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Interactivity and Sense of Community- Fundamental Parts of the E-Learning Environment

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Abstract

During the COVID-19 pandemic, the traditional learning system embraced at an accelerated pace the e-learning and m-learning platforms, significantly transforming the educational sphere. Understanding the factors that contribute to creating an effective digital learning environment has become crucial. Despite this shift, the adoption of these methods faces challenges, particularly due to a lack of comprehensive scientific research. Specifically, the role of interactivity in shaping the learning outcomes remains insufficiently explored in the existing literature. This gap underscores the need for further investigation into how interactive elements impact both teaching and learning in digital context. Additionally, the sense of belonging to a study community is an important factor that can enhance the overall e-learning experience. This study aims to address these issues by examining the impact of interactivity and community belonging on student engagement and performance in e-learning. It seeks to contribute valuable insights to the field of education and inform best practices for effective e-learning environments.

Keywords: E-Learning, Interactivity, COVID-19 Pandemic, Asynchronous Learning.

Introduction

The COVID-19 pandemic has speeded up the paradigm shift in the educational system, involving the widespread adoption of digital tools and platforms to ensure access to remote learning. In the first phase the challenge was to maintain learning continuity during lockdown and social distancing period. This way the existent mobile and online applications became indispensable resources. Teachers, students, parents, educational content, all must adapt to this new reality.

Our research examines the interactivity component of the online educational process. Given the fact that it was an unprecedented situation, to completely replace the traditional learning, less attention has been paid in a conscious manner to this feature, the goal being as above mentioned, to ensure the education continuity. Initially, acquiring the physical means such as laptops or tablets to achieve this goal represented the biggest challenge. Only after a while accent emphasis moved to the content delivered to the student and the manner it was delivered. It has become important to develop this area and enhance understanding the interactivity, as a reflection of the student response to the new innovative environment, highlighting not only the advantages, but also the challenges encountered, with the sole goal to improve the practice on long term. In this paper we will try to highlight why is it important to pay attention to the interactivity feature in the e-learning classes and to make suggestions that can be followed to achieve the best outcomes and how does this intertwine with belonging to a study community.

Literature Review

Over time there have been many attempts to define the e-learning concept. It has been considered that it has its origins in long-distance learning. Sangrà, Vlachopoulos and Cabrera (2012), have classified the e-learning definitions into four main categories: technology-driven definitions (accent on use of technology for learning), delivery system-oriented definitions (e-learning seen as method to access information, knowledge), communication-oriented definitions (e-learning as collaboration tool), educational paradigm-oriented definitions (e-learning as new method of learning).

A more recent definition, offered by Rodrigues et al (2019), (p. 95), cited in Valverde et al (2020), identified e-learning as an innovative web-based system that is based on digital technologies and other types of educational material, with the primary goal to provide the students with a personalized, learner-centered, open, enjoyable, and interactive learning environment supporting and enhancing the learning processes.

Many educational institutions utilize e-learning platforms and applications adopting a customer-oriented approach to tailor services to meet the specific needs and preferences of the end users. These platforms often offer features such as the wiki spaces for collaborative projects, video presentations, software applications, simulators, the real-time communication channels, or other learning applications (Rodriguez-Ardura and Meseguer-Artola, 2016).

These instructional methods help categorize the e-learning settings into either synchronous or asynchronous. In a synchronous setting teachers and students interact in real time, using a digital platform to facilitate live lessons and discussions (Amiti, 2020). Synchronous learning is characterized by interactions and time (Shahabadia and Uplane, 2015). On the other hand, the asynchronous settings are temporally and geographically independent, individuals, the students act on their own and impose their own pace, being less teacher-dependent (Bernard et al., 2004; Murphy et al., 2011; Clark and Mayer, 2016; Xie et al., 2018 cited in Fabriz, Mendzheritskaya and Stehle, 2021). The methods are time delayed, as the interested parties – teachers and students do not engage at the same time on the

platform. What distinguishes these two types of settings is the time and the place of teaching and learning activities, the presence, or the absence of the concomitant presence. In the asynchronous setup, the communication often involves using communication channels such as emails, messages, posts on forums and at the same time can spread to a greater number of students in a given period.

In a comparison study on the effect of these settings, Hrastinki (2008) cited in Mohammad et.al. (2024) revealed that the asynchronous type of learning has a positive impact on the student ability to process information, while by using the synchronous method for teaching, the students felt more motivated and curious. This might be caused to a certain level, by the possibility of the students to provide and receive feedback in real time. In terms of satisfaction, the synchronous environment seems to conduct to a greater level of satisfaction among students (Fabriz, Mendzheritskaya and Stehle, 2021).

After reviewing several articles in the literature, some of the key advantages and disadvantages associated were grouped in the following table, pointing out the impact that these environments might have on involvement, collaboration, and other learning outcomes:

Table 1
Advantages and disadvantages of synchronous and asynchronous learning

SYNCHRONOUS LEARNING	**ASYNCHRONOUS LEARNING**
Advantages	
Interaction Immediate feedback, dynamism, active involvement (Hrastinski, 2008; Murphy et al., 2011)	**Time for processing the information** To reflect and study, deepen understanding encouraged (Hrastinski, 2008; Bernard et al., 2004)
Collaboration Teamwork is encouraged (Murphy et al., 2011; Chen, et.al, 2020)	**Collaboration** Usually through forums or other shared materials (Rodriguez-Ardura and Meseguer-Artola, 2016; Swan, 2003)
Involvement and motivation To participate to courses (Hrastinski, 2008; Chen et al., 2020)	**Autonomy** Engagement with course content in own rhythm (Bernard et al., 2004; Swan, 2003)
Real time feedback To clarify issue that might arise (Hrastinski, 2008)	**More detailed feedback** More time to analyze (Rodriguez-Ardura and Meseguer-Artola, 2016)
Disadvantages	
Synchronization Leads to limited flexibility (Hrastinski, 2008; Murphy et al., 2011)	**High flexibility** Might conduct to inconsistency in study (Bernard et al., 2004)
Reduced focus and attention At individual level (Hrastinski, 2008)	**Isolation** Might demotivate and decrease level of involvement (Rodriguez-Ardura and Meseguer-Artola, 2016; Swan, 2003)

Technology dependency Necessity of a stable internet connections and updated technology (Hrastinski, 2008; Murphy et al., 2011)	**Reliable access** Less affected by disruptions, still require s access to the internet. (Bernard et al., 2004; Swan, 2003)
Motivation Scheduling conflicts and distractions can demotivate and reduce participation (Hrastinski, 2008)	**Motivation** Translated into self-discipline and time management (Swan, 2003)

Both synchronous and asynchronous learning offer several advantages for students and teachers, but they pose also challenges such as reliance on technology. To address these challengesand enhance the experience for the users, incorporating interactivity into e-learning is essential. Interactivity can create a more dynamic environment that leverages the benefits of both approaches.

In this section we`ll explore how effectively incorporating interactivity can transform the e-learning experience and boost student engagement. Although education based on e-learning addresses limitations such as geographical barriers, as noticed during the pandemic, it might also come with uncertainties amongst students. Only when the student overcomes the barriers of insecurity through interaction, one can fully benefit from the learning process. A pivotal role in overcoming such limitations is building a supportive community built around the class, this being a topic that will be later addressed. Interactivity alone is not enough; it lays the foundation for creating and maintaining a community where the student feels confident to ask questions and communicate openly.

With the unprecedented growth in e-learning demand in recent years, educational institutions face the challenge of a thoroughly understanding this instrument and the impact that interactivity might have on the learning process. According to a study of Rodriguez-Ardura and Meseguer- Artola (2016), an interactive e-learning environment fosters a positive attitude and behavior among students, enhance their sense of belonging to the educational universe, and increases their engagement with learning tasks. Mehra and Omidian, cited in Nariman (2020), identified five factors that can influence the student attitude toward adapting the e-learning: intention, perceived usefulness, perceived ease of use, pressure to use technology and resource availability.

Interactivity, especially in the context of e-learning, refers to the capacity for interaction within the system, in most common cases, usually within the platform and is represented by the design features that enable communication between users. It provides the framework for interactions that enhance the outcomes. A closely related concept, the interaction in e-learning refers to the bi-directional dynamic manifested between students, students and teachers, auxiliar personnel, but it also includes the interaction with the content of the study, with the learning material (Moore, 1989, cited in Leem, 2023). Along with the individual interaction that plays a pivotal role, the mixture of these three types of interactions is considered to maximize motivation, satisfaction and achievement when using e-learning (Mahle, 2011, Park and Choi, 2009, cited in Dailey Hebert, 2018).

Several researchers have analyzed and integrated all three types of interaction in their studies. For instance, the Community of Inquiry (CoI) Framework proposed by Garrison, Anderson and Archer (2000), integrates teaching presence (*learner-teacher interaction*), social presence (*learner-learner interaction*) and cognitive presence (*learner-content interaction*). Likewise, Moore (1989), cited in Leem (2003), allocates three dimensions to interactivity: communication between learners and teachers (including feedback, discussions, and other type of content-clarification), engagement among peers (on collaborative projects or group discussions) and the interaction with educational materials (including simulations, quizzes or other resources).

Taken one by one, in an e-learning environment, teachers should manage and succeed in establish make as productive as possible the connection with the students. There are authors who consider that *interaction with the teacher* increases satisfaction with the course (Turley and Graham, 2019) or authors who consider that technology prevents effective communication between parties (Thomson, 2010), both opinions cited in Keaton and Gilbert (2020). Among the indicators of the teacher`s presence with the most impact for students, Sheridan and Kelly (2010) have identified understanding course requirements, adaptability to learner`s needs, role as feedback provider or information accuracy. In an e-learning environment, fostering productive connections with the students and prioritizing learner-teacher interaction is essential for creating an engaging e-learning experience.

Learner-content interaction reflect the way learner connects with the available materials (multimedia resources, simulations, textbooks, audiobooks and so on). Bernhard et. al. (2014) concluded, based on their meta-analysis, that this form of interaction might be the most influential form for a successful outcome of education, especially in an asynchronous environment. As a result of the literature review, we can emphasize the need to create interactive instruments that would encourage student involvement and active participation. Unlike the other two forms of interaction, the learner-content interaction is a one-way road (Kuo et al., 2014 cited in Ahoto, Mbaye and Anyigbah, 2022). Student-content interactions advocate for autonomy flexibility and learner created content (Dailey Herbert, 2018). Time spent with the content of the course is vital in the educational process, learning outcomes (Zimmerman, 2012 in Ipinnaiye and Risquez, 2024).

Hrastinski (2019), emphasized the importance of *learner-learner interaction* for fostering the sense of community and to stimulate collaboration, resulting a motivational role that should not be overlooked when analyzing the success of a e-learning experience. Collaboration in the learning process, properly encouraged, inspires teamwork, can impact student`s performance, cultivate critical thinking, elevate individual confidence and last but not least enhance communications skills (Alzahrani and Mehdipour, 2020). If learners interact with their peers, they are more likely to remain focused and committed to study. Interactivity fosters support, encourages students to share, to clarify unknown aspects and last, but not least it can reduce the feeling of isolation, given the distance imposed by e-learning.

To conclude, when designing the e-learning experiences, specific instrument can be applied to each type of interaction, instruments presented in the below list, which is not intended to be exhaustive one:

- Learner-Teacher Interaction: live webinars, moderated discussion forums, messaging platforms, feedback systems (Keaton and Gilbert, 2020; Sheridan and Kelly, 2010; Bernard et.al., 2004)
- Learner-Content Interaction: multimedia instruments (simulations, games, video), live quizzes, virtual spaces (Zhu and Doo, 2020, Bernard et. al., 2004)
- Learner-Learner Interaction – debates, role-play, breakout rooms, groups assignments, video conference, messaging platforms (Hrastinski, 2019; Alzahrani and Mehdipour, 2020, Dailey Herbert, 2018).

Sense of Community- Relevance in E-Learning

While interactions between students and teachers, their peers and context play a significant role in the e-learning process, this might not suffice for the individual to succeed. We can mention some other factors such access to resources, learning strategies, self-motivation, discipline, contextual factors, presence of a supportive network and the list can continue.

The perspective presented by Mohammad et al (2024), highlighting the constructivist theories, based on which learning becomes more effective when students feel connected to a community, sets the stage of the next section, for a deeper exploration of how a sense of belonging to a community impact e-learning outcome.

Research has increasingly focused on the importance of a sense of belonging within the educational landscape, particularly when discussing about e-learning. Studies have shown that students that perceive themselves as part of a learning community are more likely to actively engage in their education and have proven higher level of achievement (Rovai, 2002, Walther, Boote and Torkzadeh, 2015). This engagement can be explained by its influence on motivation, intrinsic motivation of connected students increases (Deci and Ryan, 2000).

Group membership can therefore impact the various dimensions of learning such as motivation and engagement (community and peer interactions increase student motivation in online classes – Jaggars and Bailey, 2010), academic performance (due to increased involvement, support and opportunities), social support and collaboration (through shared knowledge and supportive environment – Smith et al., 2014), emotional well-being (minimum chances to feel isolation from group, especial in the context of social distance – Freeman, Anderman and Jensen, 2007), retention rates (higher rates of class completion). We can conclude, based on literature review, that fostering the belonging sense can lead to enhanced e-learning outcomes. This is why is equally important that teachers should be more and more involved in developing a supportive community to maximize the chances for student success in online learning environments.

Recommendations

In order to enhance the e-learning experience for the end-users, several recommendations can be further implemented. First, involving the students in the co-creation of the learning content cand encourage them to actively participate, enhances engagement and promotes at the same time the feeling of ownership over the learning process. In addition, establishing collaborative communities for practice, can give the learners the opportunity not only to interact, but also to share their own expertise, facilitates support and most important, contributes to a stronger sense of belonging. Also, proposing accessible learning materials is important, using of the resources for various context, accommodating them to learners needs. Last, but not least, by implementing a feedback mechanism, the students will have the possibility to receive prompt and customized responses, will enhance satisfaction and track the progress, therefore, will create a more effective learning environment.

Conclusions

The transition to e-learning, significantly accelerated by the COVID-19 pandemic has highlighted both the challenges and the opportunities presented by online education. As important as enhancing the e-learning experience is the integration of interactivity and cultivation of a strong sense of community among learners, teachers, and content of education. This dual focus is essential for sustaining meaningful interactions that contribute to student motivation, satisfaction and overall improved learning outcomes.

The literature suggests that interactivity enhances engagement, improves academic achievements and builds a supportive environment. The successful implementation of these interactive elements requires careful consideration of both technological and pedagogical factor. Only relying on technology, without an effective integration can lead to a superficial engagement, losing sight of the benefits.

As educational institutions worldwide continue to navigate the complexities of e-learning, the emphasis on community-building and interactive learning strategies will gain more importance. By prioritizing these elements, teachers will be able to create more inclusive and engaging learning experiences, that serve students with different backgrounds and skills. Future research should focus on proposing even more innovative methods to further integrate interactivity within e-learning environments, addressing existing challenges and exploring the impact on student retention and long-term success.

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