From Face-to-face to AI Powered LMS: A Brilliant Transformation

Case Study Assignment

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Introduction

Digital learning replaced traditional face-to-face learning as the need to learn outside the classroom increased. In fact, distance learning was always required and adopted by several institutions ever since technological innovations allowed it to be real. For instance, ‘’in 1953, the University of Houston, USA, televised the first for-credit college course for people to learn right from the comfort of their homes. Video lectures/lessons were aired every evening so that everyone—including full-time workers—could benefit from the lessons, ensuring that learning was not compromised because of work commitments.’’ (Athmika, 2021). Moreover, since the invention of the computer, distance course delivery has become popular even though it has had different names such as Computer Based Instruction (CBI), Computer Assisted Instruction (CAI), Computer Assisted Learning (CBL), and Internet-Based Learning (IBL) (Ozan, 2008). LMS today does not just facilitate and organize distance learning, LMS *is* distance/digital learning. This case study focuses on the educational technological instance where LMS replaced traditional face-to-face learning on a global scale. It explains when, how, and where this transformation took place. Then, it analyzes in depth why this instance of change took place from AI perspective. Finally, this case study sheds light on the implications of using AI-powered LMS. The author of this case study would like to emphasize the fact that this case study focuses mainly on modern LMSs. It does not provide extensive details about the history of LMS or old-age LMS. Neither does it delve into digital learning as it is a larger topic than the scope of this case study. Its main focus is the instance where modern LMS (since 1990s) replaced traditional face-to-face learning from an AI perspective.

A Brief Overview of the History of LMS

The early beginnings of LMS date back to 1924 when Sidney Pressey invented the learning machine. In the following decades, multiple technological advancements took place resulting in different forms of LMS, from the problem cylinder (1929), to SAKI (1956), to PLATO (1960), to ARPANET (1969), to HP's first-ever PC which made e-learning possible (1970). However, the major milestone which completely transformed LMS and e-learning was the invention of the World Wide Web in 1983. After that, many LMSs were released and the LMS market grew larger and LMS gained a wide popularity and in so many cases became indispensable. What revolutionized LMS and gave it the modern form we know today was cloud computing which enabled LMS to be hosted completely online which freed companies from having to install and maintain LMS on internal networks.

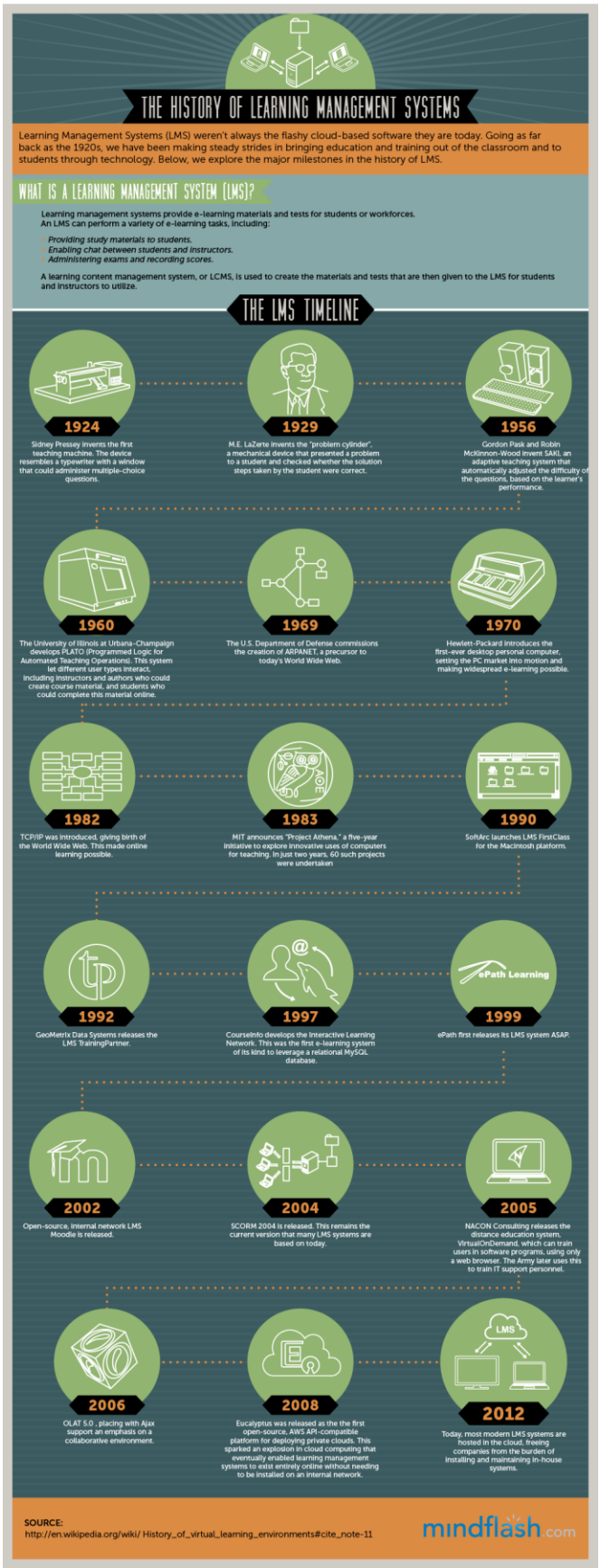

Figure 1: A brief history of LMS

Sidney Pressey was an educational psychology professor at Ohio State University. He was truly a visionary. He stated that, "the procedure in mastery of drill and informational material were in many instances simple and definite enough to permit handling of much routine teaching by mechanical means." (1926, p.374) Pressey maintained that the teacher is "burdened by such routine of drill and information-fixing" (p. 374). Pressey further stated that this mechanical device could:

Lift from her [the teacher's] shoulders as much as possible of this burden and make her free for those inspirational and thought-stimulating activities which are, presumably, the real function of the teacher. (p. 374)

Pressey was directly influenced by Edward Thorndike, an educational psychologist at Columbia University Teachers College who described the premise of computer-based instruction half a century before such a system existed. In 1912, he wrote:

If, by a miracle of mechanical ingenuity, a book could be so arranged that only to him who had done what was directed on page one would page two become visible, and so on, much that now requires personal instruction could be managed by print. (p. 165)

The teaching machine that Pressey developed resembled a typewriter carriage with a window that revealed a question having four answers. On one side of the carriage were four keys. The user pressed the key that corresponded to the correct answer. When the user pressed a key, the machine recorded the answer on a counter to the back of the machine and revealed the next question. After the user was finished, the person scoring the test slipped the test sheet back into the device and noted the score on the counter.

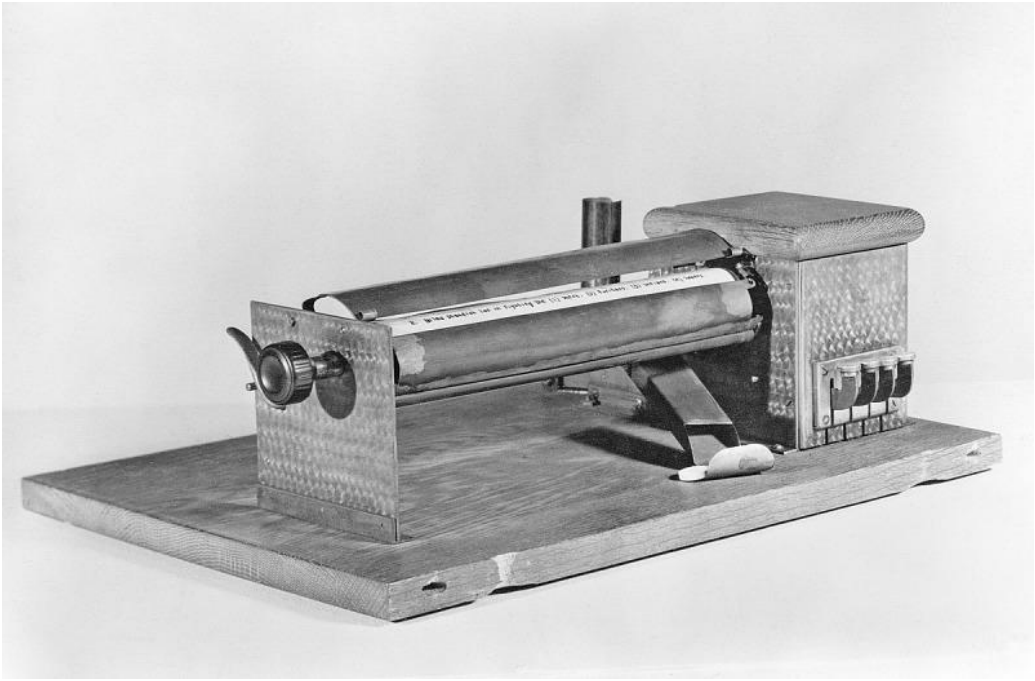

Figure 2: The learning machine

Fast forward decades, AI is invented, and the field of education is undergoing unprecedented transformations. Marvin Minsky, John McCarthy, Claude Shannon, and Nathan Rochester organized the Dartmouth Workshop in New Hampshire, USA. They proposed that, ‘’ every aspect of learning or any other feature of intelligence can be so precisely described that a machine can be made to simulate it". The year 1956 marked the birth of artificial intelligence research as an official academic discipline. With the advent of minicomputers in the 1960s, AI has since gradually evolved and has been having extensive educational applications. From CAI (computer-assisted instruction) in the late 1950s to ICAI (intelligent computer-assisted instruction), and intelligent tutoring systems (ITS) from the late 1970s to the 1980s, AI has proven to have great potential for improving education, and this explains why many institutions are shifting towards AI in different areas of education, LMS included. AI’s capabilities have even multiplied and reached a wider audience with the invention of the internet and the continuous maturity of cloud computing.

AI powered LMS

One of the many definitions of AI is Minsky's: "AI is the science of making machines capable of performing tasks that would require intelligence if done by humans." (Minsky, 1968). From this perspective, it was evident that a shift towards AI is inevitable. After all, the purpose of technology is to make human life easier.

According to Business Fortune Insights, '' The global learning management system (LMS) market is projected to grow from $16.19 billion in 2022 to $40.95 billion by 2029''. Thanks in part to the great advantages AI provides, the LMS market is expected to grow over the years. Indeed, LMS has become an integral part of many companies and institutions. Below is a list of important benefits which explain the significance of the shift towards AI in LMS:

Figure 3: LMS market size in North America

1. **Personalized learning experience**

   The ‘’one-size-fits-all approach in education has proven to be ineffective. Today, learners strongly need individualized learning experiences based on their needs and learning styles. AI does that by detecting and analyzing patterns in a learners’ behavior and learning what content they interact with the most thus tailoring the course to their specific needs and unique learning styles by recommending relevant content. This not only provides a faster pathway to success and growth, but also maintains learner motivation as learners learn only what they are interested in. This also saves time and resources for companies as employees/students don’t waste valuable time learning something irrelevant.

2. **Real-time assistance and feedback**

   AI is capable of virtual tutoring through chatbots that utilize machine learning algorithms, text analysis, and natural language processing. These chatbots, which can be as sophisticated as a 3D model of a teacher generated by AI in virtual reality, answer learners’ questions any time they want and provide real-time feedback on their progress. This ensures speedier and more accurate accomplishments and saves time for both the learner and educator.

3. **Automation of tasks**

   AI relieves educators and admin from the burden of mundane tasks as it performs them continuously in a very efficient and fast manner. These tasks include sending reminders, checking attendance, generating reports, performing and grading knowledge checks, tagging content, translating courses to different languages, and

onboarding new teachers/students/employees. All of these tasks and more can be automatically done through AI thus reducing human effort and saving lots of time which allows resources (human or otherwise) to be more effectively allocated to where and what really matters.

4. **Intelligent monitoring and reporting**

   AI tracks learner progress, collects insightful data, analyzes it, and generates reports based on that data analysis. It can identify gaps in knowledge, strengths, and areas of improvement for each individual. This can be used to determine the effectiveness of courses and programs which undoubtedly contributes to the success of institutions.

5. **Gamification**

   Elements of gamification can be integrated or built into LMS. Research has shown that gamification can lead to better learner engagement which in turn leads to better knowledge retention.

The implications of this displacement of traditional face-to-face learning for AI powered LMS are mainly positive ones. Examples of these positive implications include the fact that knowledge sharing and access is much easier now especially among fortunate nations for whom internet access is not an issue. Moreover, with AI's ability to collect and analyze data in such an impressive speed, it is now a reality that this data is used to enhance the learning experiences of students by customizing content and style of delivery, and therefore empowering the entire company or institution by being aware of areas of development and gaps in knowledge and how to fill them. One example of a not-so-positive implication, at least from the viewpoint of

teachers and educators, is that they are gradually becoming obsolete and easily replaced by AI. With the speed and accuracy with which AI achieves tasks, the need for human educators or trainers is increasingly becoming limited.

The following section presents more features that AI can adopt and develop in order to enhance the learning experiences even more.

What does the future hold for LMS?

1. **Incorporating social learning features**

   Learners can collaborate with peers and monitor or learn from them. Social learning is supported by multiple learning theories such as Vygotsky's Sociocultural Theory of Cognitive Development (1934).

2. **Microlearning**

   It is a trend of today which gives learners small chunks of information to learn at a time which can allow for better retention and engagement, especially for people who are always on the go.

3. **Compatibility with multiple learning methodologies**

   LMS could facilitate different kinds of learning: blended, instructor-led, synchronous, asynchronous, and mobile

4. **More accessibility via mobile devices**

   Since most LMSs are better accessed from a desktop device, it would be a great enhancement if future LMSs were more mobile-friendly.

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