The Future of LMS Platforms: What Will Be the Challenges, Roles and Opportunities for Decades to Come?

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Abstract

The perception of learning management systems (LMS) by academic staff including teachers, tutors, administrative staff and students before and after the Corona pandemic cannot be compared. Almost all educational institutions worldwide have extended and improved their systems during this time. Many features, functions as well as connections to other systems have been developed. Learning management systems (such as Moodle, Canvas, Blackboard etc.) became more and more central part of the organizations' infrastructures. The question is now, will these changes be sustainable? Will the developments meet the needs of future academic institutions as well as its teaching and learning demands? This paper will discuss the future of learning management systems by opening up the discussion towards its roles, challenges, and opportunities for the next decades. It will highlight the recent influence of more hybrid teaching and learning settings and will point out the need for more flexibility for integrating new digitalized resourced and activities of the future that hopefully will enable a new level of engagement in digital learning and teaching. Moreover, future LMS will also be influenced to a larger extent by developments of other research fields such as artificial intelligence, virtual reality, big data etc. Aspects of LMS systems such as interactivity, usability, scalability, connectivity, user-centered support for collaboration as well as communication will be more significant, but to which extent? This paper will discuss these issues and will try to give also practical insights based on experiences by an expert involved in the development and integrations of learning management systems for many years.

Keywords: *Learning management systems, future, development, challenges, roles, opportunities, higher education*

1. Related work

Almost the entire content of this paper is based on the personal experience of the author rather than a literature review. Papers used for discussing the main aspects of future e-learning platforms are [1][2][3][4] and [5].

2. Short introduction

As indicated in the abstract, due to rapid advancements in technology and also the global ground-breaking influence of the Corona pandemic learning and teaching is rapidly changing. Learning management systems are often used to bundle learning and teaching activities. Within this paper the author provides a picture of key aspects of the future LMS. This will include aspects of technology advancements, social aspects of future educators and learners, roles, sustainability and scalability of systems as well as other aspects – discussed for both perspectives – challenges and opportunities of the next decades. A symbolized illustration of all the aspects is given in Figure 1.

3. Key aspects of future LMS

Future role:
The role of LMS in the future will probably go towards being a "central hub". Learning management system will be for both – educators and learners – the entry point into teaching and learning

processes. LMS might act as a “Swiss knife”. Being a central point for learning different learning scenarios, paths and models will be enabled. For this of course the development of seamless integration options for various digital tools, systems and infrastructures must be enabled. It will be a challenge to support the needs of this large variety of interlinked tools, especially when we look at the large amount of learning tools and learning tool categories, e.g., listed in [5]. LMS will act as a gateway for different tools including communication, collaboration, assessment, feedback, exploration, support etc.

Artificial intelligence:
Not just because of the recent hype in media - one of the key trends in the future of e-learning platforms is the integration of developments in artificial intelligence (AI) and machine learning. This will allow more personalized and adaptive learning experiences for learners. LMS use AI algorithms to analyze students' learning patterns and provide them with personalized recommendations for resources and activities. This would allow a more engaging and effective learning experience for students. If we think further, AI might boost tutorial support as well. As an example, artificial avatars could answer questions and further explain learning content if required. These digital helpers powered by AI might also support learner when having language difficulties. They could provide automatic translations and hereby introduce mankind an era of teaching and learning without language barriers.

The possibilities for content creation are almost infinite. Educators of the future might develop content by cherry picking out of various supported fully integrated tools to produce learning content for their teaching needs. Besides already existing tools for multimedia creation as well as conversion, tools for coding tasks, correction tools, learning path generators might be developed. AI however might also blur boundaries of what learning outcome of a student is real or artificially composed. New tools might arise for teachers providing new forms of cybersecurity in terms of detecting students’ works created with. This aspect will also be key for e-assessment. The education sector might have to completely rethink the way of how assessment is done via LMS. Here education providers must master the balance between surveillance technologies as well as systems and technologies enabling free, informal, explorative and unrestricted learning.

Virtual reality:
Another central trend in the future of LMS will be the use of virtual realities (VR) in different forms such as augmented, mixed, 360 technologies. These technologies will allow more immersive and interactive learning experiences. For example, LMS could use VR to provide learners with virtual field trips or simulations of real-life scenarios. This would bring a new level of excitement and engagement to online learning. In the future VR will also provide more haptic experiences – enabling learners to experience objects, materials, dynamic elements, physical forces etc. at home. In combination with deeper integration of live communication tools VR will provide virtual learning rooms, laboratories, social rooms for exchange and informal learning. These developments would also boost possibilities of gamification – enabling immersive educational gaming for different level. Higher levels of connectivity would enable peers to explore, experience and create learning artifacts in remote or hybrid learning settings.

Inclusion, accessibility and personalization:
Future of e-learning platforms will need to be more accessible and inclusive for all learners. This includes providing individual support for students with disabilities, special learning needs, flexible timing needs etc. Besides existing approaches such as closed captioning, audio descriptions for videos, languages support, future LMS might also be capable of transcoding learning content into different formats, e.g., transforming a video into an interactive virtual book or an enriched pdf with virtual reality content. Digital support-tools could also supplement textual descriptions with artificially generated images, audio and interlink (for the individual needs of the student) different parts of the learning item with social learning tools boosting hereby communication with learning peers. It would be highly desirable that all these new features within the LMS would take privacy, transparency, openness into account at high integrational level.

Use of big data:
Also, the optimized use of big data (that is obviously available in modern LMS) will be key for the decades to come. In this context almost certainly, AI will provide a boost by helping to develop analytics more easily. Moreover, also identification of anomalies, similarities, group activities and

characteristics will be improved. Currently the development and analysis efforts are way to high, advancements in the future will have here (hopefully) a large effect to use (hidden) big data information more efficiently in order to support the learner. One aspect in this context might be the blockchain technology. The integration of blockchain technology could help to make learning platforms of the future more streamlined, efficient, secure and transparent.

Scalability:
Future LMS will have to be very flexible when being used in different learning settings such us remotely, on campus, in hybrid formats etc. Hopefully dependencies to hardware and software will decrease boosting universal use. Platforms will need to be extended in order to meet the needs of new teaching models tailored in favor of more practical, customizable, and lifelong models of cross-cutting, skills attainment and credentialing. This will be certainly a development challenge. Currently most often individual developments and highly non-standard specifications are applied. Here in order to support high scalability and connectivity between requirement international standards of interoperability must be fostered. Simply put, LMS must be prepared to be fairly easily being connected to each other in order to share learning nuggets, collection of learning items, entire courses or even curricula among national or international entities of education in both government or private sectors. At last future LMS must also consider sustainability. Network centers and hosting institution must provide a sustainable and green service operation for example low-energy consumption or the using exclusively renewable energy.

Fig.1: Key aspects of future LMS

Usability:
At last future LMS must also focus on user-centered designs, putting learners and educators first. As an example, consistent application of nudging in learning – meaning to create always the right (smaller) amount of learning units and combining these to larger learning constructs. This would also boost personalization of learning within the learning platform. Hereby, learning platforms of the future could become even more personalized and adapt to the individual learning needs, skills, learning outcomes and abilities of users. Usability of future LMS should also boost interactivity by design to empower students with features and tools to effortlessly, seamlessly and lightweightly connect and exchange with their peers.

4. Conclusion

In conclusion, the future of e-learning platforms is bright and exciting. With the integration of features such as artificial intelligence, virtual realities, big data driven learning analytics, further developments in usability, scalability, interoperability, openness etc., the possibilities for delivering effective and engaging online learning experiences are endless. However, e-learning platforms will need to remain accessible and inclusive to all students to continue to provide high-quality education for everyone.

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