

COMPARING E-LEARNING PLATFORMS FROM THE PERSPECTIVE OF FACILITATING ACTIVE AND COLLABORATIVE LEARNING

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Abstract

The last decade of research on how to create and manage efficient educational processes indicates significant improvements. The shift from traditional learning to learner-centered education has led to the implementation of various learning environments supported with strong online functionalities.

Therefore, at present, the E-Learning systems at individual level, not just at the generation level, tend to be increasingly complex, integrating multiple facilities such as audio and video content distribution, live streaming, chat, exercises and tests, discussion forums, integration with other platforms and so on. The intense development of E-Learning platforms makes it difficult to differentiate between them, often the possibilities offered to the users being almost similar. In addition, the existence of a large number of E-Learning systems determines the difficulty in dividing them taking into account well-defined criteria.

The present paper aims to expose the results obtained by performing a comparative analysis between some of the most popular platforms that are created and primarily used for educational purposes, from the perspective of facilitating active and collaborative learning. From a methodological point of view, the analysis in this case is based both on qualitative research, necessary in order to provide a better understanding on the addressed subject, as well as on the direct observation on the reality, in an attempt to obtain significant information following the comparative analysis performed.

Keywords

E-Learning Platforms, E-Learning Comparison, E-Learning Solutions, Collaborative Learning

JEL Classification

D83, Q55, L86, O3

Introduction

The continuous evolution of computer technology has influenced many spheres of activity therefore today the use of digital tools has become a familiar activity to many of us. The development experienced by the Information and Communications Technology (ICT) field has led to the reorganization of many domains or to the change of the activities undertaken within them, also affecting the educational processes. Hence, the traditional teaching and learning approaches have benefited from significant transformations, the digital progress encouraging the creation of educational environments supported by complex technological infrastructures.

Over time, many concepts have been used in order to define the educational processes carried out with or through digital tools. However, at present, as a result of the undeniable progress of the Web and the increased possibilities in terms of connectivity, the specific terminology often refers to the E-Learning concept. In fact, in many cases, E-Learning is similar to Computer-Assisted Instruction, but implies the existence of internet connection.

E-Learning systems have benefited from a chronological development, concurrent to the progress of the Web and the ICT field as a whole. Individually treated, the E-Learning solutions developed over time came in the form of platforms or systems, gradually offering increasingly complex facilities.

Collaborative learning has been recognized as being more effective than individual learning, offering many benefits such as enhancing the motivation of participants in educational processes and significantly contributing to positive outcomes (Slavin, 1995; Johnson, et al., 2000; Snowman, et al., 2009). From this specific reason, multiple E-Learning systems have been designed and implemented aiming specifically to support active and collaborative learning. Currently, the most widely used E-Learning systems encourage learner-centered approach and function based on the idea that participants in the learning processes are directly involved in it, through collaboration with others. Therefore, the student plays the most important role, being both in the position acquiring/developing knowledge, but also being responsible for distributing and development of knowledge of other people.

Nowadays, the options for E-Learning systems are extremely diverse, including those aimed at supporting active and collaborative learning. The natural question thus arises: *How can we choose the right platform from the available platforms?* The increased number of such software products, but also the multiple and often almost similar facilities offered by them hampers the process related to their differentiation. Therefore, when it comes to using an existing E-Learning system we may face a real and hard challenge in terms of choice.

The main purpose of this paper is to make a comparative analysis among some of the most used and recommended E-Learning platforms in terms of facilities offered that support active and collaborative learning. In order to identify the platforms under analysis, a first filtering was performed based on well-known categories of distance learning solutions with online functionalities, which proved that Learning Management Systems (LMS) best serve the purpose of our analysis. The second stage consisted in choosing some of the most popular LMS following criteria that would facilitate the analysis by direct testing, such as the multilingual character of the platform. The results of the study provide an overview of the analyzed LMS, which can facilitate the choice process when targeting active and collaborative learning. At the same time, the proposed framework of reference can serve as a starting point in achieving a more extensive benchmarking model, taking into account other perspectives or criteria.

Category Selection

When a comparative evaluation of elements that are part of a large conglomerate is desired, one of the initial steps of the analysis process consists in identifying the elements that are significant for it. In the present situation, the elements are represented by the platforms with

online functionalities that can serve educational purposes. However, the current multitude of such platforms determine the difficulty with respect to the selection process. Hence, identifying some categories through which the analyzed elements can be distinguished becomes almost imperative.

In the present section, the interest is attributed to the choice of a representative category for online educational solutions that are *(1) created and used primarily for educational purposes, (2) encourage collaboration between participants in educational processes (both instructors and learners) and active learning, and (3) have a high degree of complexity.* Thus, given the fact that the ICT field is dominated by rapid progress, we consider that outdated solutions or offering limited facilities have a low degree of significance for the analysis in question, as there is an increased risk that they will be removed from the market in the future.

Defining a generally accepted typology regarding E-Learning platforms can be considered an almost impossible task. We justify our statement by the fact that each new platform or new E-Learning system lays the foundations of its own learning model, offering new facilities and opportunities for users. In addition, there are currently many software products that can be used for educational purposes, but these were not created directly or solely for this purpose. Thinking about the previous mentioned aspects, we can affirm that a new online learning solution will not fully comply with the typologies of previous generations.

Although we cannot identify a general typology that can be attributed to E-Learning platforms, we can distinguish between several main categories of software products with online functionality that are, have been or can be used for educational purposes, depending on the characteristics offered. In the context of the coronavirus pandemic (COVID-19), UNESCO has published a list of distance learning solutions (UNESCO, 2020). The mentioned list contain both online and offline distance learning solutions, in order to support disadvantaged communities as well.

As the purpose of this research only relies to the E-Learning platforms, which are part of distance learning solutions with online functionality, we will focus on them, but also on other online tools that can be used for educational purposes. Thus, we distinguish between the following categories, for which were also presented some of the main characteristics based on the authors experience and literature review:

Table no. 1 Categories of Distance Learning Solutions with Online Functionalities

CATEGORY	GENERAL CHARACTERISTICS
<i>Digital Learning Management Systems (LMS)</i>	<ul style="list-style-type: none"> • Ensures the administration of learning, training, personal development or other types of educational courses; • Among the general facilities offered by such systems, we can mention ensuring the communication between students and instructors, monitoring, reporting and delivery of educational courses, class and user management. (Coates, et al., 2005)
<i>Massive Open Online Course (MOOC)</i>	<ul style="list-style-type: none"> • Provides unlimited participation (massive) and open access (without specific restrictions on participation) to educational resources through the Web; • Offers interactive elements in order to encourage interactions among learners and between learners and instructors, although the second one does not represent a defining requirement. (Kaplan & Haenlein, 2016)
<i>Collaboration platforms that support live-video communication</i>	<ul style="list-style-type: none"> • Provides real-time video conferencing via the Web; • Facilitates task management, scheduling and attendance tracking; • Provides instant messaging features.
<i>Systems built for use on basic mobile phones</i>	<ul style="list-style-type: none"> • They are intended for conducting educational courses predominantly through basic mobile phones; • The provided interface implies a high degree of adaptability depending on the mobile device used.

<i>Self-directed learning content</i>	<ul style="list-style-type: none"> • Provide users with educational content tailored to different levels of learning, so that they can learn individually; • Support personalized learning.
<i>Mobile reading applications</i>	<ul style="list-style-type: none"> • Provide educational content for reading; • The educational resources are often available in several languages.

Source: Table realized by the authors based on information provided by reviewing the literature in this filed and own experience

Based on the information presented through the previous table, is observed that the division into categories was carried out based on the main goals or learning needs targeted by them. In order to solve the objective of this paper, we will focus on the *Digital Learning Management Systems (LMS)* category. We consider the other categories as being only tools and not E-Learning platforms, because they serve limited purposes or can be used, to some extent, by integration with LMS.

Identification of the Platforms under Analysis

Given the category previously identified as suitable for the current research, namely LMS-type educational tools, the following step of the analysis involved the identification of the platforms that can be included in this group. Although, at present, there are multiple LMS existing on the market, the current research was limited considering the LMS-type online learning solutions proposed by UNESCO (Table no. 2). The majority of the proposed solutions are free, multilingual, tend to have a wide coverage, an extensive user base and evidence of the exercised positive impact (UNESCO, 2020).

Table no. 2 LMS-type Online Learning Solutions

PLATFORM	GENERAL DESCRIPTION
<i>CenturyTech</i>	It offers a full range of courses based on microlearning in order to address knowledge gaps, challenge students and support the development of long-term memory.
<i>ClassDojo</i>	Ensures the connection between teachers, students and parents, building class communities.
<i>Edmodo</i>	It provides tools and resources for managing courses and involving distance learners, offering a variety of languages.
<i>Edraak</i>	Represents a non-profit open online course portal for promoting knowledge in the Arab world. It is considered the first non-profit, pan-Arabic online educational platform to offer free courses to students around the world.
<i>EkStep</i>	Open learning platform with a collection of learning resources to support literacy and numbering.
<i>Google Classroom</i>	Helps classes connect remotely, communicate and be permanently organized.
<i>Moodle</i>	Open, community-based learning platform supported worldwide.
<i>Nafham</i>	Arab language online learning platform hosting lessons of educational video films that correspond to Egyptian and Syrian school curricula.
<i>Paper Airplanes</i>	Suitable for learners with personal tutors, promoting learning through sessions (12-16 weeks) conducted via video conferencing platforms.
<i>Schoology</i>	Offers tools that support instruction, learning, grading, collaboration and evaluation.
<i>Seesaw</i>	Provides tools that enables and encourage the creation of collaborative and sharable digital learning content.
<i>Skooler</i>	Provides tools aimed to turn Microsoft Office software into an educational platform.

Source: Table realized by the authors based on information provided by UNESCO (UNESCO, 2020) and vendors of the platforms

In order to facilitate the direct evaluation of the analyzed platforms, those with an extensive multilingual functionality were chosen from the above-presented list. Moreover, the platforms with limited functionality, for example focused on a certain type of learning such as microlearning, were not subject of the preset analysis. Therefore, following the filtering process, the selected software systems were: ClassDojo, Edmodo, EkStep, Google Classroom, Moodle, Schoology, Seesaw and Skooler.

Evaluation Criteria

The specialized literature offers us numerous studies targeting models of comparative evaluation between different E-Learning systems. Analyzing this field of research we concluded that most studies similar to the one aimed to be carried out in the present paper are either focused on a particular type of platform, or analyze multiple E-Learning systems from certain perspectives. We consider these approaches to be normal in a dynamic context as that of digitalization in which the continuous evolution of the ICT field and, implicitly, of E-Learning prevents us from creating a framework that can serve as a permanent guide or general model of evaluation.

A well-known solution that can be used in order to compare E-Learning systems was proposed by Britain and Liber (Britain and Liber, 2004), considering two models on which the assessment strategy can be based. The first model takes into consideration various ways in which the learning process is produced within an E-Learning platform (discursive, adaptive, interactive or reflective). The second model aims at the analysis based on criteria from an organizational perspective. The authors consider the two methods to be complementary and in terms of their application, methods such as questionnaires or grid-based evaluation were used to determine whether or not a platform meets the established criteria.

Some studies have involved the evaluation of E-Learning systems that fall into a certain typology, often targeting free or open-source platforms (Saeed, 2013; Ouadoud, et al., 2016) as they can be used by a wide range of users. Other research focused on comparative analysis from certain points of view, such as adaptivity (Reyes et al., 2009), usability (Martin et al., 2008), quality (Masoumi and Lindström, 2011; Casanova, et al., 2011) and so on. Although the research carried out over time targeted a certain purpose, the establishment of a general comparison framework being impossible, each of them included several evaluation criteria considered important for the objectives of the studies in question.

The above mentioned are just some of the studies conducted over the years in terms of evaluating E-Learning systems, often the approach being comparative. In this paper, we have limited our research by proposing an evaluation framework that aims to analyze only two main directions, namely **(a) the active involvement of participants in educational processes** and **(b) the collaboration between them when using an E-Learning platform**. Certainly, in the current context most E-Learning systems integrate facilities specific to the two directions that were selected, but in an attempt to analyze them comparatively, we consider such a framework as the one proposed useful.

In order to establish benchmarking criteria for the proposed framework of reference, multiple external sources previously presented were taken into account, the starting point being represented by the studies provided by Casanova et al. (Casanova et al., 2011; Masoumi and Lindström, 2011 and Ouadoud et al., 2016). In fact, following the review of these external sources, criteria have been extracted, adapted and grouped and their fulfillment can serve as a model for the evaluation of E-Learning platforms from the perspective of supporting active and collaborative learning.

At the same time, the establishment of the criteria followed the model proposed through the LMS Evaluation Tool (Longsight, 2013), which also served as a guide on the evaluation grid. Thus, in order to examine the analyzed E-Learning platforms, we chose to rate each criteria

in accordance with the grid proposed in the LMS Evaluation Tool: 0 (*Feature Not Present*), 5 (*Fair*), 8 (*Good*) or 10 (*Excellent*).

Table no. 3 provides an overview of the benchmarking criteria considered important for the purpose of the analysis in question.

Table no. 3 Overview of the benchmarking criteria

Functional Facilities that Enhance Active and Collaborative Learning			
CRITERIA	FAIR (5)	GOOD (8)	EXCELLENT (10)
<i>Content authoring</i>	Provides basic means for content uploading and storing.	It allows the uploading, creation and storage of content by basic means in a creative system that is part of the platform.	Provides a suite of built-in tools that can be used for creating rich media content (audio, podcasts, videos, presentations, etc.).
<i>Communication</i>	Offers basic communication facilities such as comments based on educational content or basic messaging facilities.	Offers extensive means of communication such as real-time chat or written/audio/video one-to-one communication through tools that are part of the platform.	Offers complex means of communication integrated into the platform, such as video conferencing with a large number of users.
<i>Content transfer</i>	Provides means for instructors to exchange educational content with students.	Offers extensive means by which educational content can be transferred both from the instructors to the students and from the students to the instructors.	Provides complex means by which the educational content can be exchanged between all participants in the educational process, including among learners.
<i>Integration with other platforms that support collaboration</i>	The integration with platforms or plugins that support written communication such as e-mail or those used for collaborative creation of educational content such as Google Docs is ensured or possible.	Integration with platforms that support both written collaboration and extended video or audio such as Google Meets or Zoom is ensured or possible.	The integration with platforms that support both written, video and audio collaboration, as well as the distribution of knowledge at external level, such as platforms such as social networks is ensured or possible.
<i>Testing and evaluation tools</i>	Offers built-in basic individual evaluation tools for written assessment, such as questionnaires and open-ended questions, or students have the opportunity to upload materials in a variety of formats using external software tools.	Offers built-in basic individual and collaborative evaluation tools for written assessment, such as questionnaires and open-ended questions, or students have the opportunity to upload materials in a variety of formats using external software tools.	Offers built-in individual and collaborative assessment tools through which students can solve tasks in writing, video or audio.

Source: Authors' proposal

We assume that this framework for the comparative assessment of E-Learning systems can be considered a relatively limited one, being restricted for the purpose of “labeling” the platforms evaluated exclusively for active and collaborative learning. However, it allows us to provide an overview of the platforms under analysis.

Results and Discussion

In order to analyse the selected E-Learning platforms, starting from the previously proposed framework of reference, both a detailed exploration of the information proposed by the vendors of the systems concerned and a direct observation by the authors were involved. By using the two methods of obtaining information and performing the analysis, acquiring a higher degree of significance was intended.

For the purpose of direct observation, both teacher/instructor accounts and student accounts were created within the analyzed platforms, where possible. Also, in terms of direct observation of reality through the practical simulation performed, the basic functionalities offered by the platforms were explored by testing. Although most of the analyzed systems are free, in some cases there are also possibilities to extend the functionalities through payment, option that was not chosen for the present study.

Table no. 4 summarizes the results obtained from the analysis in order to provide an overview of the facilities offered by the analyzed LMS, from the perspective of encouraging active and collaborative learning.

Table no. 4 Summary of the Results Obtained

LMS	Content creation	Communication	Content transfer	Integration with other platforms that support collaboration	Testing and evaluation tools	Total
<i>ClassDojo</i>	Good (8)	Fair (5)	Excellent (10)	Good (8)	Excellent (10)	41
<i>Edmodo</i>	Fair (5)	Good (10)	Excellent (10)	Good (8)	Excellent (10)	43
<i>EkStep</i>	Excellent (10)	Fair (5)	Excellent (10)	Good (8)	Fair (5)	38
<i>Google Classroom</i>	Good (8)	Fair (5)	Excellent (10)	Good (8)	Good (8)	39
<i>Moodle</i>	Fair (5)	Good (8)	Excellent (10)	Good (8)	Good (8)	39
<i>Schoology</i>	Fair (5)	Good (8)	Excellent (10)	Good (8)	Good (8)	39
<i>Seesaw</i>	Excellent (10)	Fair (5)	Good (8)	Good (8)	Excellent (10)	41
<i>Skooler</i>	Good (8)	Fair (5)	Good (8)	Good (8)	Fair (5)	34

Source: Authors' analysis

Based on the conducted analysis, it can be stated that all eight compared platforms represent good examples in terms of supporting active and collaborative learning, as each of them meets the established criteria to some extent. Of course, each LMS has its own strengths and weaknesses in terms of collaboration and active involvement of participants in educational processes. However, although there are comparison criteria to which some of the LMS do not perform at full capacity, by integration with other platforms, plugins or specific instruments that support collaboration they cover possible gaps to a large extent. Therefore, we emphasize the fact that the analyzed educational software solutions tend to be constantly improved, even if they do not have certain built-in facilities.

Conclusion and Future Research Directions

The results obtained from this research led to the establishment of a reference framework of comparing LMS-type E-Learning systems from the perspective of facilitating active and collaborative learning. In addition, the proposed framework was applied by comparatively evaluation of some of the most used and recommended LMS. Although current research has been relatively limited, we believe that it can be a starting point in the development of evaluation models with increased complexity, by integrating new perspectives and evaluation criteria.

With respect to the limitations of the research, the identified LMS may not be the most representative given the large number of such solutions currently available. On the other hand, we assume that the analysis by direct observation of the basic functionalities provided by the analyzed platforms may not be significant as they may offer extra facilities and privileges in the context of payment or integration with other software tools.

Future research directions are aimed at including a greater number of benchmarking criteria in the proposed framework and considering more platforms for analysis. Hence, we can offer the results obtained in the form of a recommendation regarding the choice of an E-Learning system.

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