U.S. Army Training and Doctrine Command Virtual Learning

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Abstract

This article presents a brief history of the development of virtual learning enablers and the software and hardware that supports virtual learning. The article addresses the early roots of hypertext and hypermedia and today's delivery platforms that offer virtual classrooms with instructor and student interaction.

Early in the year 2020, the world came to know a new enemy by name. That enemy was a global pandemic, and its name was COVID-19. In response, most Americans made adjustments to their daily lives. In the Army, decisions needed to be made that would ultimately impact the future of training and education for soldiers and civilians. Army senior leaders envisioned an environment for virtual learning and recognized the need for an environment agile enough to train and educate at any time and in any place. This environment could put instructors and students together to reap all the benefits of face-to-face learning. This article aims to trace the evolution of the foundational tools in the Army and enable robust future virtual capabilities.

The Introduction of Virtual Learning

The technology that underlies an environment for virtual learning draws from the use of hypertext. Hypertext allows the learner to access other information by clicking a mouse, and it predates the Army's distributed learning program. In 1945, Vannevar Bush conceived the concept of clicking links as a way of branching between pieces of information and described a "hypertext like device" he called memex (Bush, 2019). In 1965, Theodor Nelson gave this concept the name of hypertext (Talbert, 1988, p. 2.8). Hypertext allowed the reader to branch as needed rather than follow a strictly linear path of information.

Hypermedia was a natural extension of hypertext that allowed linkage between information and different forms of media. It offered four elements that enabled the learn-

er to interact with content that was part of the virtual environment: linear, substitution of image for text, look back, and branching. The Department of Defense later adopted these elements for computer-based training (Kenyon, 2012; Vernon, 1993).

In 1985, a large-scale hypertext/hypermedia system called Intermedia allowed instructors and students to create, organize, visualize, and connect multimedia information (Talbert, 1988, p. 2.14). This system produced excellent results as both students and instructors felt a deeper understanding of the course material over a traditional linear display of text or platform recitation. Blended learning allows students the benefits of both traditional and digital learning. David Ausubel's theory of meaningful learning explains part of this phenomenon as an individual's desire to make meaning of new information by relating it to previously understood concepts. From a cognitive perspective, it is the purpose of education to help students grasp essential and central ideas (Talbert, 1988, p. 3.2). To assist instructional designers, Intermedia used toolsets that made up three instructional design environments: one to help instructors plan their course material; one to manage the development process; and one to provide for delivery, presentation, testing, and controlling content to achieve the desired learning event (Talbert, 1988, pp. 2.16–2.17).

These early tools evolved into software applications known today as course management systems (CMS). The systems that employed all three instructional design environments became learning content management systems (LCMS). These systems formed the enabling technology for a virtual learning environment (VLE). The evolution of VLEs aligns and traces back to the growth of e-learning or the use of emerging technology in the delivery of training and education. The standards, specifications, and implementation of a virtual university were envisioned in 1998 by the Institute of Electrical and Electronics Engineers. The VLE ultimately defined a university environment for students with limited or no access to a brick-and-mortar campus. It provided an online interaction in three types: student-content interaction, teacher-student interaction, and student-student interaction (Boser, 2020).

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The Army's Use of VLEs

The Army's use of software applications to enable the face-to-face classroom environment includes an LCMS called Blackboard. Instructors for the Command and General Staff College, the Army War College, the School of Advanced Military Studies, and the Sergeants Major Academy primarily use this LCMS to manage learning, post grades, communicate with students, and receive homework submissions (Weller, 2007).

The same LCMS used in those classroom venues was used in the distributed-learning environment, providing access for Reserve Component students and to other students who do not have easy access to a brick-and-mortar campus. As the implications of the COVID-19 pandemic evolved, this distance-learning environment became the new normal for the instructor-led classroom as hundreds of instructors and thousands of students became the focus of the professional military education/operational planning team in March 2020. Classroom support and a distance-learning environment became the Army's solution: a VLE.

Virtual Learning Enablers

The term "virtual learning enabler" does not have a concrete and indisputable definition. Enablers provide a virtual space for students and instructors to interact. The capabilities of an LCMS includes many touchpoints for student-to-instructor interaction such as methods for breaking down the curriculum, tracking the student, and plans for student-to-student and student-to-instructor communication.

These VLEs are software applications, and there are today many LCMSs in use in academia, business, and government. Within a CMS, there are defined roles for both instructors and students. The instructor can be present with students in a synchronous session or have the students engage in the CMS independent of instructors and peers. The Army's LCMS, defined as a web-based platform for the digital aspects of courses of study, presents resources, activities, and interactions within a course structure and provides for the different stages of assessment (U.S. Army Training and Doctrine Command [TRADOC], 2013).

To better understand the VLE, we need to acknowledge the value of a learning management system (LMS). This system provides options that are much broader in scope than a CMS. A CMS fits within the range of an LMS to provide structure and delivery to a course. In contrast, the LMS provides for the planning, implementation, assessment, and evaluation of many classes or a complete curriculum. The Army has defined an LMS as a software application for the administration, documentation, tracking, reporting, and delivery of educational courses. It provides training programs or learning and development programs that are focused on online learning delivery supporting a range of uses, and acting as a platform for online content, including
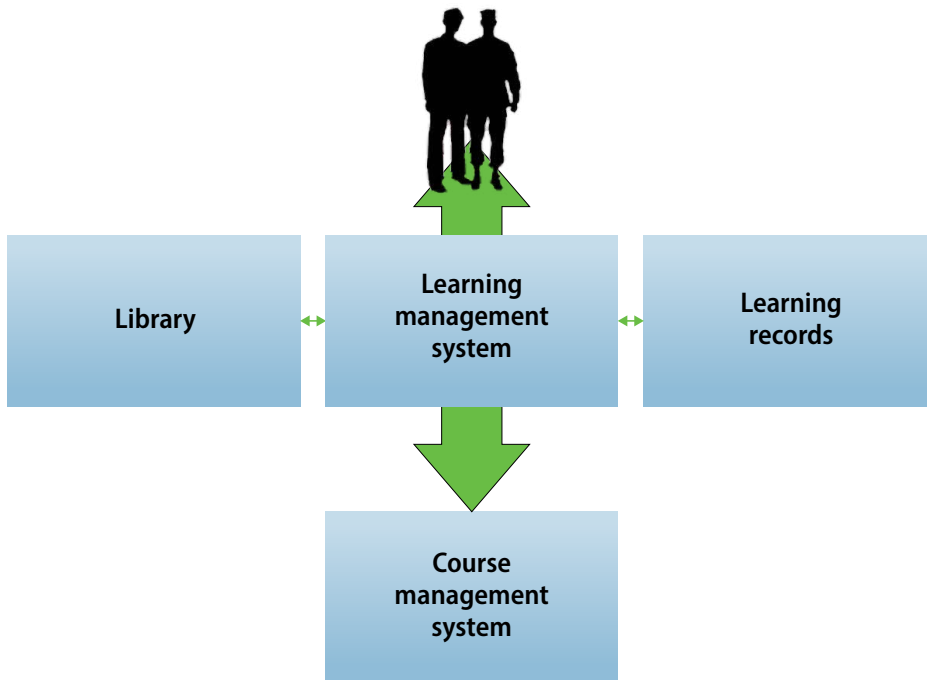
Figure. Virtual Learning Environment. Figure adapted from M. Weller, 2007, *Virtual learning environments: Using, choosing and developing your VLE.*

courses both asynchronous-based and synchronous-based (TRADOC, 2013). An LMS may offer classroom management for instructor-led training or a flipped classroom used in higher education, but not in the corporate space.

In the figure, the student enters the VLE via the LMS. This route accomplishes a few things. First, it confirms the identity of the student and offers a catalog of courses. Second, it manages the registration of the curriculum and the various courses that support it. Once complete, the student can launch the course and begin the learning event. The library and other resources are captured in the course environment. Additional resources are videos, podcasts, assessments, and games. The LCMS provides for authoring content, importing content, or storing content.

Finally, when the course is complete, the LMS manages the updates to the student records and can report completion or grades to another system if required.

One could argue that only an LMS or only a CMS is needed, but there are legitimate reasons to employ the capabilities of both. An LMS can manage a curriculum, but a CMS can better handle a course.

Conclusion

The future direction for Army training and education now includes a plan for a virtual environment. As the events of this year unfolded, the enablers the Army already had in place became the fallback. The Army rose to the occasion. It quickly formed the professional military education/operational planning team, identified systems in place, ascertained gaps in instructor-led education and training, and found a shortfall in software application licenses. Within a few weeks, the Army VLE was fully operational.

The way forward for Army training and education reflects optimism and determination. It has been a long, tough year, but in true Army fashion, there was an attitude of "we can do this," and it did. ‽

Glossary

Asynchronous learning allows students to complete their work on their own time. Students are given a time frame–usually a one-week window–during which time they need to connect to their class at least once or twice. (eLearning, n.d.)

Blended learning has seen growth over time, primarily because of the increasing accessibility of technology and ongoing interest in digital learning technologies. Many education advocates have spoken to the advantages of blended learning in the classroom, such as student-centered instruction, data collection, and increased engagement. As with any educational model, blended learning should be used sensibly and thoughtfully to enrich student learning. (Study, n.d.)

Flipped classroom is a model that involves instructors having students interact with new material for homework first. Then, they use class time to discuss the latest information and put those ideas into practice. (Nelson-Danley, 2020)

Hypertext is text displayed on a computer or other electronic device with references (hyperlinks) to other documents the reader can immediately access, usually by a mouse click or keypress sequence. Early conceptions of hypertext defined it as text that could be connected by a linking system to a range of other documents stored outside that text. (Talbert, 1988)

Synchronous learning occurs on set schedules and time frames. Students and instructors are online simultaneously in synchronous classes since lectures, discussions, and presentations take place at specific hours. All students must be online at that exact time to participate in the class. (eLearning, n.d.)

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