreover, to estimate convergent validity, each dimension’s average variance extracted (AVE) was evaluated. Utilizing the threshold value of 0.50 for AVE, the findings support convergent validity (Barclay, Higgins and Thompson, 1995).

#### Table 2: Loadings and Cross Loadings

<table>
<thead>
<tr>
<th></th>
<th>Computer Self-Efficacy</th>
<th>Engagement Absorption</th>
<th>Engagement Dedication</th>
<th>Engagement Vigor</th>
<th>Group Expectations</th>
<th>Group Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSE_1</td>
<td>0.849</td>
<td>0.16</td>
<td>0.33</td>
<td>0.376</td>
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<td>CSE_10</td>
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</tr>
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<td>CSE_2</td>
<td>0.835</td>
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<td>0.216</td>
<td>0.439</td>
<td>-0.021</td>
<td>0.068</td>
</tr>
<tr>
<td></td>
<td>Compute Self-Efficacy</td>
<td>Engagement - Absorption</td>
<td>Engagement - Dedication</td>
<td>Engagement - Vigor</td>
<td>Group Expectations</td>
<td>Group Satisfaction</td>
</tr>
<tr>
<td>----------------</td>
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<tr>
<td>CSE_3</td>
<td>0.777</td>
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<td>0.319</td>
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<tr>
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</table>

First Order Reliability and AVE

<table>
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<tr>
<th></th>
<th>Compute Self-Efficacy</th>
<th>Engagement - Absorption</th>
<th>Engagement - Dedication</th>
<th>Engagement - Vigor</th>
<th>Group Expectations</th>
<th>Group Satisfaction</th>
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<td>AVE</td>
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Cronbach’s Alpha

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<th>Engagement - Dedication</th>
<th>Engagement - Vigor</th>
<th>Group Expectations</th>
<th>Group Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.913</td>
<td>0.812</td>
<td>0.862</td>
<td>0.849</td>
<td>0.959</td>
<td>0.969</td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Intercorrelations of the Latent Variables for First-Order Constructs1
Researchers then evaluated the construct’s convergent and discriminant validity (Table 3). The Fornell-Larcker criterion was utilized, as suggested by Hair, et al. (2017), to assess discriminant validity. As the square root of the AVE exceeded the highest correlation with any other construct, it was concluded that there was adequate discriminant validity among the measures.

6.3 Results

The study’s results (see Figure 1) indicate that computer self-efficacy (CSE) leads to student engagement ($\beta = 0.350, t=3.785, p <0.001$). Student engagement then leads to group expectations ($\beta = 0.361, t=3.223, p <0.001$), and group expectations predict group satisfaction ($\beta = 0.632, t=7.280, p <0.001$). However, student engagement does not impact group satisfaction ($\beta = -0.001, t=0.013, ns$) directly; instead, that relationship is fully mediated by group expectations (Hair, et al., 2017; Zhao, Lynch and Chen, 2010).

![Figure 1: Results of the Structural Model](image)

7. Discussion

The findings of this study indicate that student engagement is driven by a student’s perception of their computer self-efficacy. This outcome evinces that a student who perceives themselves as being able to competently use computers is more likely to be engaged in an online course. Moreover, the findings also demonstrate that student engagement leads to higher levels of group satisfaction in online settings. However, this relationship is fully mediated by group expectations. Although the analysis found no direct relationship between student engagement and group satisfaction, student engagement did trigger more positive feelings about the group’s ability to successfully perform.

As a result of this finding, it is recommended that instructors devote meaningful time during distance learning students’ orientation to the understanding of utilized technology in order to facilitate higher levels of computer self-efficacy. However, it is not essential that students possess a mastery of technology utilized in the online learning environment. A working knowledge that establishes a comfort level would be sufficient. This would allow students to have more time to focus on course content as well as increase students’ self-esteem as online learners. It follows that greater feelings of self-esteem and technological comfort could secure more active participation in group activities. Furthermore, by recognizing that group expectations mediate the relationship...
between engagement and satisfaction, an instructor should focus on increasing future expectations, or perceptions of positive future group experiences, rather than concentrating on increasing present group satisfaction. Successful learning online (or in the classroom) is supported by the creation of a community of learners (Borup, et al., 2020). Although the findings and subsequent implications of this study are insightful in offering potential ways in which instructors can increase student engagement in their online courses, the results must be viewed in light of a few limitations. Since data from a survey administered to students enrolled in an online business course was used for the purposes of this research, all information was self-reported. The results of this analysis are, therefore, subject to common method variance (Schwarz, et al., 2017). Further, a replication of this study in other settings and across disciplines is encouraged to address the issue of generalizability. Additionally, future research conducted at other universities would also aid in confirming the results of this empirical research. Because increasing our understanding of the factors that influence engagement in online settings has potentially significant implications, future research in this area is encouraged. Further, the increase in online course offerings requires further research to better understand the role of computer self-efficacy in online learning settings.

8. Conclusion

Student engagement remains a desired outcome in education, especially in online learning environments (Schwarz and Zhu, 2015). This study’s findings indicate that engagement in online course settings is driven by a student’s individual perception of their computer-related abilities. Further, our analysis found a more complex relationship exists between engagement and the group interaction factors, group expectations, and group satisfaction. Results indicate that prior or early course perceptions/expectations significantly impact the eventual course experience. Both perceptions of computer self-efficacy and group expectations are most likely determined prior to real course activity. Yet, these pre-conceived attitudes are extremely relevant for the role they play in the latter sentiments of engagement and satisfaction.

Studies have shown that computer self-efficacy improves as there are increases in the number of experiences and familiarity with technology (Lee 2015; Ozberas and Erdogan, 2016). It naturally follows that individuals with greater exposure to different learning technologies will possess key computer competencies necessary for success in an online learning environment. Additionally, researchers suggest that accessibility to digital learning technologies has an influence on computer self-efficacy and the academic success of online students, noting a move towards improvement in higher-level skills such as problem-solving and critical thinking (see, for example, Chang, et al., 2014). Yet, students’ attitudes towards online learning can also impact their levels of computer self-efficacy. For example, Prior, et al. (2016) found that students with more positive attitudes towards online learning environments also possessed more positive levels of self-efficacy. Thus, the current study’s findings are consistent with those of extant literature, suggesting that greater emphasis be placed on improving students’ individual technological confidence levels since computer self-efficacy is a critical component for learning content in online settings (Parkes, et al., 2015). Yet, our results also suggest that additional importance be placed on managing students’ expectations specifically towards group activities. Positive pre-existing student perceptions and attitudes can significantly improve the online student’s experience. Only with a clear understanding of these important constructs can instructors hope to meaningfully create engaged and satisfied students in online courses.

References


Preville, P., 2018. Furthermore, generational research on the characteristics of our current student bodies, suggest that these individuals connect their student experience with higher levels of digital engagement. Top Hat, Trends in Higher Education [blog] 16 October. Available at: https://tophat.com/blog/generation-z-teach-classroom/[Accessed 22 February 2020].


### Appendix – Survey Items

<table>
<thead>
<tr>
<th>Group Expectations</th>
<th>Adapted from Premkumar and Bhattacherjee (2008)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I believe that…</td>
<td></td>
</tr>
<tr>
<td>1. Being in a group in this class will help me better understand new course material (Strongly disagree…Strongly agree).</td>
<td></td>
</tr>
<tr>
<td>2. Being in a group in this class will help me learn new material (Strongly disagree…Strongly agree).</td>
<td></td>
</tr>
<tr>
<td>3. Being in a group in this class will increase my interest in the course material (Strongly disagree…Strongly agree).</td>
<td></td>
</tr>
<tr>
<td>4. Being in a group in this class will provide me with insight into the course material (Strongly disagree…Strongly agree).</td>
<td></td>
</tr>
<tr>
<td>5. Being in a group in this class will facilitate interesting discussions (Strongly disagree…Strongly agree).</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Student Engagement (Utrecht Work Engagement Scale for Students)</th>
<th>Adapted from Schaufeli, et al. (2002)</th>
</tr>
</thead>
<tbody>
<tr>
<td>From more/less after the face-to-face case study discussion</td>
<td></td>
</tr>
<tr>
<td><strong>Vigor</strong></td>
<td></td>
</tr>
<tr>
<td>1. When I’m studying for this class, I feel mentally strong.</td>
<td></td>
</tr>
<tr>
<td>2. I can continue for a very long time when I am studying for this class.</td>
<td></td>
</tr>
<tr>
<td>3. When I study for this class, I feel like I am bursting with energy.</td>
<td></td>
</tr>
<tr>
<td>4. When studying for this class, I feel strong and vigorous.</td>
<td></td>
</tr>
<tr>
<td>5. When I get up in the morning, I feel like going to this class.</td>
<td></td>
</tr>
<tr>
<td><strong>Dedication</strong></td>
<td></td>
</tr>
<tr>
<td>1. I find this course to be full of meaning and purpose.</td>
<td></td>
</tr>
<tr>
<td>2. This course inspires me.</td>
<td></td>
</tr>
<tr>
<td>3. I am enthusiastic about this course.</td>
<td></td>
</tr>
<tr>
<td>4. I am proud of my studies in this course.</td>
<td></td>
</tr>
<tr>
<td>5. I find the course challenging.</td>
<td></td>
</tr>
<tr>
<td><strong>Absorption</strong></td>
<td></td>
</tr>
<tr>
<td>1. Time flies when I’m studying for this class.</td>
<td></td>
</tr>
<tr>
<td>2. When I am studying for this class, I forget everything else around me.</td>
<td></td>
</tr>
<tr>
<td>3. I feel happy when I am studying intensively for this class.</td>
<td></td>
</tr>
<tr>
<td>4. I can get carried away by my studies for this class.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Computer self-efficacy</th>
<th>Adapted from Compeau and Higgins (1995)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I could complete my coursework using technology if…</td>
<td>from not confident to very confident</td>
</tr>
<tr>
<td>…there was no one around to tell me what to do</td>
<td></td>
</tr>
<tr>
<td>…I had never used a package like it before</td>
<td></td>
</tr>
<tr>
<td>…I had only the software manuals for reference</td>
<td></td>
</tr>
<tr>
<td>…I had seen someone else using it before trying it myself</td>
<td></td>
</tr>
<tr>
<td>…I could call someone for help if I got stuck</td>
<td></td>
</tr>
<tr>
<td>…someone else helped me get started</td>
<td></td>
</tr>
<tr>
<td>…I had a lot of time to complete the assignments for which the software was provided</td>
<td></td>
</tr>
<tr>
<td>…I had just the built-in help facility for assistance</td>
<td></td>
</tr>
<tr>
<td>…someone showed me how to do it first</td>
<td></td>
</tr>
<tr>
<td>…I had used similar packages like this one before to complete my coursework.</td>
<td></td>
</tr>
<tr>
<td>Group Satisfaction</td>
<td>(Premkumar and Bhattacherjee, 2008)</td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>I am _ with my group.</td>
<td></td>
</tr>
<tr>
<td>2. Extremely frustrated . . . Extremely contented.</td>
<td></td>
</tr>
</tbody>
</table>
A Conceptual Model for Effective Quality Management of Online and Blended Learning

Yves Bleick¹, Chang Zhu¹, Kim Schildkamp², Katrien Struyven¹³, Bram Pynoo¹, Cindy L. Poortman² and Koen Depryck¹

¹Vrije Universiteit Brussel, Belgium
²University of Twente, Netherlands
³Hasselt University, Belgium

Yves.Blieck@U hasselt.be
Chang.Zhu@vub.be
k.schildkamp@utwente.nl
katrien.struyven@uhasselt.be
Bram.Pynoo@vub.be
C.L.Poortman@utwente.nl
Koen.De.Pryck@vub.be
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Abstract: Institutions considering online and blended learning (OBL) face the challenge of strategically adopting OBL to develop, implement, monitor, assess and improve the quality of programmes and courses. The principles of continuous quality improvement (CQI) allow this challenge to be addressed. Effective CQI management implies that quality assurance and quality improvement follow and inform each other as part of a continuous cycle. Scholars report, however, that quality management of OBL usually focuses on assurance. The purpose of this paper is to provide a state of the art approach for effective CQI management which allows practitioners to achieve coherence between quality assurance and improvement of OBL. In this conceptual paper, we link and integrate work across fields to address the challenge of achieving coherence between quality assurance and improvement. We discuss research in the context of CQI that uncovers features of OBL that prevent practitioners from achieving coherence. The conceptual model for effective CQI of OBL integrates data-based decision making. The conceptual model provides a foundation for research on the effectiveness of this CQI management approach in the context of OBL. The quality management approach supports practitioners during the entire CQI-cycle to foster dialogue and consultation between all stakeholders in the institution in order to strategically develop assess and improve the quality of OBL programmes and courses. The originality of the model lies in making explicit data-based decision making as a driver for effective CQI management in the context of OBL.

Keywords: quality assurance, quality enhancement, quality improvement, e-learning, online and blended learning, data-based decision making.

1. Introduction

Online and blended learning (OBL) is valued for its potential to remove barriers, such as accessibility and flexibility, that prevent students from participating in traditional education (Shea, 2007). Institutions face challenges when they (plan to) redesign their programmes in order to implement OBL (Jara and Mellar, 2009; Moskal, Dziuban and Hartman, 2013). Indeed, successful adoption, implementation and improvement of OBL requires that the needs of the different stakeholders in institutions are taken into account (Moskal, Dziuban and Hartman, 2013). It is important to ensure that the institution puts reliable and robust infrastructure and sufficient resources in place to support the faculty and the students during OBL (Moskal, Dziuban and Hartman, 2013). For instance, if it appears in the context of OBL that students do not receive sufficient support in an OBL programme, the institution must take actions to address this. This implies that professionals from the meso (the management) and micro level (the faculty responsible for courses/modules in a programme) enter into dialogue, consult the students, and decide what measures are appropriate (Deepwell, 2007; Ehlers, 2007).

Continuous quality improvement (CQI) can facilitate a process of change, innovation, assessment and improvement and is suited to capture the perspectives of these different stakeholders (Becket and Brookes, 2005). CQI is defined as a quality ‘[…] management approach […] to continuously improve the efficiency and effectiveness of all aspects of the organization’s programmes and services in order to maximise benefits for clients. […] relying on evidence-based information to support the organizations’ success in achieving its goals and outcomes’ (Sonpal-Valias, 2009, p.2). The implementation of a quality model is essential in CQI. ‘A quality model defines the set of variables in terms of which quality is measured and the way in which it is measured’

(Inglis, 2008, p.348). Figure 1 shows the ‘variables’ referred to in the literature as the quality areas (management, services and products) that capture the six common systemic quality dimensions that need to fit together in institutions to achieve quality in OBL (Ossianilsson et al., 2015). The traditional models for quality management of OBL adhere to this structure (Hansson, 2008; Marshall, 2010; Williams et al., 2012).

A quality model guides choices to improve and restructure management, services and programmes; and to evaluate an institutions’ progress (Bloxham, 2010). In the example concerning insufficient support for student to use technology given above, adequate improvement measures might be increasing the support in using the technology in the dimension of ‘support for students’ (figure 1). However, improvement could also be achieved by measures in other quality dimensions. For example, adopting a more user friendly learning management system in the ‘course delivery’ dimension can also be an answer, provided of course that this dimension is present in the quality model implemented by the institution.

**Figure 1**: The three common quality areas and six quality dimensions in quality management models (Ossianilsson and Landgren, 2012; Ossianilsson et al., 2015).

Srikanthan and Dalrymple (2002, 2003) noted a mismatch between quality models for CQI and education. This mismatch consists of a focus on management and services at the expense of pedagogy (Srikanthan and Dalrymple, 2003, 2002). According to Abdous ‘[…] because of this perceived disconnection (Srikanthan and Dalrymple, 2003) CQI is considered more applicable to management and student services […]’ (Abdous, 2009) than it is to educational processes (the products in figure 1). Srikanthan and Dalrymple (2002) make the case that a model for effective CQI management in education must not only be systemic and address management and services but must also explicitly address the pedagogical aspects (Srikanthan and Dalrymple, 2002). Hansson et al. (2008) confirm this need for the context of OBL claiming that indeed all quality dimensions should be aligned in a functional manner focused on pedagogy: they must ‘[…] fit together in a coherent manner on the basis of a pedagogical philosophy’ (Hansson, 2008, p.40). If educational processes are addressed, CQI principles can help institutions to implement, assess and improve OBL successfully (Moskal, Dziuban and Hartman, 2013; Srikanthan and Dalrymple, 2003). For instance if it appears that the pedagogical design (the courses and the programme) – which covers aspects of content, learning goals, methods and materials – is not in line with the students learning needs, the institution should take additional actions to address this (Ehlers, 2004). If this is so in the example we introduced in the section above, providing additional support for students to use technology might not suffice. This is likely insufficient since scholars in the context of OBL agree e.g. that OBL environments coerce students to take ownership of their learning process (Ehlers, 2004). It is therefore, likely that improvement measures need to focus on improving the pedagogical design in the dimensions of ‘course design’ or ‘programme design’ for students to take ownership. To inform such improvement measures, the pedagogical
processes specific for OBL, need to be explicitly present in the quality model that is used. While these pedagogical processes are not lacking from the traditional models for quality management (Hansson, 2008; Marshall, 2010; Williams et al., 2012), they are not explicitly present (Bliek et al., 2018). Since the last decade, several studies have empirically identified the needs of students related to OBL, including needs related to pedagogy (Ehlers, 2004; Jung, 2011, 2012; Ossiannilsson and Landgren, 2012). One of these studies, the conceptual quality framework for OBL proposed by Ossiannilsson and Landgren (2012). In the literature on quality management, the terms 'model' (e.g. Ossiannilsson et al., 2015) and 'framework' (e.g. Ossiannilsson and Landgren, 2012) are used interchangeably. In both cases it is a model or framework that is used for quality management. The conceptual quality framework for OBL proposed by Ossiannilsson and Landgren (2012) is unique because it introduces success factors for OBL that makes the pedagogical needs of students related to the quality areas: management, services and products explicit (figure 2). Three of these success factors are related to pedagogy (McLoughlin and Lee, 2008). Success in OBL is described as: '[...] to be successful in e-learning from an academic and educational point of view but also with regard to their personal and social life' (Ossiannilsson and Landgren, 2012, p.49).

Figure 2: The needs of students related to OBL captured in success factors (Ossiannilsson and Landgren, 2012).

2. Problem statement

As no guidelines on how to use this conceptual quality framework are given, there is a need for scientifically validated knowledge on 'how' professionals can implement this conceptual quality framework, which explicitly address pedagogy, for effective quality management of OBL (Ehlers, 2007; Inglis, 2008). The objective of this contribution is therefore to answer the research question: 'how’ can a conceptual quality framework that captures the needs of students (Ossiannilsson and Landgren, 2012) for effective CQI management of OBL be implemented? And, more specifically, to answer this question against the context of AE in Flanders (Belgium).

2.1 Context: the case of Flanders (Belgium)

Adult education in Flanders (Belgium) is recognised, financed, and subsidised by the Flemish community. In Flanders (Belgium), Centers for Adult Education (CAE) cater to a wide range of target groups. To meet the needs of these adult students in terms of accessible and flexible education, the Flemish government, at the macro level, promotes OBL (Vlaams Parlement, 2007). As a result of the promotional policies of the Flemish government, OBL has been increasingly adopted in CAE. As demand increases, staff of CAE at both micro and meso levels, urgently need scientifically grounded quality instruments along with indicators and guidelines to manage the quality of OBL. However, quality models suited for OBL in AE are rare in the literature. Due to the lack of quality models for OBL in AE, CAE have to use what is available in the context of HE for CQI of OBL. Regarding this CQI in CAE, the Flemish inspectorate reports, that at the management level (meso level) it is
sufficient to strong in most CAE and that course teams (micro level) either strongly or sufficiently support the meso level. The majority of CAE have sufficient capacity to innovate which means that a culture focused on innovation and improvement was installed in the CAE (strategical adoption). However, CAE struggle with the use of data in quality management (quality assurance). While it is common practice in CAE to derive data from student and teacher surveys, at times these are insufficiently comprehensible to students (De Niël et al., 2016). Finally, CAE adopt an ad hoc approach to data analysis resulting in superficial analysis and ad-hoc quality improvement (De Niël et al., 2016) undermining the effectiveness of CQI. To conclude, although large amounts of data are available, there is hardly any monitoring, not least because data registration is not coherent and a number of concepts are ambiguously defined (De Niël et al., 2016).

In Flanders, the field of AE can benefit from a comprehensive and contextualised quality model and instruments for OBL that are in line with the principles of CQI, i.e., strategical adoption, quality assessment, and the improvement of OBL. Care should be taken to ensure that quality is captured in clear concepts, including those related to pedagogy, and that quality indicators allow effective CQI management of OBL from strategical adoption, over quality assurance towards continuous quality improvement. Second, adult education providers in CAE can benefit from an approach with scientifically sound guidelines for effective quality management. More specifically, guidelines on how to use data during CQI management in practice. Addressing these gaps in the field of AE, while taking the necessary improvements mentioned previously into account, makes this highly challenging and demanding contribution relevant beyond the context of AE.

**Departing from the research context of AE in Flanders, we rephrase the general research question as ‘how’ can a conceptual quality framework that captures the needs of students (Ossianilsson and Landgren, 2012) for effective CQI management of OBL be implemented in AE?, and, split it into three specific research questions:**

1. ‘how’ can internal stakeholders in CQI of OBL implement a conceptual quality framework that captures the needs of students to strategically adopt OBL in AE? *(srq1)*
2. ‘how’ can internal stakeholders in CQI of OBL implement a conceptual quality framework that captures the needs of students for quality assurance of OBL in AE? *(srq2)*
3. ‘how’ can internal stakeholders in CQI of OBL implement a conceptual quality framework that captures the needs of students be implemented for quality improvement of OBL in AE? *(srq3)*

**3. Methods**

To answer this research question a conceptual paper was chosen (Cropanzano, 2009). A conceptual paper is not based upon empirical data but summarises and integrates recent research, presents an integrated framework and highlights directions for future research (Gillon and Goldberg, 2015; Cropanzano, 2009). In conceptual contributions, the focus lies on developing logical and complete arguments for associations rather than testing them empirically. In line with the recommendations of Gillon and Goldberg (2015) we take a problem-focused approach i.e. effective CQI management in online and blended learning and link work across disciplines to broaden the scope on thinking about effective CQI management. Given that a review is not the sole focus of a conceptual paper, that section in this article is tightly focused on the literature within the domain of effective CQI management (Gillon and Goldberg, 2015). We focus on contributions that could explain and answer the challenges i.e. specific research questions with effective CQI management for the specific context of AE in Flanders. In contrast to a systematic review of the literature, we selected a subset of studies that were chosen based on authors selection, to answer the “what’s new” question that distinguishes a conceptual paper from a review, and on availability.

In the next section we conceptualise OBL and the challenges it presents for institutions that adopt it and the consequences it has for the internal stakeholders involved in the quality management. Then, we introduce the answer to the specific research questions describing how the conceptual quality framework by Ossianilsson and Landgren (2012) can be implemented together with a scientifically valid approach for effective quality management of OBL. In the fifth section we provide the background and underpinning for the different elements in the conceptual model for effective quality management in relation to OBL. We explain how, according to the recommendations of Gillon and Goldberg (2015), the problem-focused approach in this paper allows to link and integrate work across research fields in order to answer the research question. In the final section we conclude with critical suggestions for future research based on the proposed conceptual model for effective quality management of OBL.
4. A conceptual model for effective quality management of OBL

4.1 Online and blended learning and the internal stakeholders in CQI of OBL

Different types of OBL have emerged in education in the past two decades and are referred to in the literature as e.g. e-learning, blended learning or distance education (Boelens, De Wever and Voet, 2017). Most of these types are defined as a combination of online and face-to-face learning (Boelens, De Wever and Voet, 2017) and all can be situated in the continuum between face-to-face learning (no technology) and fully online learning (all technology) (OECD, 2005) with blended learning in between the endpoints. According to Boelens et al. (2017), blended learning remains an ill-defined concept which they describe at the course level as: “[…] learning that happens in an instructional context which is characterised by a deliberate combination of online and classroom-based interventions to instigate and support learning” (p. 2). It is possible that courses are delivered completely face-to-face, blended or completely online as part of a programme that can be considered to be blended. We can thus extend the concept of Boelens et al. (2017) to the programme level. Institutions that adopt OBL need to address this new educational mode in the institutional quality management strategy (Hansson, 2008). Effective quality management of OBL starts with the strategical adoption (SA) of OBL and demands that quality assurance (QA) provides the information needed to initiate a phase of quality improvement (QI) (Abdous, 2009; Williams, 2016).

Because OBL reaches up, down and through the entire organization, a broad group of internal stakeholders at the meso (management) and micro level (faculty) is responsible for quality (Deepwell, 2007). This implies that a team must be assembled involving professionals from both levels of the organization in CQI. In accordance with the principles of CQI, a quality model and approach for effective management should be put into place to help professionals adopt, set goals, identify resources and strategies, and measure progress towards the institutions’ vision (Moore, 2005; Moskal, Dziuban and Hartman, 2013).

We assume that the conceptual quality framework developed by Ossianilsson and Landgren (2012) is essential to strategically adopt OBL to meet students’ needs in OBL programmes. If, at the level of success factors, quality instruments provide clear concepts, quality expectations between stakeholders and students can be clarified and assessed at the indicator level. First, this will enable the dialogue between internal stakeholders, at the meso and micro level, to set goals, identify resources and strategies, and measure progress towards the institution’s mission and vision for OBL. While it is important that professionals involve students as part of CQI, the literature mentions several practical problems in the case of OBL (Jara and Mellar, 2009; Ehlers, 2007; Moskal, Dziuban and Hartman, 2013). Therefore, it can be useful to consult students to assess whether the quality of OBL is in line with their needs. Second, if the success factors are connected to the quality dimensions, quality instruments can help to consult students to detect and clarify opportunities for improvement in the institution.

4.1.1 Development and validation of two quality instruments to involve the internal stakeholders in CQI for OBL

Departing from the assumption that the conceptual quality framework by Ossianilsson and Landgren (2012) can provide a narrative for dialogue between professionals and consultation with the students, Blieck et al. (2017, 2018 and 2019) developed and validated two quality instruments in the context of adult education. The development and validation of the instruments was informed by the recommendations of Inglis (Inglis, 2008). First, since the quality framework (Ossianilsson and Landgren, 2012) was derived from higher education, it is important to verify whether the concepts are relevant in adult education (Inglis, 2008). Next, quality indicators that have proven their value in HE must also be contextualised to adult education (Inglis, 2008). Finally, the structure of a quality framework must be tailored to the way it is meant to be used (Inglis, 2008). In this particular case, to support dialogue and consultation to strategically adopt, assess, and improve the quality of OBL.

To address these recommendations, two quality instruments were validated in line with the principles of design-based research (Amiel and Reeves, 2008; Barab and Squire, 2004; Herrington et al., 2007; Reeves, 2006). The result is the hybrid conceptual quality model depicted in figure 3 (Blieck et al., 2017). In this model, a limited number of quality indicators are linked to both success factors and to the established quality areas and quality dimensions in extant quality models e.g., ‘the ratio between contact education vs. online education (flexibility) of the programme (design of the programme) matches the needs of the students. The success factors and quality indicators are important in enabling adult students to participate in OBL. Credibility, transparency,
flexibility, and accessibility are assumed to facilitate student participation in OBL while interactivity, personalisation, and productivity relate to the pedagogy of OBL (Blied et al., 2017, 2018).

Figure 3: Hybrid conceptual quality model connecting success factors and quality dimensions with quality indicators (Blied et al., 2017).

From this conceptual quality model, Blied et al. (2017) derived and validated two instruments for effective CQI management of OBL. The first of these (Blied et al., 2018) presents a list of quality indicators and comprehensively described success factors that underpin the SA of OBL (qiSA-OBL) and aligns all quality dimensions within institutions with this vision (Hansson, 2008; Kipta and Berge, 2006). Because all success factors depend upon the adoption of OBL, priorities can be set at the level of the indicators (Blied et al., 2018).

The second instrument (Blied et al., 2019) is relevant for the quality assurance of OBL and to guide internal quality improvement of OBL (qiQA&I-OBL). Usually, student satisfaction is chosen as an indicator for effective CQI in education (Arbi, Hidayato and Zagloel, 2012). However, taking the reported drop-out rates of students in OBL into account (Nistor and Neubauer, 2010; Rovai, 2003) along with how Ossiannilson and Landgren (2012) describe success in OBL, sustained and successful student participation (Nistor and Neubauer, 2010; Rovai, 2003) as chosen as a relevant indicator for effective CQI management of OBL (Blied et al., 2018). In this survey students are consulted about the extent to which the success factors allowed them to participate in the OBL programme, the result informs the quality improvement.

We now conceptualise the implementation of these validated quality instruments for effective CQI management of OBL (Blied et al., 2017, 2018, 2019); see also figure 4.

4.2 A conceptual model for effective quality management of OBL

In the case of OBL literature indicates that teams composed of management and faculty should participate in frequent meetings to develop (Nihuka and Voogt, 2011) and effectively manage the quality of OBL (Deepwell, 2007; Ehlers, 2007; Jara and Mellar, 2009). Dialogue between professionals at various levels of an educational institution and consultation with the students is required to strategically adopt, assess and improve OBL
successfully (Deepwell, 2007; Ehlers, 2007; Moskal, Dziuban and Hartman, 2013). To strategically adopt OBL several questions like e.g. ‘Why should the institution engage in OBL?, what are the goals, and what outcomes are expected to be achieved, both initially and in the longer term?, what student benefits are sought—improved success, increased persistence, shortened time-to-degree, etc.?, demand an answer (Moskal, Dziuban and Hartman, 2013, p.16).

The strategic adoption of OBL (srq1): We assume that management and faculty, can use the success factors and the indicators mentioned in the qiSA-OBL (Blieck et al., 2017), which was derived from the work by Osianniilsson and Landgren (2012). First, to engage in this dialogue to strategically adopt OBL in line with the institutions’ vision during the planning-phase. Second, in line with this reason for adoption, to develop an OBL programme and courses tailored to the needs of adult students, both pedagogical and other, to participate in the educational offering. We assume that the adoption and development of the management and faculty will elicit concerns.

The concerns of the team members are important to prepare to access and collect data to explore a problem or investigate hypotheses (plan-purpose). We identify data in line with Lai and Schildkamp (2013, p. 10) as the ‘[…] information that is collected in a systematic manner and organised to represent some aspect of schools […]’, or an educational institution. In the case of OBL the reported attrition rates indicate that student participation can be an issue (Nistor and Neubauer, 2010), therefore we suggest that student participation in OBL is taken as an indicator for effective CQI as alternative for, or in addition to, other indicators such as student satisfaction (Ardi, Hidayatno and Zagloel, 2012). The success factors in the qiSA-OBL (Blieck et al., 2017) are important in formulating research questions or hypotheses when preparing to investigate and purposefully (purpose) monitor student participation in OBL, or what can influence student participation, alongside other outcomes such as student satisfaction.

The quality assurance of OBL (srq2): During implementation of the OBL courses and programme, the team accesses and collects data to purposefully monitor student participation or what can influence participation in OBL, next to other outcomes like e.g. student satisfaction. This is important to ensure purposeful quality assurance (do-data). At the end of the implementation phase the effect of the CQI management must be assessed (check-information). Because student input is valuable in guiding the improvement process (Harvey, 2003), stakeholders can consult with students to check and assess if the quality of the OBL programme and courses meets their needs, and get feedback e.g. by survey data at the end of the implementation phase. The qiQA&I-OBL (Blieck et al., 2019) can be used for this purpose. Students are consulted to check and assess the (perceived) effectivity of OBL programmes in a reliable and valid manner, for instance in terms of whether the quality of the OBL programme and courses meets their needs. In this survey, students report the extent to which the indicators and success factors enable them to participate in OBL. Team members combine this data in the check-phase with the, both qualitative and quantitative, data that they collected to monitor OBL during the implementation. Team members then filter, check, organise and analyse the data of OBL to explore a problem or investigate hypotheses (check-information). This provides information to the team members about the extent to which students were able to participate in OBL and it installs a feedback loop to initiate the quality improvement phase. In the case of adoption of OBL, this would be the first CQI-cycle resulting in a current state analysis in the check phase by the end of QA. The effects of improvement measures will need to be based on this information.

The quality improvement of OBL (srq3): During the reflect-phase the team members need to combine their understanding and expertise to install improvement measures in the institution. This is needed to convert the information into actionable knowledge to take informed decisions about what improvements i.e. management processes, services or pedagogical aspects of the products delivered to students (reflect-knowledge). The connections between the success factors and the quality indicators in the qiQA&I-OBL (Blieck et al., 2019) are useful for this purpose (figure 4).
Finally, in the act-phase the knowledge of the team members is applied. There are two possibilities. Either the vision on OBL needs refinement, or improvements to management processes, services or the pedagogical aspects (the products) are needed. In both situations a new CQI cycle is initiated (plan). Several CQI-cycles are needed to assess mid-term and long-term effects of the quality management approach on student participation in OBL (Jara and Mellar, 2010, 2009).

The conceptual model for effective quality management supports to investigate the effectiveness of the quality management approach for OBL. In line with widespread use in literature we distinguish short-term, mid-term and long-term effects and refer to these respectively as outputs, outcomes and impacts (Leiber, Stensaker and Harvey, 2015). Leiber et al. (2015) reported that the terms ‘effect’ and ‘impact’ e.g. ‘impact evaluation’ or ‘impact analysis’ are both used as umbrella terms. Like Leiber et al. (2015), we choose to use ‘effect’ as an umbrella term.

This conceptual model for effective quality management of OBL is relevant for several reasons. First, it presents a scientifically valid quality management approach to foster dialogue between all stakeholders in an institution and consultation of students. Second, combined with the quality instruments (Blieck et al., 2017, 2018, 2019) derived from the framework by Ossiannilsson and Landgren (2012), it can support institutions to implement a CQI management approach to adopt, develop, monitor, assess and improve OBL to meet the (pedagogical) needs of students.

5. Background for the conceptual model for effective quality management of OBL

In this section, we first address literature on effective CQI management of OBL. We introduce the general principles, a quality indicator and a common problem in effective CQI management for OBL. Then we present research that clarifies the causes of this common problem of CQI management in the context of OBL. Since this research points to the use of student (feedback) data to address this common problem we link the field of database decision making (DBDM) to the field of CQI. We explain how DBDM is a driver for effective CQI management of OBL.

5.1 Effective CQI management of OBL

Since Deming (1950), CQI management is identified as different variants of the plan, do, check, reflect and act cycle (Moen and Norman, 2010). We identify CQI in accordance with Sonpal-Valias (2009) as: plan–do–check–
reflect and act (figure 5). Effective CQI implies that quality assurance (QA) and quality improvement (QI) follow and inform each other as part of a continuous cycle (Williams, 2016). In practice, this means that first a QA-phase is initiated in which: OBL programmes and services are strategically planned and developed (plan), implemented (do); and that quality is monitored during and assessed by the end of the implementation (check). This QA-phase provides feedback for the QI-phase. This phase starts when the results from the QA-phase are checked (check) and interpreted (reflect) and decisions to improve are taken (act). Thus initiating a subsequent CQI-cycle.

Figure 5: The conceptual quality model of Osiannilsson and Landgren (2012) can support effective CQI

5.1.1 Student participation as an indicator for effective CQI management of OBL

We argued that sustained and successful student participation is a relevant indicator for effective CQI of OBL as alternative for, or in addition to, other indicators such as student satisfaction (Ardi, Hidayatno and Zagloel, 2012).

Nistor and Neubauer (2010) describe sustained and successful student participation in OBL as: “[...] learners completing the activities specified in the seminars’ didactical concept” (p. 664). Two dimensions of participation in OBL are distinguished. First, students can choose to participate actively in the interaction with peers and teachers about the (online) learning content, which is coined as: ‘active participation’ (Nistor and Neubauer, 2010, p.664). Students can also choose to ‘lurk’ i.e. ‘only consume without producing information’, which is referred to as ‘passive participation’ (Nistor and Neubauer, 2010, p.664). In the latter case, students make, at best, passive use e.g. read the online content and digital traces of the online interaction to complete learning activities. Effective CQI of OBL will ultimately lead to improved student participation in OBL.

5.1.2 A common problem in effective CQI management of OBL

While scholars take different perspectives on the relationship between QA and QI, some acknowledge that: ‘[...] they are part of a cycle, each part informing the next’ (Williams, 2016, p.101). Such a feedback loop is crucial for quality improvement (Bloxham, 2010; Harvey, 2003). Effective CQI management needs a simultaneous focus on QA and QI (Abdous, 2009). Yet scholars report that institutional CQI of OBL usually focuses on QA at the expense of QI (Jara and Mellar, 2009; Abdous, 2009; Williams, 2016). In the case of OBL, Abdous (2009, p. 382) showed that CQI ‘[…] can be transformed from a static, after-the-fact state to a more iterative and dynamic state […]’, if QA is intertwined with the development (Plan) and implementation process (Do) of OBL. While the conceptual framework for quality of OBL (Osiannilsson and Landgren, 2012) is useful for effective CQI, the research question is, ‘how’ the implementation of this conceptual quality framework that captures the needs of students for effective CQI management of OBL can be implemented for effective CQI management?

5.2 Linking the field of Data-Based Decision making to the field of Continuous Quality Improvement
Deepwell (2007) emphasises that a broad group of professionals at all levels of an institution is responsible for the quality of OBL (figure 4). A distinctive feature of OBL is e.g. its dependence on institutional infrastructure and access to technologies beyond the control of the faculty (Deepwell, 2007). The implication is that management and faculty, both stakeholders in CQI for OBL need to engage in a dialogue. CQI management for OBL is therefore to be implemented at the intersection of the meso (management) and micro (faculty) level of an institution (Deepwell, 2007; Ehlers, 2007). However, CQI management requires the participation of ‘all’ stakeholders, including the consultation of students (Deepwell, 2007; Ehlers, 2007). The research question is therefore restated to ‘how’ can the conceptual quality framework that captures the needs of students be implemented to foster dialogue and consultation between the stakeholders to achieve effective CQI management of OBL? We address this question in the section below and offer an answer. To come to this, we discuss studies that highlight challenges to achieve coherence in CQI management of OBL. We present a scientifically state of the art approach for effective quality management that supports dialogue between professionals, during the entire CQI-cycle, and consultation of students.

5.2.1 Data-Based Decision Making as a driver for effective CQI management of OBL

In their case study, Jara and Mellar (2009) reported four main factors related to the features of OBL that disrupt the effectiveness of CQI management for OBL. Three of these factors challenge the installation of a dialogue between management and faculty in CQI (Jara and Mellar, 2009). The fourth factor presents challenges to consult students during CQI of OBL.

First, in relation to management and faculty, developing an OBL programme and courses is complex and demands different skills, leading to disaggregated processes. Second, this demands that different professionals in different roles are involved in the development and implementation of OBL courses, which lead to a distributed configuration of these teams. Third, as a result of the organizational position that courses have within institutions not all professionals are equally available. These three factors indicate that institutions need to adapt their CQI management approach to be suited for OBL (Jara and Mellar, 2009). Jara and Mellars’ (2009) study suggests that CQI management of OBL, addressed from a team perspective, can be beneficial. It is interesting to note that current literature on the development of OBL programmes and courses embraces a collaborative approach such as in multidisciplinary teams or teacher design teams (Nihuka and Voogt, 2011). This approach provides an answer, among other things, to the different roles and responsibilities a department faces when they develop and implement OBL (Berge, 1995). As part of their responsibility to develop and implement OBL, faculty can participate in CQI of OBL together with management.

The fourth disrupting factor for CQI of OBL is that it is not straightforward to consult students (Jara and Mellar, 2009). The limited opportunities to interact with students puts pressure on the need to consult them in CQI of OBL (Jara and Mellar, 2009). To solve this issue, Jara and Mellar (2009) suggested that the faculty together with the management collect, analyse and act upon student (feedback) data from a wide range of instruments (e.g. interaction logs, observation, student surveys and student-tutor relationships) to effectively manage the quality of OBL.

It seems that data are drivers for quality improvement (Harvey, 2003; Inglis, 2008; Williams; 2016). In line with Inglis (2008) we assume that data, especially student feedback (Harvey, 2003), can be the driver for CQI. DBDM allows management and faculty to offset the fourth of the disrupting factors for CQI i.e. the difficulty to consult students (Jara and Mellar, 2010). Several studies about CQI for OBL confirm this statement. Bloxham (2010) used (formative) student feedback to monitor, assess and improve the development of online courses. Barrie et al. (2005) showed that a CQI management approach that uses data that was focused on student learning promoted coherence between quality assurance and quality improvement. A focus on DBDM in CQI can thus promote coherence between quality assurance and quality improvement. The DBDM-process is an inherent part of CQI since it was introduced by Deming (1950). Yet research indicates that DBDM is difficult to put into practice due to the features of OBL (Jara and Mellar, 2009). Next, as Schildkamp et al. emphasise that ‘[…] management and faculty often still do not use data to their best effect, if at all ‘[…]’, and ‘[…]’ that decisions are still mainly based on intuition and limited observations [...]’ (Schildkamp, Poortman and Handelzalts, 2015). It is therefore useful to make data use throughout the CQI-cycle explicit. This is helpful to support developing practitioners’ competence in the use of data (Schildkamp and Kuiper, 2010) in quality management for OBL (Ehlers, 2007). Therefore, in the next paragraph we make DBDM in the CQI-cycle explicit.
Data-based decision making (DBDM) as part of CQI. DBDM is ‘[…] an iterative and cyclic procedure […]’ (Schildkamp, Poortman and Handzelzalts, 2015) that can be used by teams composed of management and faculty to use data collaboratively in a reflective dialogue within a school, using a structured approach ‘[…]’ (Schildkamp, Poortman and Handzelzalts, 2015). Management and faculty operating as a team at the programme level offers an answer to the first three disrupting factors for CQI (Jara and Mellor, 2009). In such a constellation the expertise and efforts of these professionals, with their different roles, who are responsible for OBL in the institutions can be directed in a targeted manner both for developing (Nihuka and Voogt, 2011) and managing the quality of OBL. Schildkamp et al. (2015) identified DBDM as a cyclic procedure that can be used by teams:

‘Data use in data teams starts with a purpose in the form of a problem definition and a related goal instead of with data. Next, data are collected to investigate possible causes of the problem. The team needs to filter the data (e.g. are the data valid and reliable? If not, additional data need to be collected and a feedback loop is created), organise the data to investigate the hypothesis, and analyse and interpret the data. Only then, these data are transferred into information. Combined with stakeholder understanding and expertise, this becomes actionable knowledge. Data teams can take two possible actions: The hypothesis is incorrect and the action is to go back to formulating new hypotheses (a feedback loop is created), or the hypothesis is correct and the data team takes action based on the data. In case of the latter, they also need to evaluate (collect new data) whether their actions have led to the desired outcomes and goal; in this way, another feedback loop is created.’ (Schildkamp, Poortman and Handzelzalts, 2015, p.4).

This typical DBDM-cycle (Schildkamp, Poortman and Handzelzalts, 2015) can be integrated in the CQI-cycle, figure 6. When the DBDM-cycle is embedded in the CQI-cycle it can be used for two purposes i.e. process evaluation and effect evaluation (Schildkamp et al., 2014). In the case of process evaluation, an implementation process is monitored (Schildkamp et al., 2014). This is useful to explore (monitor) and assess the effects of what is implemented (QA). If a team adopts an innovation like OBL, only the implementation process of OBL can be monitored and assessed (process evaluation). This first CQI-cycle results then in a current state analysis in the check phase (QA). Effect evaluation is only possible in a subsequent CQI-cycle. Effect evaluation is about whether improvement measures (QI) solve a problem (Schildkamp et al., 2014). This means whether the causes of a problem have been removed or that a problem has been solved and the goal has been achieved.
Figure 6: An integrated approach for effective CQI management of OBL: DBDM-cycle and steps integrated into the PDCRA-cycle.

The conceptual quality management model in this contribution is in line with literature in the fields of internal quality improvement and external quality assessment that emphasise the importance to systematically collect and analyse multiple data as a point of departure as a basis for decisions (Creemers and Kyriakides, 2010; Mutch, 2012; Vanlommel, Vanhoof and Petegem, 2016).

6. Discussion

The CQI management approach presented in this contribution is designed to be implemented with the conceptual quality framework for OBL by Ossiannilsson and Landgren (2012) and strategically adopt, monitor, assess and improve the quality of OBL in line with the needs of the adult students. We assume that the conceptual model for effective CQI management of OBL presented in this contribution can be used to investigate the effectivity of the CQI management approach. For these purposes Blieck et al. (2017, 2018, 2019) developed and validated two quality instruments.

Assuming that the conceptualised model for effective CQI management of OBL described in this contribution provides an approach to implement the work of Blieck et al. (2017, 2018, 2019) is one thing, achieving it quite another. To achieve this implementation, various concerns that the literature points to, need to be considered such as the relation to the external quality assurance (Mutch, 2012) and factors related to the quality instruments (Faddar et al., 2017) and the context (Schildkamp et al., 2016; Van Kemende, 2017). Because it is not possible to address all concerns in this contribution, we address the two most important aspects in relation to the educational context in which our work is meant to be implemented i.e. adult education. The first is, when carried out in OBL settings, whether the use of the quality instruments in the CQI management approach presented in this contribution can influence the learning or educational process already in place. More specifically, transform the implemented pedagogy of the face-to-face programme to realise the full potential of a (re)designed OBL programme (Graham and Robison, 2007). The second, is the need to take contextual factors (e.g. characteristics of the organisation, the team, the professionals and the data) into account during the implementation of the CQI management approach (Schildkamp, Poortman and Handelzalts, 2015; Schildkamp et al., 2016).

6.1 Critical reflections related to the implementation of the OBL quality instruments

While the quality instruments were validated for the context of adult education, have an explicit focus on OBL pedagogy and were designed to strategically adopt, develop, implement and assess OBL programmes (Blieck et al., 2017, 2018, 2019); they were used in an implementation study by Blieck (2018) in two contexts as part of their doctoral study. In this descriptive case study the researcher supported two teams consisting of management and faculty in different CAE, indicates that the quality instruments indeed support a quality dialogue between professionals (Deepwell, 2007; Ehlers, 2004, 2004; Ossiannilsson and Landgren, 2012) upon the adoption of OBL to take informed decisions to design and implement (QA) programmes for OBL (Blieck, 2018). However, the implementation was time intensive, spanning a period of 18 months, and resource intensive. With respect to this design of OBL programmes in education, it is important to take note that several stakeholders influence OBL design decisions i.e. management, faculty and learners (Shea, 2007). Therefore, it is crucial that the CQI approach supports management and faculty to implement OBL programmes that go further than increasing the convenience and productivity to learners (Graham and Robison, 2007). This means, firstly, to devote sufficient resources and time (management) to support and encourage the faculty to design OBL programmes focused on the pedagogical requirements of OBL programmes for adult learners. The time intensive implementation study by Blieck (2018) confirms these assertions. Secondly, in relation to this pedagogical design, it is important to take note of two observations. Firstly that several generations of distance education pedagogy emerged over time: cognitive-behaviourist, social constructivist and connectivist pedagogy (Anderson and Dron, 2011). The implementation study by Blieck (2018) indicates that the quality instruments (Blieck et al., 2017, 2018, 2019) allow to guide the decision process of practitioners towards the pedagogical elements of OBL. However, it remains unclear that the instruments are sufficiently generic to be compliant with these different pedagogical perspectives. This compliance is important for at least two reasons. Firstly, because in practice OBL programmes are seldom designed in accordance from one single pedagogical perspective (Anderson and Dron, 2011). Secondly, compliance is also important because all pedagogical perspectives add to the quality of the educational offering (Anderson and Dron, 2011). In sum, it remains thus to be seen if the instruments allow practitioners to re-design the learning or educational process that is already in place towards OBL programmes.
Also, when quality assessment uncovers problems, to what extent the quality instruments allow professionals to evolve towards an optimal educational design in terms of OBL pedagogy that is aligned with the needs of the adult students and balanced with the management infrastructure and resources. Because the implementation study by Blieck (2018) ended upon completion of the quality assurance phase, it did not allow to investigate the effectivity of the CQI management approach on the educational design.

6.2 Critical reflections related to the effective quality management approach for OBL

Both CQI and DBDM happen in a context that is influenced by characteristics of the organization, the team and its members (Abdous, 2009; Bloxham, 2010; Jara and Mellar, 2009, 2010; Schildkamp, Poortman and Handelzalts, 2015; Schildkamp et al., 2016). These (perceived) characteristics can act as catalysts or hinder implementation of effective CQI of OBL. With respect to the conceptualised approach for effective CQI management of OBL in this paper, it should be noted that it is generic and the design of the approach has been derived from literature in the context of higher education. Since scholars such as Van Kemenade (2017) contend that contextual elements affect CQI at the interface between the meso and micro level, it is not clear if and to what extent it can be implemented in different educational contexts. Because the implementation study by Blieck et al. (2018) was conducted in only two cases this question remains largely unanswered. Van Kemenades’ (2017) main argument is that, like quality models and their instruments, generic principles of quality management need to be adapted to different educational contexts. This is in line with the ICDE’s (Ossiannilsson et al., 2015) recommendation to assist institutions in adapting a (generic) quality management approach to their specific context, i.e., adult education. This is important because, there are practical issues involved in implementing quality models for effective CQI of OBL in HE (Jara and Mellar, 2009).

It is thus important to expand scientific knowledge on the context elements that are at play during the implementation (Abdous, 2009; Bloxham, 2010; Jara and Mellar, 2009, 2010; Schildkamp, Poortman and Handelzalts, 2015; Schildkamp et al., 2016). It remains to be seen whether the approach for effective CQI management can offset two important challenges related to the features of OBL (Jara and Mellar, 2009). First, if acting as a team can offset the features of OBL that challenge the involvement of the stakeholders at the interface between the meso level and micro level, and the consultation with students (Jara and Mellar, 2009). Second, if the explicitation of the DBDM-approach in CQI management alone will allow practitioners to achieve coherence between quality assurance and quality improvement (Abdous, 2009; Jara and Mellar, 2009). Taking research such as Schildkamp, Poortman and Handelzalts (2015) and Schildkamp et al., (2016) into consideration it is likely that teams comprised of management and faculty will need support in DBDM. This will be crucial to offset the factors at the level of the organization, the team (members) and the data (Schildkamp et al., 2016).

It is thus important in implementation studies (Blieck, 2018) to take the context in which quality models and instruments are implemented into account. This is important to assess transferability to other contexts. Despite the efforts of the researcher (Blieck, 2018) to provide an indication for the transferability of the findings in the implementation study by means of a thorough context description the number of cases to draw conclusions from remained limited. Therefore, we agree with the recommendation to explore suitable participation methods to involve all stakeholders, i.e., providers and students, through dialogue to achieve effective institutional quality management of OBL in education (Ehlers, 2004; Ossiannilsson and Landgren, 2012) and AE in particular (Ossiannilsson et al., 2015; Van Kemenade, 2017).

6.3 Suggestions for further research

We advise exploratory case study research (Yin, 2009) with the conceptual framework (Ossiannilsson and Landgren, 2012). This will inform practitioners how the different education providers (teachers and trainers (in all their roles), course designers and management) can engage and use the quality framework by Ossiannilsson and Landgren (2012). These studies are important to confirm the generic implementation principles of the approach for effective CQI management of OBL in different educational contexts (Van Kemenade, 2017) and enable mid-term and long-term effectivity research. Next, we advise that case studies in the field also investigate the contextual elements (Yin, 2009). Although elements such as institutional context, team, data, and self-characteristics lay beyond the scope of this contribution we advise to examine how these elements can interfere with or strengthen the quality management approach (Abdous, 2009; Bloxham, 2010; Deepwell, 2007; Jara and Mellar, 2009, 2010; Schildkamp, Poortman and Handelzalts, 2015; Schildkamp et al., 2016; Van Kemenade, 2017). Expanding the implementation research to a sufficient number and diversity of institutions is necessary to establish generic principles for implementation, for instance by uncovering the contextual factors that are at play. Investation of these contextual factors is important to gain insight into the transferability of the findings to
other contexts. A final route for future research is to implement the quality instruments by Blicke et al. (2017, 2018, 2019) together with traditional quality models for OBL (Hansson, 2008; Marshall, 2010; Williams et al., 2012), or even generic quality models in education, as the hybrid structure of these quality instruments would allow this.

7. Conclusion

In this conceptual paper we presented an approach for effective CQI management of OBL at the intersection of the meso and micro level. The approach integrates key findings from the fields of CQI (of OBL) and DBDM.

Effective CQI management (of OBL) needs coherence between quality assurance and quality improvement. Such coherence can be reached when management and faculty operate as a team, through dialogue, and consult the students, following a data driven approach. Multiple data sources are systematically collected to monitor and assess the implementation process and complemented with student feedback data to decide how to improve the quality of OBL and later assess the effects (Creemers and Kyriakides, 2010; Mutch, 2012; Vanlommel, Vanhoof and Petegem, 2016). Student participation in OBL is assumed as a suitable indicator for effective CQI next to, or in addition to, other quality measures (Ardi, Hidayatno and Zagloel, 2012).

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References


Editorial for EJEL Volume 18 Issue 2

Dear readers of the EJEL,

Just in time for the summer break of most readers we have been able to complete the second issue of the EJEL for the year 2020. Due to the currently ongoing COVID epidemic, the importance of e-learning has gained special significance. In only short periods of time, e-learning solutions had and still have to be implemented where conventional classroom teaching was the accepted standard just months ago. Educational institutions unintentionally have become real laboratories of e-learning. Although e-learning benefits unintentionally from the current situation, it is to be hoped that this reason for the advancement of e-learning will disappear as soon as possible.

Combining seven articles, this issue again looks – led by the notion of blended learning – at different aspects of e-learning and thus illustrates the complexity that everyone, who is developing or implementing e-learning solutions, has to tackle.

The first article by Johannes Cronje from Cape Peninsula University of Technology, Cape Town, South Africa, prepares the ground for a new definition of blended learning. In “Towards a new definition of blended learning“, he argues that current definitions of blended learning are not based on theory and do not consider the notion of learning. Instead, he suggests building a definition on learning theory, thus blending direct instruction and learning by doing. The definition presented combines context, theory, methodology, and technology.

Thereafter, Josemaría Elizondo-Garcia and Katherina Gallardo from the School of Humanities and Education (Tecnologico de Monterrey, Monterrey, Mexico) investigate learner-learner interaction in xMOOCs. Their article “Peer Feedback in Learner-learner Interaction Practices. Mixed Study on an xMOOC on Energy Saving“ provides evidence that students are willing to participate in peer feedback activities and that peer feedback is a advantageous means of providing feedback compared to discussion forums, despite of the great diversity of students. Although inherent and external factors of providing feedback are identified, the authors conclude that more research is required to improve the beneficial effects of peer feedback.

Further, Ammar J. M. Karkar, Hayder K. Fatlawi, and Ahmed A. Al-Jobouri from the University of Kufa, Najaf, Iraq present a case study of their university in the article entitled “Highlighting E-learning Adoption Challenges using data Analysis Techniques: University of Kufa as a Case Study“. From the perspective of a developing country, the authors state that adoption of technology for learning seems to be dependent on the regional and national context. The University of Kufa has introduced the learning management system Moodle in 2013. Based on a survey among the university’s educators, having the impressive number of 242 participants, factors hindering the adoption of e-learning are identified. One remarkable factor identified is the perception among educators that social media might be used more conveniently than learning management systems. Finally, a guideline facilitating the introduction of e-learning and aimed at policymakers is given.

The fourth article in this issue is authored by Rachael Njeri Kibuku, Daniel Orwa Ochieng, and Agnes Nduku Wausi, representing KCA University and University of Nairobi, both located in Nairobi, Kenya. Their article titled “eLearning Challenges Faced by Universities in Kenya: A Literature Review“ tackles a similar problem to that described in the previous article: implementation of e-learning faces many challenges. Based on a scoping literature review, the challenges especially prevalent at Kenyan universities are identified. Thus, a roadmap for successful implementation of e-learning in Kenya – and probably further countries characterized by a similar structure– is delivered.

Blended learning again, this time from the perspective of the practical implementation, is focused on in the next article provided by Dina Adinda and Najoua Mohib from the University of Strasbourg, France. Their article, named “Teaching and Instructional Design Approaches to Enhance Students’ Self-Directed Learning in Blended Learning Environments“ investigates, based on a mixed method study, blended learning scenarios of 18 lecturers. Among the findings is that self-directed learning is only being supported by few of the learning scenarios investigated. The support of interaction and collaboration in blended learning environments is seen as a further research need.

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Thereafter, Colleen Carraher Wolverton, Brandi N. Guidry Hollier, and Patricia A. Lanier from the University of Louisiana at Lafayette, United States examine the impacts of computer self-efficacy. Their article “The Impact of Computer Self Efficacy on Student Engagement and Group Satisfaction in Online Business Courses” describes findings based on a survey among students. Among their findings is computer self-efficacy having positive effects on engagement and group satisfaction, although the latter is based on group expectations as mediator variable, thus in summary advocating technical literacy as a key skill for e-learning.

Finally, a combined team of researchers from Belgian and Dutch universities describe “A Conceptual Model for Effective Quality Management of Online and Blended Learning“. Yves Blieck, Chang Zhu, Kim Schildkamp, Katrien Struyven, Bram Pynoo, Cindy L. Poortman, and Koen Depryck present a theoretical foundation of continuous quality improvement (CQI) management for online and blended learning (OBL) scenarios. Thus, the authors provide a method not relying only on quality assurance but also on continuous improvement. By discussing literature-known factors preventing practitioners from achieving coherence between quality assurance and improvement, a conceptual model is developed, which exploits data for decision making driving the CQI management.

Concluding, we hope you will find many interesting insights while reading this issue’s articles and we are looking forward to welcoming you again in the next issue of EJEL - hopefully under improved circumstances.

We would also like to refer you to the special edition of the EJEL on topics of e-learning, which have gained special importance due to the COVID pandemic, or which are particularly prominent under the conditions of the pandemic. You are invited to submit articles on these topics by the end of the year.

Journal Editors
Heinrich Söbke and Maria Cubric.