Visionary Essay – Online Learning Technologies in 2023
Monica M Russell
DETC 630

Introduction

Ten years from today online learning will be taken for granted, an afterthought, and so ubiquitous that discussions will revolve around how best to access the learning you want and not where to find the resources you need. In the United States, online learning is becoming pervasive, but not yet an unquestioned part of the fabric. There are still debates on the benefits of online learning as massive open online courses (MOOC) spread throughout higher education and discussions continue about how best to incorporate online learning into existing education models. The value of online learning for children is being questioned while Kahn Academy and YouTube are becoming the Wikipedia and Google for the K-12 crowd. As the Ontario Online Learning Portal explains, "all learners today are online learners to some degree" (2013). So what can we expect in 2023? At a high level, the next steps will include learning analytics (LA) and personal learning environments (PLE). At a more granular level, the emerging technologies for the next decade will be learning management systems (LMS) connected if not directed by learning analytics, synchronous communication tools for both verbal communication and group collaboration and videos that support sharing and showing.

Education's Three Future Technology Vehicles

Education in general can be broken down into two distinct components, teaching and learning. Each has many unique challenges, but both have the goal of moving students from their initial understanding of a topic or position to a different and hopefully deeper understanding of that topic or position and its connectors. Thus, the difference between learning analytics and personal learning environments is the same as that of education; learning analytics support teaching by identifying individual needs for instructors while personal learning environments are student-driven and provide ways for students to make sense of information that they are taking in and attempting to process. Online education has the same goals, but in this arena, technologies play a crucial role because they provide the vehicles to move students and their knowledge and understanding from point A to point B. Under this umbrella, the emerging technologies offer a foundation for the next decade of online education.

Figure 1. 10 Year Online Education Diagram with Technology Scaffolding and Foundation Supports
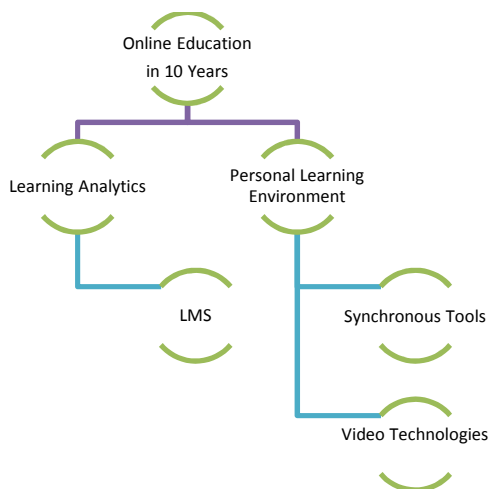

Figure 1. Schematic of the author's expectation for the technological foundation that will support online education in 2023. Learning analytics and personal learning environments represent the bridge connectors that will facilitate the relationship between online education in 10 years and LMS applications, synchronous tools and video technologies.

Visionary Essay – Online Learning Technologies in 2023
Monica M Russell
DETC 630

Learning Analytics and Learning Management Systems

Analytics is a model that takes large chunks of data and evaluates that data for use. Learning analytics focuses on using the data gathered from the analytics model to analyze student activity and suggest outcomes with respect to "grades, retention, or completion" to name a few areas of concern for teachers and schools (Educause, 2011). However, LA is not limited to these areas of concern. LA also supports improving the experiences of learners and their learning environments (Siemens, Gasevic, Haythornthwaite, et. al. 2011).

In the U.S. Department of Education, Office of Educational Technology issue brief, a distinction is made between data mining, specifically educational data mining and LA. However, when reviewing the example questions in Table 1, it is evident that all of the questions support a student-centered focus with successful learning outcomes as the overall goal.

Table 1

List of questions taken directly from a U.S. Department of Education Issue Brief on Educational Data Mining and Learning Analytics

Data mining questions:	Learning analytics questions:
- What sequence of topics is most effective for a specific student? - What student actions are associated with more learning (e.g., higher course grades)? - What student actions indicate satisfaction, engagement, learning progress, etc.? - What features of an online learning environment lead to better learning? - What will predict student success?	- When are students ready to move on to the next topic? - When are students falling behind in a course? - When is a student at risk for not completing a course? - What grade is a student likely to get without intervention? - What is the best next course for a given student? - Should a student be referred to a counselor for help?

(Bienkowski, Feng, & Means, 2012, pp.12 and 14).

This is where learning management systems come in. LMS applications track students, their frequent or infrequent access, time in the system and in the many areas of the system, coursework viewing and completion, clicks (how many times a test is taken or material reviewed) and progress. LA can then collect the data captured in the LMS and use that data to predict student issues and success, course problems and benefits, and instructor weaknesses and strengths. As we move toward a learner-focused environment, being able to gather information that supports learners and their learning experiences will be one of the trends for the next decade. LA and LMS are therefore, two pieces of a complex pie that have the potential to yield suggestions for next steps in teaching and learning and that type of information will become more and more important as educational institutions seek to differentiate themselves in the marketplace.

Synchronous Tools and Video Technologies in Personal Learning Environments

Personal Learning Environments are the next evolution in online learning and a definite player in the education arena in the next decade. Currently, there is a distinction between traditional and non-traditional learners, but as Siemens & Tittenberger (2009) captured in a quote,

> "We call students over twenty-five who are working full-time non-traditional students because when they first entered education research and policy discussions, they differed from the traditional undergraduate student. Today, these 'non-traditional' students are the majority of the student population in higher education. More than sixty percent of students enrolled are now over twenty- five and more than sixty percent of students are now working full-time while pursuing their education. We should start using a new term to describe these students" (p. 24).

As we move from the traditional to the non-traditional student and continue through the next ten years, the self-directed learner (SDL) will become the new normal. This self-directed learner is struggling right now with an abundance of tools, but little in the way of instruction on how to incorporate those tools (Valjataga & Laanpere, 2010).

The PLE is at the beginning of a journey that will move both students and their methods for creating understanding into the next decade. Synchronous tools and video technologies are only two of the numerous Web 2.0 tools that have the potential to facilitate learning in PLEs. The GoTo collection of products (GoToMeeting, GoToWebinar, & GoToTraining) and the WebEx product suite are two examples of popular synchronous tools that facilitate connection, collaboration and instant communication with the option to record and share with others asynchronously for review or for anyone unable to attend synchronous sessions. Video technologies such as YouTube, Screencastomatic, Pixorial, Camtasia and Captivate provide different ways to capture and save video content that can be shared in public venues or kept private for use by specific groups or individuals. Each of these have the potential to contribute to a student's PLE. For example, the ASTD (American Society for Training & Development) records synchronous meetings and provides text transcripts and PowerPoint slides at the conclusion of the meetings. Links to completed Google Hangouts are another way to have a discussion with people who are in different places and capture that information for future use.

RSS feeds, wikis, blogs, and the ability to tag items of interest with various social bookmarking tools are just a few of the Web 2.0 tools that can be a part of personal learning environments. Personal Learning Environments are certainly more than video technologies and synchronous meetings but, synchronous tools and video technologies are the instruments for the next decade because they facilitate and support connection. Many students in online learning courses bemoan the loss of connection. These tools facilitate real-time, face-to-face interaction, collaboration and opportunities for engagement which continues to be a key driver of successful online courses (Bart, 2011).

Benefits, Disadvantages and Challenges

From a framework perspective, it is the proposal of this author that the next decade will see learning analytics software pulling data from personal learning environments to better serve student populations. These same personal learning environments will be connected to learning management systems that make use of Web 2.0 tools with the goal of connecting and interacting using synchronous and video technologies. Future student SDL (or self-directed learner) will log into an open network learning environment (ONLE) where he or she can build their PLE (Tu, Sujo-Montes, Yen, et al. 2012). As SDL builds the learning environment, she/he runs into a question that they cannot find an answer to even after checking their social bookmarking sites and putting a request out on a Twitter-like microblog. SDL then requests a synchronous demonstration from their instructor with a request to record for later review. After confirming with their instructor, SDL gets a message from a peer who volunteers to "show" them how they approached the problem by creating a video and posting the video on a limited access YouTube type channel so that SDL can then post a link to the video in their PLE. This is a high-level overview of the benefits of LA, PLE, LMS applications, synchronous tools and video technologies. Additional details follow.

Visionary Essay – Online Learning Technologies in 2023
Monica M Russell
DETC 630

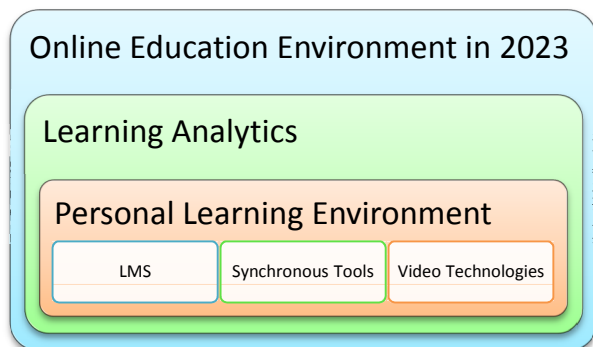Figure 2. Nesting of Key Components of the 2023 Online Education Environment

Figure 2. This is a nested drawing of the important role that learning analytics will play in all areas of online education in 2023. The drawing shows that online education is the main canvas with learning analytics holding PLEs, LMS, synchronous tools and video technologies. LMS, synchronous tools and video technologies are inside the PLE canvas where they will interact together and as a part of PLEs.

Benefits

The benefits of LMS, synchronous tools and video technologies going forward will be integration. The idea of integrating LMS applications with Web 2.0 technologies has already begun and is referenced in a 2009 article about emerging technologies (Godwin-Jones, 2009). In addition, the article talks about iGoogle and the canvas view that supports full-page displays of certain widgets which is similar to the idea of an ONLE where a foundation is created, but students are able to customize based on their learning habits (Godwin-Jones, 2009).

Disadvantages

The same article that talks about LMS and Web 2.0 integration also points to the inherent problems in the top-down approach that current LMS applications continue to maintain (Godwin-Jones, 2009). PLEs, synchronous tools and video technologies are collaboration focused while LMS applications are management focused. The critical connection between LMS applications, PLEs, synchronous tools and video technologies is integration and at this time, not all applications or technologies work well together. In other words, there is not an agreed upon standard language for all tools and technologies. Some tools will work with iPhones, but not Android phones. Some technologies can effectively integrate with some LMS applications, but not all. Some LMS applications allow integration, some do not and some allow minimal integration with a limited number of technologies or vendors.

Challenges

The challenges going forward will be evaluating next steps specifically with respect to learning analytics. As Yuan (2012) explains

> However, a number of unanswered questions, concerns, and hesitations suggest that there is a need to move analytics forward with caution and reflection. It is agreed that education is a complicated system and cannot really be run as business. Similarly, learning is a complex social activity and all technologies, regardless of how

innovative or advanced they may be, remain unable to capture the full scope and nuanced nature of learning (p.6).

Learning curves, carefully evaluating the results of LA so that assumptions are not detrimental to the learning process, PLEs that are pedagogically scaffolded and tools and technologies that are intuitive are just a few of the fundamental challenges facing this next decade of learning change. At this time, the learning curves can be steep and the potential for the misapplication of LA data is high, synchronous technologies are limited by Internet connections that may be slow or intermittent and video technologies can be misused without solid pedagogical footings.

Table 2

A listing of the Advantages and Challenges with LMS Applications, Synchronous Tools and Video Technologies

	Management	Accessibility	Privacy	Ease of Use	Support	Cost
LMS	The advantage of LMS applications is that they were created to manage student and course data and are therefore a positive for management. The challenge is that there may be a steep learning curve when learning to manage the different pieces of an LMS.	LMS applications are typically top-down and require passwords for access. In addition, access is typically not global so an administrator could have more access than an instructor. Accessibility is possible, but not guaranteed.	LMS application support privacy and were not created to support global sharing of information as evidenced by the use of password access. At this time, privacy is a benefit because educational institutions will need to negotiate what is shared and with whom by both teachers and students.	LMS systems are typically user-friendly for instructors and challenging for administrators. Ease of use is not a primary benefit, but instead more of a challenge because even with open source LMS systems, there will be a need to learn how to manage, track and gather the kind of data that each instructor needs to access.	Both paid for and free LMS applications come with support. From an industry perspective, there is a leaning toward online videos for additional instruction and troubleshooting.	LMS systems can be cost prohibitive especially for smaller institutions. Free and open source LMS systems may not be as robust, but the functionality is typically better than attempting to manage and track student progress using spreadsheets or simple documents.
Synchronous Tools	Synchronous tools that have costs involved are usually easier to manage because the expectation is that the environment should be limited to those invited. Free tools also provide the opportunity to limit access, but not necessarily to limit the fact that the event is	Synchronous tools are highly accessible and pride themselves on being user-friendly. There is an understanding in the industry that anything that takes up too much of your time will result in customers finding a different avenue. The	Synchronous tools offer a level of privacy and the ability to record and share via private links. They also provide the ability to password protect the information. The ASTD uses member logons and the requirement for registration to	The advantage of synchronous tools is that they must be user-friendly to survive the marketplace. The challenge for synchronous tools is that end users may not be aware of the wealth of functionality available with the different tools.	Synchronous tools provide support in the form of online video tutorials and paid synchronous tools offer customer support lines. There are no apparent challenges with support for these tools.	Synchronous tools can be costly, but based on personal experience over the past decade, costs for use have gone down. The challenge will be with webinars and training sessions that allow more than 100 people to participate. As the number of participants go

	occurring, e.g. Google Hangouts.	potential challenge with synchronous tools is the fact that they run on networks that may not have the bandwidth to optimally support the interactive activities.	view recorded synchronous meetings. The challenge to privacy is ensuring that end users understand how to protect their information and the synchronous tool owner doing the work to ensure that their software is secure.			up, so does the cost to connect those participants.
Video Technologies	Video technologies do not lend themselves to management. In order to manage video technologies, organizations will need to have identified guidelines in place. Otherwise, as has been observed by many with various YouTube videos that have embarrassed both celebrities and everyday people, video technologies are too easy to use so management must be proactive and regularly communicate video boundaries.	Video technologies are highly accessible. There are many free versions in use by everyday people and education versions that may have costs associated. In a recent certification program, it was determined that videos were highly useful because some students were deaf and being able to sign on a video and provide captions for hearing students bridged a communication gap for group projects.	Video technologies have the potential to live on a student's computer and not be shared, but once shared (even with privacy settings turned on), what is posted on the World Wide Web can always potentially be accessed. Hackers and protection from hackers is a key concern when considering the privacy of video technologies.	Video technologies lend themselves to one-click functionality with the option to edit and add functionality. This, of course, will depend upon whether or not the end user is working with a free, limited video technology or a paid-for function friendly technology.	Support for video technologies is not surprisingly provided in the form of video clips focused on particular tasks. The benefit to this is that much of the training is easily accessible. The challenge is if an end user has a complicated question that is not identified in the free online videos typically available.	The cost for many video technologies is usually reasonable and in many cases free. Those video technologies that do cost have to offer a lot of additional functionality to motivate end users to purchase their product so those technologies tend to be pretty robust. There are no real cost negatives for video technologies because of the need to offer exceptional functionality if there are costs involved.

Conclusion

It is this author's belief that learning analytics will drive the next decade. Analytics are being used in the healthcare industry, the business sector and now the educational arena. Online education has the potential to benefit greatly from learning analytics because educational institutions need a way to manage and track their online learners and LMS applications already provide a lot of student data. The future of integrated Learning Management Systems will make managing, tracking and data gathering an easier proposition because these applications are moving in the direction of

Visionary Essay – Online Learning Technologies in 2023
Monica M Russell
DETC 630

social media integration which will provide a deeper view into the habits and actions of students. LMS applications that integrate and provide their students the freedom to create their own canvas and by default create understanding in their own PLE further set a foundation that encourages connectedness. This connectedness then fosters the use the synchronous tools and video technologies.

Thus the 2023 emerging technologies remain personal learning environments, synchronous tools and video technologies. Steve Wozniak, co-founder of Apple, explains that because videoconferencing has become the norm and reading manuals pushed aside in favor of viewing online videos that provide easy to follow step-by-step instructions, the future will be about how "collaborative and video technologies in the classroom are allowing students to receive individualized attention and learn at their own pace while being actually engaged" (Wozniak, 2013). In the online education arena, collaborative and video technologies will not be a nice-to-have, but a must. Therefore, as LA help us navigate this next decade and PLEs provide a vehicle for student curation of content, synchronous tools and video technologies will be the transportation method that keeps students, instructors and even content connected.

Visionary Essay – Online Learning Technologies in 2023
Monica M Russell
DETC 630

References

Bart, M. (2011, June). How to make your online students feel connected. *Faculty Focus*. Retrieved from

http://www.facultyfocus.com/articles/online-education/how-to-make-your-online-students-feel-connected/

Bienkowski, M., Feng, M., & Means, B. (2012). Enhancing teaching and learning through educational data mining and

learning analytics: An issue brief (Issue brief ED-04-CO-0040). Retrieved from

http://www.cra.org/ccc/docs/learning-analytics-ed.pdf

Educause Learning Initiative. (2011). 7 Things You Should Know About First-Generation Learning Analytics. Retrieved

from http://net.educause.edu/ir/library/pdf/ELI7079.pdf

Godwin-Jones, R. (2009). Emerging technologies personal learning environments. *Language Learning & Technology*,

13(2), pp. 3 – 9. Retrieved from http://llt.msu.edu/vol13num2/emerging.pdf

Siemens, G., Gasevic, D., Haythornthwaite, C., Dawson, S., Shum, S., Ferguson, R., Duval, E., Verbert, K., & Baker, R.

(2011). Open learning analytics: an integrated & modularized platform. Retrieved from SoLAR Society for

Learning Analytics Research website: http://solaresearch.org/OpenLearningAnalytics.pdf

Siemens, G. & Tittenberger, P. (2009). *Handbook of Emerging Technologies for Learning*. Winnepeg: University of

Manitoba. Retrieved from http://elearnspace.org/Articles/HETL.pdf

Ontario Online Learning Portal for Faculty and Instructors. (2013). 5 Ways Online Learning is Enabling Change in Post-

Secondary Education. Retrieved from http://www.contactnorth.ca/trends-directions/evolving-pedagogy

Tu, C., Sujo-Montes, L., Yen, C., Chan, J., & Blocher, M. (2012). The Integration of Personal Learning Environments &

Open Network Learning Environments. *Techtrends: Linking Research and Practice To Improve Learning*, *56*(3),

13-19.

Valjataga, T., & Laanpere, M. (2010). Learner Control and Personal Learning Environment: A Challenge for Instructional

Design. *Interactive Learning Environments*, *18*(3), 277-291.

Wozniak, S. (2013). What if a computer could be a teacher? Retrieved from http://allthingsd.com/20130426/what-if-a-

computer-could-be-a-teacher/

Yuan, L. (2012). Will analytics transform education? A critical view on the data we gather about the learners. Retrieved

from http://www.learningfrontiers.eu/?q=story/will-analytics-transform-education