

Past, Present and Future: Emerging Media's Role in Online Learning

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Abstract: The TCC Worldwide Online Conference celebrates its 20th anniversary in 2015 with theme Hawaii 2-0: The Future is Now. This paper examines the impact of emerging media on education and presents six years of NMC Horizon Report forecasts from the Higher Education Edition. It concludes with an exploration of the future of mobile VR and virtual assistants.

Introduction

A leader in the exploration of online education, the TCC Worldwide Online Conference has a 20-year history in the study of online education and technology use. Two research archives (TCC, 2007; TCC, 2014) describe the strategies and tactics employed by educational professionals, librarians, and curriculum designers (Ho, Kimura & Narita, 2009).

This paper reviews the influence of emerging media on online education today and in the future.

Collaboration

Over ten years ago, a TCC presenter told a story about a class she taught in Nepal. When she gave an exam to the class, the students moved their desks into the center of the room and discussed it.

She asked the translator to tell them to stop cheating, but learned that they did not have a word for cheating in their language. It was natural to explore the exam questions as a group. While their motives might be varied (Fleck, 2000), it raised questions about the benefits of collaboration and cooperative work.

Why address problems individually when groups make better decisions?

The seeds of an idea grew from that simple story. While the issue was perhaps more complex as Chadwick Fleck (2000) described his experiences, interest in leveraging online collaboration and social learning via interactivities, shared technologies, and virtual environments had taken root.

Teaching online was not constrained to offering geographically distant, ubiquitous education. It stimulated thought by encouraging diversity, conflict and collaboration through online discussions, authentic assessment, team and individual projects and activity-based learning.

At the time, group work was perceived as the bane of students who felt that the risks were greater than the benefits (Calongne, 2002). Improving online collaboration and teamwork required tools to make it easier to collaborate and reward individual accomplishments.

The Use of Technology in Education

Web technologies and their use in online education have changed dramatically since 1996. One significant change is the shift from Web 1.0 sites and course designs written in HTML to today's learning management systems. Web 2.0 changed the content from text to include rich media, content mashups, browser-based software, Web services and online collaboration tools. Video conferencing and application sharing required Voice over IP capability, additional bandwidth, and extensible cloud computing services.

The use of games in learning ranges from text-based, multiuser dungeons (MUDs) (Rheingold, 1993) to alternate reality games that leverage collective intelligence (McGonigal, 2007). The last ten years have seen increases in the educational use of massive multiplayer online games (Minecraft), virtual world learning environments, and massive multiplayer online roleplaying games (World of Warcraft).

What would happen if learners used mobile devices, Web resources and even games in online classes?

Early augmented reality games (ARG) used Web resources across personal computers to provide interactive and personalized experiences for players. Quick response (QR) codes link to Web or GPS references, offering students with interactive learning experiences. They use a smartphone or tablet to scan the QR code, retrieve the website, GPS location or other relevant data, and discover clues that turn the learning activity into an engaging game.

Additional tools for learning include virtual clickers, online polls, tweets and social media. Mobile devices support context-sensitive searches, the use of augmented reality apps and support alternate reality games. The personal computer and smartphone were class distractions, but by increasing learner interaction and discovery, these same tools are welcome and augment the learning experience.

For classes held in virtual worlds, students send questions to the instructor and use the instant messaging feature to coordinate ideas with classmates. The backchannel refers to sending instant messages privately or to public services using social media. The advantages and possible problems associated with the use of social media tools in online classes were notable during Danah Boyd's Web2.0 Expo presentation (Boyd, 2009, 24 November). Public opinion matters, but without careful use of the backchannel, the feedback may wander off topic and disrupt the session.

Are there benefits to supporting informal opportunities for learning, similar to how students socialize and discuss their ideas?

Students tend to learn and remember better when they actively discuss and use the content. They remember even better when they make mistakes.

Support for activity-based learning increased with Web 2.0 technology and browser-based, collaborative software, rich media, cloud storage and near constant connection to the Web via mobile devices (Kelly, 2007). Growth on the Internet and social discourse resulted in the emergence of Web subcultures and debate (Shirky, 2009). The marketplace of ideas fashioned online education and rising interest led to the massive multiuser online courses (MOOCs) and open educational platforms.

Growth in new media, Web science (Shadbolt & Berners-Lee, 2008), and online learning led to research in the study and support of the future of technology in education (NMC, 2014b).

New Media

The term *new media* addressed many of the artifacts employed in online education. The technological and cultural changes during the last decade led academics to review the need for formalism in its professional certification and to plan for the future.

The NMC Commission on Accreditation

In April of 2010, the New Media Consortium (NMC, 2010) held a Commission on Accreditation Inaugural Convocation in San Antonio, Texas to explore the need for academic accreditation and certification in new media studies. Until this time, the term *new media* embraced the production and use of media for creativity and innovation.

Media and film studies prior to the mid-90s evolved into new media studies that adopted Web technologies, including the production of streaming media, 3D graphics and animation. Today, online students develop projects that feature the production of streaming media, machinima, and six-second videos.

The Commission on Accreditation included NMC charter member universities who had attended TCC conferences (NMC, 2013, May) and NMC events hosted by Learning Times. They were interested in media studies or the rising influence of Web science research and its impact on communication and education. Similar to the TCC, the NMC as part of its 20th anniversary celebration, published a timeline that reflects its impact on new media (NMC, 2014a).

The Commission reviewed the challenges, opportunities and drawbacks of accreditation and the limitations of early certification for a rapidly changing field. Rather than stifle creativity and growth, the Commission decided to table the discussion of professional accreditation.

Emerging Media and Online Education

When the session concluded, the Commission asked the attendees if they recommended a new name for the field as new media seemed like a dated term after two decades. The participants selected *emerging media* (EM) as the future name for new media.

Emerging media focuses on the production and consumption of Web media and includes the issues related to privacy, identity, presence, and socio-technical needs. It embraces Web culture, the value of communities (*Gemeinschaft*), and their relationship in society (*Gesellschaft*) (Tönnies, 1957; Truzzi, 1971, Calongne, Sheehy and Stricker, 2013).

Topics included in emerging media span video production, social media analytics, game development, and virtual world design. Some degree programs feature 3D graphics, animation, and the future of Web science (Calongne, 2009; Shadbolt & Berners-Lee, 2008).

Universities started offering emerging media programs and certificates. Ithaca College has a new Emerging Media degree that extends beyond the boundaries of game development to include virtual worlds, media development, and entrepreneurship. Colorado Technical University launched a doctoral concentration in emerging media in October 2009 to promote research in these technologies and to study their influence on society.

Prior references to emerging media were constrained to Web marketing and advertising, contributing to confusion over the past five years. Undaunted, emerging media studies absorbed analytics and informatics to explore the impact and challenges of media on Web culture.

Web Communication

As Clay Shirky (2009) noted, social media encourages discussion and argument, exploring perspectives that help learners to delve deeper into the theory and practice. The opportunities for fostering constructivism and heutagogy with learner-driven opportunities in the online classroom keep expanding

How does emerging media impact online education?

Kevin Kelly (2007) noted that the next 5,000 days of the Web were not going to be the same Web, only bigger, but that it would be different. One difference stems from how people connect to it and maintain frequent, if not nearly constant, connections to it. Another lies in rapid changes in technology adoption and culture.

Increases in mobile device and smartphone use continue to grow and are expected to reach 6.1 billion users by 2020 (Goldstein, 2014, November 18). Communities that previously had no access to the Web now will have mobile access (Shirky, 2009).

In 2009, students in a futuring and innovation class examined the merits and challenges associated with social media use, smartphones and text messaging. They were hesitant to try social media for reasons ranging from Web privacy to working for agencies that discouraged opportunities for social engineering, and it was not a requirement of the course.

After reporting that they did not send text messages, a student checked his smartphone bill and was surprised to observe that his son had written over 40,000 text messages the previous month.

Emerging Technology in the Future

Increases in text messaging, tools that promote brevity in communications like six-second videos and media sharing, and rising interest in biometrics may have an impact on how students choose to share ideas and study in online classes.

The NMC’s Horizon Report 2014 Higher Education Edition (NMC, 2014b) was created by an international team of experts to identify key trends and their anticipated adoption in higher education. While learning analytics and the flipped classroom may be commonplace practices by the 20th TCC conference, how learners are documenting their life experiences and biometrics may strengthen the likelihood of the quantified self.

A review of the Horizon Report from 2009-2013 provides a fascinating look at the forecasts for five years in technology education.

Table 1. NMC Horizon Report Higher Education Edition Forecasts 2009-2014

Adoption	2009	2010	2011	2012	2013	2014
1 year or less	Mobiles	Mobile Computing	eBooks	Mobile Apps	MOOCs	Flipped Classroom
	Cloud Computing	Open Content	Mobiles	Tablet Computing	Tablet Computing	Learning Analytics
2-3 years	Geo-Everything	eBooks	Augmented Reality	Game-Based Learning	Games & Gamification	3D Printing
	The Personal Web	Simple Augmented Reality	Game-Based Learning	Learning Analytics	Learning Analytics	Games & Gamification
4-5 years	Semantic-Aware Apps	Gesture-based Computing	Gesture-based Learning	Gesture-based Computing	3D Printing	Quantified Self
	Smart Objects	Visual Data Analysis	Learning Analytics	Internet of Things	Wearable Technology	Virtual Assistants

Virtual assistants are a natural extension of the voice systems used in mobile devices and coupled with gesture-based recognition and greater interaction, these technologies may strengthen the use of mobile devices in online education. Games, virtual worlds, and augmented

reality applications are all facets of emerging media, and they offer opportunities for learner interaction and engagement.

The Exodus to the Virtual Frontier

Use of virtual reality in education took a blow when the educational discounts in Second Life stopped in January of 2011. Educational groups, like the Virtual Education Roundtable, the Science Circle, Virtual Worlds Best Practices in Education conference and ISTE continue to host events, share resources and provide a forum for discussion.



Figure 1. View of the Bridge from Engineering in a Space game designed by CTU students

Most schools lacked the budget to support doubled costs when the 50% discount ended in the middle of the school year. Although the educational rate returned to 50% in 2013, the economic pressure stimulated the use of open source platforms using Open Simulator (OpenSimulator, 2014). The rising costs encouraged the pursuit of diverse educational solutions with the third-party host providers, such as Dreamland Metaverse, Kately, Jokaydia, and Jibe. In 2012, the

number of open source virtual world regions grew to 24,161, exceeding the 23,359 privately-owned estates in Second Life (Korolov, 2012, February 15).

Using the Hypergrid architecture (Lopes, 2011), users can travel between OpenSim grids and the *My Suitcase* folder tracks the inventory items an avatar obtains from grids outside the user's virtual environment. High on the educator wish list is an easy to use 3D viewer for educational use, such as the OnLook viewer. A list of OpenSim grids and their Hypergrid status is published by Hypergrid Business (2014).

Mobile VR

Research by High Fidelity, Oculus and other gesture-based recognition and immersive display manufacturers focuses on the development of scalable, ergonomic, low-cost mobile virtual reality (VR) systems. Mobile VR may present new opportunities for simulating real-world experiences in the online classroom.

High Fidelity plans to increase content and audience scalability using shared processing and a sustainable ecosystem. Their research features a peer-to-peer distributed architecture to process graphics-intensive 3D worlds on mobile devices.

To complement the interest in wearable technology, Oculus released an immersive virtual reality display viewer for use in open source and commercial virtual worlds. Facebook's CEO Mark Zuckerberg announced that the future of online computing may stem from immersive technologies, such as mobile virtual reality. Facebook invested \$2 billion in Oculus, and the development of an ergonomic, low-cost virtual reality headset may strengthen the adoption of mobile VR. (Yarrow, 2014; Parkin, 2014).

How will online learning leverage these technologies?

The combination of wearable devices and invisible technology may attract students who prefer the intimacy of campus classes and real world experiences. Invisible technology refers to tools that feel natural and do not detract from the experience. The student focuses on learning and pays less attention to the device. The ability to minimize the awareness of technology while gaining the maximum benefits from its use may lead to increases in simulated learning environments and MMOGs for educational use.

Barbara Truman (2014) studied virtual physioception and virtual inter-subjective presencing to explore how people collaborate, develop commitments and experience community in massive multiplayer online roleplaying games (MMORPGs) and virtual worlds. Her research in transdisciplinarity explores how people from diverse backgrounds come together and share ideas to explore wicked problems.

Understanding how the sense of self and presence in online learning contributes to deeper learning experiences as noted by the research at MIT's Presencing Institute (Scharmer, 2000). If learners share a sense of presence and feel a connection with the content they are studying, will they remember better?

The 3D Web

High Fidelity's vision of virtual reality looks dramatically different from the objects seen in the virtual world of Second Life. To facilitate the development of a 3D Web, they launched the High Fidelity Alphas community to crowdsource the development of their mobile VR solution.

The challenges with immersive VR include the physical discomfort that some users experience with wearable technology and further research will either strengthen the technology or lead to new discoveries.

In contrast, the High Fidelity solution captures a user's facial gestures and displays them on her or his avatar in a natural fashion. Philip Rosedale (2014), CEO of High Fidelity, demonstrated this technology during his OSCC 2014 keynote address.

Gesture-based technologies, like the Leap motion and the Kinect, also monitor a user's gestures to make it easier for mobile VR users to interact in the virtual world. Cultural barriers and Web privacy concerns may make it difficult for some educators and learners to embrace these new technologies.

Implications for the Practice

Devotees of immersive learning environments dream of the day when virtual world viewers no longer have a steep learning curve, and travel between worlds is as easy as surfing the Web.

If the forecasts noted in this paper are successful, online education in 5-10 years will look dramatically different. It will be more mobile, personalized, immersive and self-aware.

Increases in the use of educational games and gamification will incentivize learning and increase engagement. Technological advances are needed to leverage problem-based learning and cognition in the study of science, technology, engineering and mathematics (STEM).

With the advent of the Internet of Things, digital assistants may play a greater role in the online classroom, depending on the fidelity of the natural language processing systems and adaptive algorithms for knowledge storage and retrieval.

Will the role of online educators change as digital assistants on the Web learn, make decisions, and adapt from their mistakes? An optimistic view shifts repetitive tasks to virtual teaching assistants, allowing educators to carve new pathways for creativity and learning.

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