

BEST E-LEARNING PLATFORMS FOR BLENDED LEARNING IN HIGHER EDUCATION

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*“When I wanted to learn something outside of school as a kid,
cracking open my World Book encyclopedia was the best I could do.
Today, all you have to do is go online.” – Bill Gates*

Abstract. Over the past ten years or so both companies and academic institutions have made significant steps towards either adopting an e-learning infrastructure or upgrading the systems already being used. During the past few years, we witnessed an incredible proliferation of Learning Management Systems (LMS’s) and the number of features they offered and a strong push towards a blended-based learning approach to training and education. This paper deals with the comparison and presentation of the most popular LMS’s currently available on the market.

In our research, we strove to not only summarize the most important information about the big players in the world of blended learning today, but to also direct the readers to the right questions they need to be asking when researching their options. Before a company or an academic institution can make an educated decision as to which system will work best in its case, it needs to carefully consider several important questions — it must decide on its budget, its expectations, its audience, the requirement for specific features, as well as why it needs an LMS in the first place.

The effectiveness of gamified learning systems has been extensively researched and consistently praised for its immense positive effect on learners’ motivation and engagement. We firmly believe that in the years to come, gamification will transform both corporate and academic training and that is why, in our research, we paid special attention to any existing system gamification features or ones that may be in development. Introducing game dynamics into an LMS results in numerous benefits and is a sure bet for the future of blended learning.

Keywords: higher education; Learning Management System; gamification; blended learning; e-learning, LMS

1. Introduction

Blended Learning (BL) is commonly defined as the integration of traditional classroom methods with online activities (Macdonald 2008;

López-Pérez et al. 2011). It will not be an overstatement to say that in the past two years, partially due to the COVID pandemic, but also due to the evolution of technology, education around the world has gone through a revolution of its own. Modern technology is getting deeply integrated into training today and the world is gradually but ever so quickly shifting to a new model of learning. Blended (or hybrid) learning brings together the best of online studies and face-to-face learning. Perhaps its strongest pluses are the way it focuses on the individual learner, its accessibility, and its flexibility.

BL is not just a temporary trend in education – it is a whole new approach that suits the future needs of students. Conventional education has worked in the past but businesses and academic institutions are evolving, along with technology, and the old one-model-for-all approach is all but gone. BL provides learners with instant unlimited access to all relevant training modules at the click of a button and so each student can tackle the material at her own pace. Teachers can more easily pay individual personalized attention to their students based on the feedback they receive. Peer collaboration can now be achieved a whole lot easier thanks to tools such as forums, virtual rooms, discussions, and group emails. The BL approach fosters independence and confidence – students may access materials multiple times and can handle the training on their own if they so desire. Most important of all, BL provides the trainees with flexibility to attend virtual and onsite classes on their own schedule and is substantially more affordable than conventional education. This takes us to the main tools of the trade and the topic of this article – the Learning Management Systems used to deliver BL.

2. Overview

LMS's represent strategic high-level solutions that allow users to plan, deliver, and manage the training an organization wants to offer in a blended or completely online format. Such systems allow one to deliver content in a virtual classroom and provides tools for managing learners' information and for tracking their progress and are capable for performing administrative task as well. LMS's are often large, heavy-duty, expensive systems designed to provide access to online training services and used by learners, educators, and administrators all at the same time. Content must be easily managed, and communication between all parties must be facilitated. However, one specific facet of online learning platforms that is not commonplace has been of particular interest to the authors – gamification tools.

Gamifying your training experience can be very effective (Pappas 2015; Apostolopoulos 2019; Clement 2021; Pentaquest 2019), but before going down that road, you must ensure that you clearly understand your learners' needs and motivations and that you design your strategy right. If you favor an

LMS that does not offer a lot of gamification bells and whistles, you can still implement a successful gamified experience using a combination of different techniques. Here are some techniques you may wish to consider: create quests based on real things the learner needs to know; make up a story line based on those quests using case-based learning and defining the main concept behind your training; use the course objectives to define a win scenario for each unit as well as for the course; use learners' avatars that reflect their achievements; use a points and leveling system that rewards but can also penalize users; set time limits on tasks in order to create a sense of urgency and to motivate your learners. Other innovative gamified activities, such as HTML-based games and wikis, have been proposed (Cheng-Chia 2018). Gamification can be a powerful tool that can improve students' attitude towards learning by enhancing their motivation and engagement but should be used carefully and with a lot of preparation.

3. Methodology

To compare the LMS's currently available on the market, we researched numerous papers and articles on the subject, published in various publications and on various websites, along with information provided by the vendors themselves, and reviewed a lot of additional literature available on the subject. We also took into consideration our own experience and observations while teaching classes using LMS's at several academic institutions as well as feedback provided by our students and our colleagues.

The sheer number of online learning tools available to educators today is astounding. Based on the data examined, we could safely conclude that LMS's are still in the center of it all. Another observation we were able to make is that there currently is no one tool or one LMS that truly stands out from the rest and that fits the needs of everyone. With that in mind, our recommendation is that, at present the best systems you should consider for your training needs are Instructure's Canvas, Google's Moodle, Desire2Learn Brightspace, and Blackboard Learn.

Given that most learning has been transferred online, one needs to carefully consider the different LMS features, in order to select the most appropriate system for the type of training at hand. The criteria used to compare the different systems included a comparison of the tool sets available to educators, learners, and administrators. Faculty need to be able to easily create and deliver course content and to test their students and track student progress. Students should have access to various communication and collaboration features (discussions, chat, email, white board) as well as easy access to a gradebook that provides tools for feedback, and the ability to access content and presentations on the go. Administrators should be able to easily manage

courses and course content (create, delete, copy, transfer), retrieve course statistics, and manage student enrollment. As mentioned earlier, special attention has been paid to each LMS's gamification features as this was one of the main targets of the research.

4. Results

The main conclusion, based on the research we carried out, is that the main high-quality do-it-all feature-rich LMS's available to educators today happen to be D2L, Canvas, Moodle, and Blackboard. Coincidentally, currently these happen to be four of the biggest players on the market. In one of the more recent studies of LMS market dominance, Inside Higher Ed reports that Blackboard Learn, Desire2Learn Brightspace, Instructure's Canvas, and Google's Moodle currently hold the top four places as the most widely used tools to deliver training online (McKenzie 2018). Edutechnica, another prominent web service which researches LMS market data on an annual basis, has published a similar but more recent report (Edutechnica 2022). Fig. 1 shows the popularity of LMS's over the past five years.

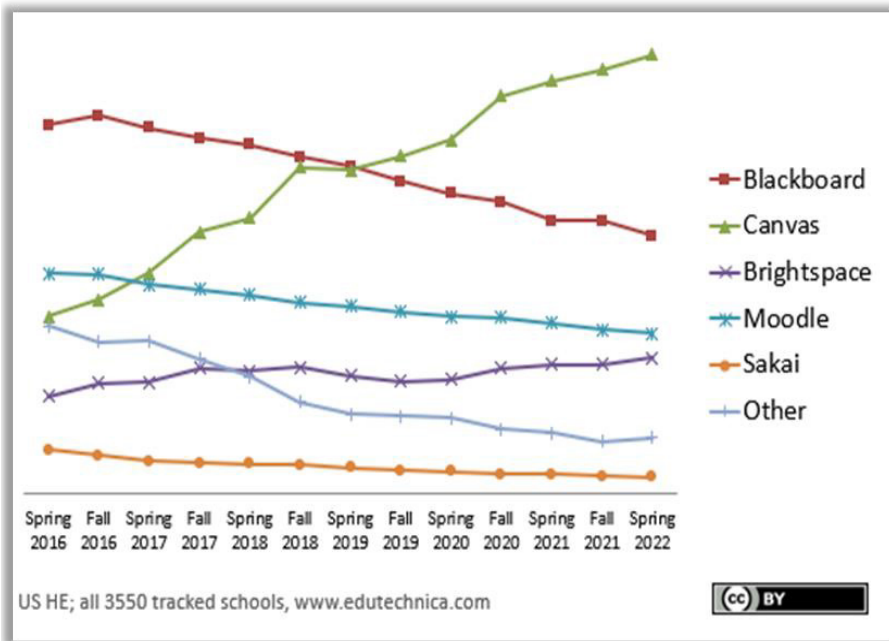


Figure 1. LMS Popularity. Credit: www.edutechnica.com

Counting down from number four to number one, here are the top four LMS that are most likely to satisfy your training needs.

At number four, Blackboard (BB) has ruled the world of online training for years and continues to be one of the leading players and a popular choice for many. It is offered as SaaS (Software as a Service) model as well as a non-SaaS one. It provides educators with the ability to manage both online and blended courses and offers numerous useful features, such as delivering assessments and tracing grades for example. Two of its most lauded features include the fact that it seamlessly integrates with institutions' Student Information Systems (SIS) and that it now provides a mobile platform. In addition, it comes with BB Intelligence – an analytics tool that helps with tracking student retention and engagement, BB Connect which is a mass notifications tool, and a collaboration tool the authors have extensively used and enjoyed in their own courses – BB Collaborate. On the downside, it does not come cheap, and some users argue that its learning curve is a bit steeper than that of most of its competitors. Fig. 2 shows a sample dashboard view of a course delivered via Blackboard Learn.

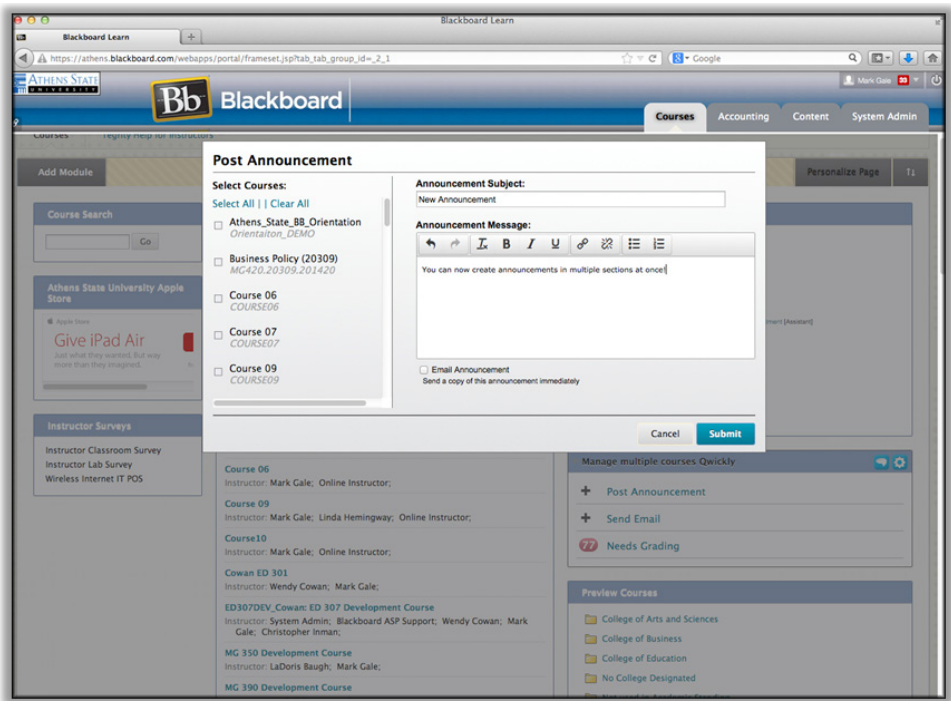


Figure 2. A view of Blackboard Learn. Credit: athens.blackboard.com

BB has been designed to let educators and administrators demonstrate student success and achieve their goals. Platform learning is boosted through

connections and collaborations. Companies of all sizes take advantage of this platform as its powerful, yet simple tools and workflows help learners and instructors stay organized, act, and engage with content and each other. At BB, accessibility is at the forefront of product development and not an afterthought.

D2L's (Desire2Learn) Brightspace is at number three in the countdown. This system combines training resources with advanced analytics and assessment features. It integrates well with Microsoft Office 365 and provides Learning Tools Interoperability (LTI) integration with third-party systems. Most users also like its pleasing tiled interface and its extensive support for competency-based education. Two of D2L's features that the authors liked in particular are the so-called Release Conditions (RC) and Intelligent Agents (IA). RC allow the instructor to set content to become accessible only if certain conditions have been met, whereas IA let the instructor trigger actions based on students' behavior. On the downside, just like BB, D2L is somewhat expensive but it does offer a free trial. It has a fairly steep learning curve, but its analytics and predictive modeling make up for it. Fig. 3 shows the view a course delivered via D2L's Brightspace platform.

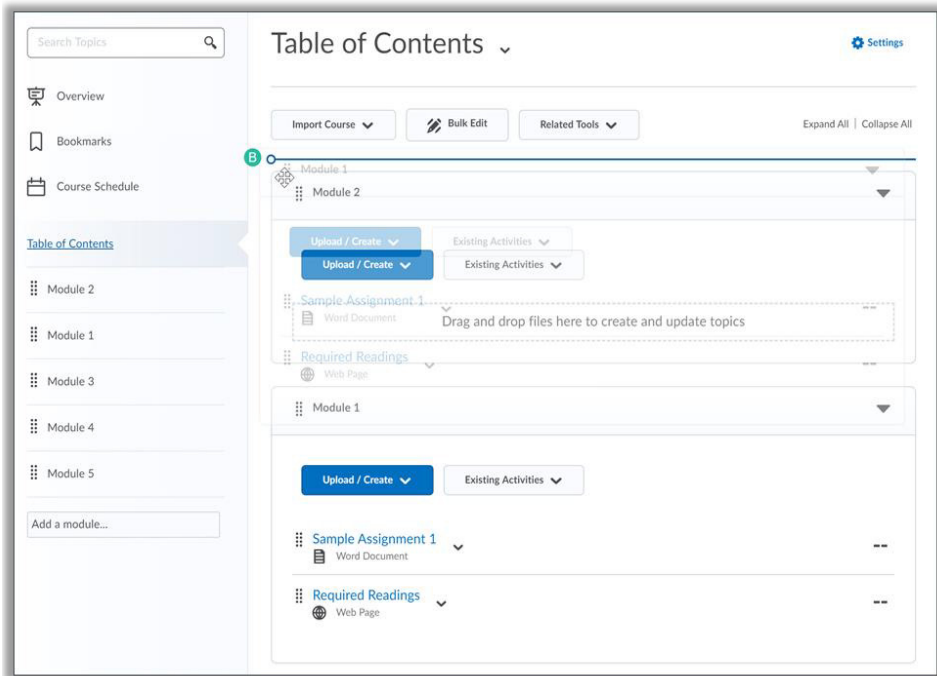


Figure 3. A view of D2L's Brightspace. Credit: Elgin Community College

TheD2L LMS does not require the installation of any extra software. It is suitable for use by academic institutions, e-learning companies, and corporations. Both synchronous and asynchronous e-learning have been provided and blended learning is easy to achieve. It comes with good quality video conferencing as well as virtual classroom benefits to accommodate mobile learners. There is an abundance of built-in course authoring tools.

At number two, you will find Canvas by Instructure. Canvas boasts a modern and easy to use interface along with native web hosting. It places an emphasis on making communication between learners and educators quicker and easier. Setting up the system is a breeze as well. Some of its most lauded features include customizable user profiles, LTI integrations, open Application Programming Interface (API), collaborative workspaces, and a comprehensive dashboard. Canvas also allows instructors to provide feedback, merge different channels of education, and track students' progress. We were quite impressed with the system's support for mobile devices – students can submit work and interact with their learning material on pretty much any device, and even integrate their Canvas accounts with their social media ones. Extensive third-party support is yet another reason this system is a favorite for many. On the downside, despite being competitively priced, Canvas is not inexpensive, but there is a free open-source version of it available and the paid version does offer a free trial. Fig. 4 shows a screenshot of a course in Canvas.

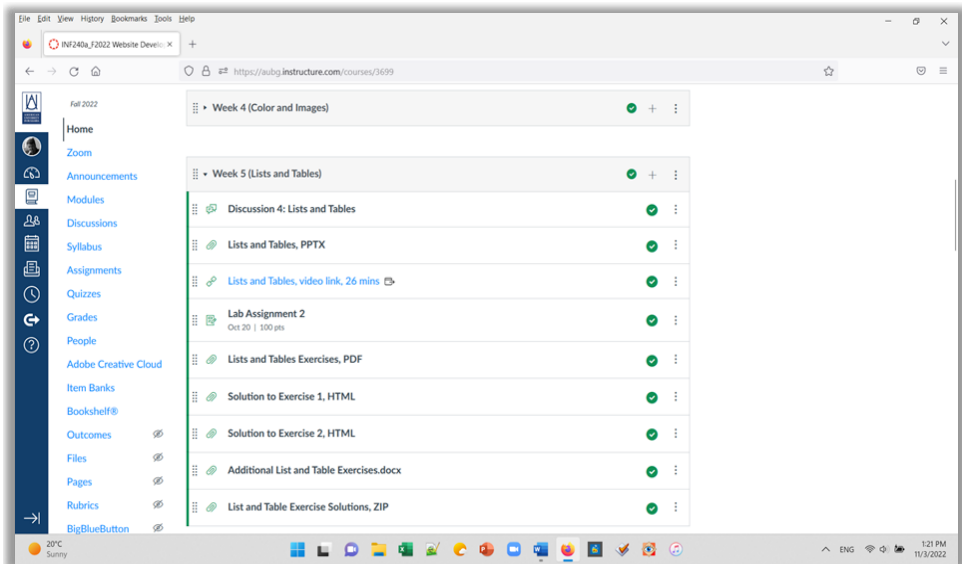


Figure 4. A screenshot of Canvas. Credit: aubg.instructure.com

Canvas is popular with academic and educational institutions. It can easily be installed onto Android and iOS. This LMS offers quite a few classroom management features, quiz building, collaboration, and a flexible gradebook. The built-in course authoring tools are impressive. The blended learning feature allows for the use of digital media and various classroom learning techniques. Instructors can benefit from conducting both synchronous and asynchronous learning and mobile learning support is available.

Finally, we have Moodle which takes the number one slot. Moodle is a community-driven learning platform that is free and open source. It may not look as polished as its paid competitors, but it offers solid functionality and an unmatched extendibility through a library of over 1800 plugins and tools. Moodle supports both online and blended courses and has solid mobile device support for all mobile platforms. Educators can upload Sharable Content Object Reference Model (SCORM) packages as course content and LTI compliant resources. Its capabilities for tracking, assessment, and reporting are exceptional. It supports multiple levels of administration and with the mind-boggling collection of plugins and a world-wide network of partners, one can extend its functionality and turn it into the LMS that one needs. The downsides of Moodle include its initially lacking look and feel and the need for administrators to host and maintain the LMS on their own. The need for an IT department is a must. Fig. 5 shows a sample Moodle-based course based.

Moodle can be run on Windows, Macintosh, Android, and iOS. Educators will find assistance with conducting synchronous and asynchronous learning sessions as well as blended learning. Among the top features of this LMS, we find SCORM compliance, gamification, built-in course authoring, video conferencing. The software is fairly simple to use and requires almost no maintenance. Moodle offers scalable and customizable e-learning solutions. One feature found only with this LMS is the ability to create custom certificates for rewarding students.

In our research we have carefully examined the gamification functionality of all LMS's. Gamification is defined as the application of gaming strategies to non-gaming platforms and is aimed at increasing trainee engagement, interactivity, and motivation (Walter 2021). Features usually include Badges, Experience Points, Levels, Rewards, Progress Bars, Leaderboards. Some feature-rich systems may even include entire gamification templates or online asset libraries of blank badges, themes, and leaderboards. The systems described above do offer some out of the box support for such features but are not designed to hold one's hand when implementing gamified user experiences, the way some smaller LMS's are.

BB has Badges and Leaderboards. Canvas has Badges, Levels, Points, and Rewards. D2L has Badges and badge customization, Leaderboards, Levels,

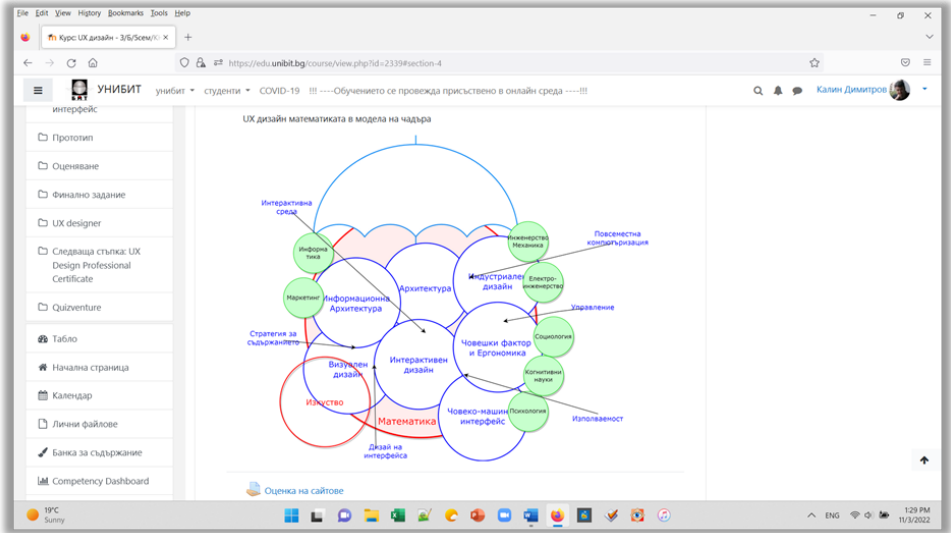


Figure 5. A screenshot of Moodle. Credit: edu.unibit.bg

Points, Rewards, gamification mechanics customization. Moodle is the clear leader with its multitude of plugins that allow you to do everything mentioned so far and a whole lot more. Here are some of Moodle’s capabilities (Henrick 2013; Muntean 2011): Ranking Block is a plug-in for Moodle that allows and shows leaderboard of students based on their points; Moodle Badges Free is a library of badges that can be given as a reward for achieved knowledge, skills and learning experience; Level up! is a Moodle plug-in that automatically captures and attributes experience points to students’ actions according to pre-defined rules; Progress bar is a Moodle plugin that visually shows what activities or resources students have to complete and their progress in the course; Tracking progress is possible thanks to Completion tracking; Tests and assignments, as well as all other activities in Moodle provide opportunities for feedback – general as well as specific.

Badges are virtual tokens used to acknowledge achievements and are aimed to providing positive reinforcements for the learners. Experience points and levels are used to indicate progress and mastery of the material. Each level usually provides access to new content and new challenges. Leaderboards help motivate users as people like to be praised and acknowledged. Rewards can be virtual but can be real as well and can help further foster learners’ motivation. Figure 6 shows a view of a fully gamified Moodle course, that we have developed for a separate project.

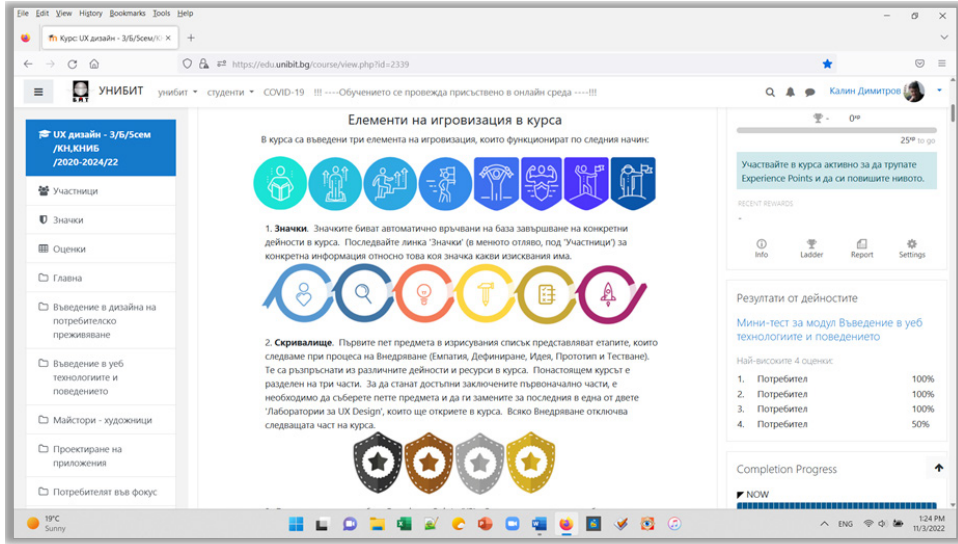


Figure 6. A screenshot of a fully gamified Moodle course. Credit: edu.unibit.bg

Here are our top choices for an LMS not only designed to provide extensive support for gamification of content but that also appear to understand the needs of modern learners and to be flexible to the always changing technological landscape.

The Impact Suite by Growth Engineering, Academy is notable for its training programs. Part of it is Genie – an innovative game-based authoring tool. It also offers a mobile-based microlearning platform titled Knowledge Arcade. Some of its features include attendance monitoring, real-time assessments, calendar management, and interactive classrooms (The Impact Suite LMS 2022).

Talent LMS. Talent is cloud-based and is a highly configurable system. Points and badges are standard. Learners achieve higher levels based on their rewards. Leaderboards promote competition and act as a confidence booster. Talent also offers a conferencing feature and is easy to use when creating courses (Talent LMS 2022).

Spoke LMS by Unboxed Technology. Spoke strongly encourages social engagement and trainee collaboration. This LMS provides upscale service, powerful reporting, and seamless integration and yet is one of the more affordable ones. Part of it are games like Jeopardy and Match. Learners share content and complete courses to earn badges and virtual coins that can be

redeemed for various incentives (Spoke LMS 2022).

Axonify LMS. This microlearning platform provides users with a personalized gamified experience. Features include badges, points, levels, leaderboards but with added flexibility in the waypoints. In Axonify, companies can link employee performance to reward programs (Axonify LMS 2022).

eLucid by WisdmLabs. Some of the most impressive features this LMS includes are Millionaire, Crossword, and Snakes & Ladders – tools that let you create game-based quizzes and assessments that are intuitive and fun. The built-in interactive content authoring tool can be used to create rich and engaging content. eLucid also offers levels, rewards, leaderboards, and milestone-based badges. Support for Mozilla Open Badges is provided which provides level graduation based on badges earned. Discovering hidden rewards in the course keeps learners alert and motivated (eLucid LMS 2022).

5. Conclusion

Carefully consider the benefits an LMS has to offer. The LMS's discussed in this paper share several undeniable benefits. They let the training institutions personalize the training experience – one can assign different learning paths or different online resources in order to create a more effective learning experience and improve learners' satisfaction. They all provide improved accessibility – geographical limitations no longer apply. So long as users log onto the LMS (using almost any kind of device) they can access the resources and start improving their skills and knowledge. The four main LMS's discussed in this paper let you gather big data in one location, use encryption to protect them, and easily maintain and update learning materials. Built-in reporting and analytics let you track all aspects of your training program either by default or through the use of plugins. Monitoring progress and performance allows trainers to track user engagement and assessment results and identify patterns or trends to improve the quality of the training and the satisfaction of the trainees.

That said, the best platform for you may not necessarily be one of our top choices. Examine closely all features and benefits and do not forget that these systems are constantly evolving. Keep in mind that you may not need to choose just one system. One of the more recent and promising developments in the world of LMS is a shift toward interoperability via API's and support for LTI through which administrators can connect a platform to an existing LMS or SIS. Other important features you should consider are the overall cost, the need for a blended learning approach at your organization, the ability of the system to easily integrate with other application solutions, the automation of administration tasks, and the support of portability and popular development standards such as SCORM.

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