

Graduated e-Teaching Levels in Higher Education

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Abstract

Rapid change has characterized the advent of e-Teaching platforms. Increasingly instructors find themselves having to learn and adopt escalating levels of technological knowledge. The challenge lies in knowing the pros and cons of the various levels and perhaps most importantly anticipating future directions. These directions have the power to transform education from a pedagogical and content perspective, independent of technology. This manuscript attempts to illustrate the different higher education e-Teaching levels in practice today and also present a projection of possible future directions. Using this knowledge, instructors can evaluate their institution's current e-Teaching profile and identify potential points of improvement and identified strength.

Key Words: e-Teaching, student development, learning outcome optimization

In the 1960s, e-Teaching began as a rudimentary “push” of information through mainframe systems mostly adapted to autocratic models of education. These early efforts were not materially different from correspondence courses that delivered course materials and waited for student responses. As mainframes were replaced in the 1990s with client-server architectures, the opportunities for more dynamic interaction became a reality. Suddenly the ability of essentially flat information models to morph into multi-dimensional one-to-many and many-to-many models was a reality. Recognizing this shift, the manuscript addresses the problems higher education instructors face anent harnessing these new technologies. Additionally, a description of the graduated levels that represent the spectrum of modern educational delivery is provided. This spectrum currently spans from rudimentary email delivery systems to dynamic neural networks that can mimic individuated synchronous interaction. While these latter systems are still in development, the promise of asynchronous instruction appearing synchronous is not entirely science fiction. For current delivery models, the pros and cons of each are detailed and what e-Teachers should consider prior to an adoption decision.

Rudimentary Push Systems – Low Interactivity Levels

For many instructors, the first contact they have with e-Teaching is through rudimentary mirroring applications that simply digitize existing analog materials. These modes of delivery closely resemble their native origin by pushing out written lectures electronically through commercial learning platforms or even email alone. Spawning from written forms of communication, these platforms are frequently used only as substitutive applications that seek to offload the existing material into a new format (Gilbert, 1995). However, these platforms possess much higher interactive capabilities than are utilized. Some instructors either defer those

enhancement opportunities or purposely scope them out of student interaction. Since these instructors see themselves as having sufficient content and pedagogical knowledge, the technology deficiency is deemed irrelevant. The “copy/pasted” nature of their interaction with students is not acknowledged as a significant problem. Other instructors, not holding this viewpoint, simply lack the necessary training to fully leverage the available tools. In these cases training can remediate any identified deficiencies.

When interactive dynamism is lacking, students frequently feel that instructors have “dumped” their materials online and added no content value. Highly demotivated, students frequently ignore these static teaching materials until the last minute and only review them before tests. In these models, the instructor has in essence transferred notes into a new medium and provided them with scant additional discussion or dimension. Absent a regular asynchronous or synchronous active dialog, the student can quickly assume that the online model is clearly inferior and that educational professionals add little marginal value to these platforms.

Advantages

The advantages of this model are that class setup and execution tend to be simple and require very little in the way of new technology acquisition. In this model, upfront investment in system setup and training is typically low and only involves knowing how to upload existing materials. Instructors who harbor disdain for new digital teaching platforms sometimes adopt this medium just to demonstrate its inferiority. Others are drawn to what they perceive as a less time consuming teaching environment that is less burdened with student interaction and questioning. This can become a self-fulfilling prophesy if students sense that the low amount of interactivity is by design and experience isolative feelings.

Disadvantages

Among the disadvantages are potentially disenfranchised students which can damage the educational process. If students are essentially consuming an electronic correspondence course, the dynamism of idea creation, challenge, and response is removed to their detriment. If students have been exposed to better e-Teaching elsewhere, they may then resent the execution of this inferior model. If they have not, they risk believing that this model is what e-Learning truly represents. Complicating the situation is that sometimes instructors feign support for a new digital teaching platform in order to facilitate increased attention to other pursuits such as writing and research. All too often, those employing these strategies are at risk of never progressing past this nascent level. Taken to extremes, if enough students take instruction in this simple unilateral model and perceive the small value extracted, that shared perception can damage all degrees with an online component.

Common Touchpoint Systems – Higher Interactivity Levels

The next level of potential interactivity can be found within the domain of learning platforms such as Blackboard or e-College that can bring with them a suite of potential interactivity. These common touchpoints allow students and instructors to potentially engage in learning through discussion threads, posted video lectures, internet links, and mass communication between students. These tools collectively serve to create a virtual connection between the instructor and the student that can partially simulate a bilateral exchange of ideas. When used properly, students can feel a sense of connection with the instructor and the material that is unrealized in the rudimentary push systems.

Where the lower interactivity can come from at this level is the instructor's hesitancy to host voluntary synchronous events, engage social media, or connect the class to a larger learning

community. This lower level does not deem a class unworthy or not valuable to its participants. The instructors that temporarily remain at this level sometimes use this time to grow their technological knowledge and allow it to mesh with their existing content and pedagogical knowledge. If open to exploring these other enhanced events and creating a more active learning community, benefits are soon recognized.

Synchronous Events

Frequently the reason given for not hosting synchronous events is because they violate some perceived unwritten truism of distance learning that everyone's schedule must accommodate all events. This is not true in the non-digital world and in both worlds taped sessions can be made available for asynchronous consumption. Synchronous events are riskier to an instructor because they require more training for students and a lingering fear of network breakdowns for live events. The initial forays into synchronous events are usually not for credit so that the sandbox of potential learning can be less stressful for all. Once synchronous events are mastered, instructors can make either participating in the live event or the subsequent consumption of the recorded event a graded activity.

Social Media

Social media utilization is also frequently not used within this learning level for a variety of reasons. Instructors sometimes feel their low participation rate in social media invalidates it as a learning tool. Although students increasingly traffic extensively in social sharing platforms, instructors sometimes trivialize the importance of those evolving communication models. The risk is that ignoring the reality of modern social sharing and group work distorts the actual learning environment native to most student populations. An example of employing social

media would be a class covering Romeo and Juliet with various students providing their impressions to classmates from a live performance. If the play is being streamed on the web, all students can potentially watch and share their reactions in real time with each other. This immediacy of communication is not reproducible on a laptop hours after a performance ends. Another would be a political science class that volunteers at polling stations and records their impressions of the process in real time for sharing with other students. Students could even host voluntary exit polls with voters and record a potentially significant first-hand account that could help future historians. Unfortunately, harnessing the immediacy of social media and the ability to create asynchronous content from synchronous events is an underutilized component of e-Teaching.

Extended Learning Communities

In regards to connecting a class to a larger world community, many instructors simply have not abandoned the four walls of conventional thinking. The regular use of brick classrooms has existed in the United States for over 150 years. In that time, the physical layout has had an effect on the design of education and also its collective mind. Many instructors still see a classroom as a private enclave unaffected by the outside world or its opinions. In reality, today's modern networked experience fairly dictates the communal nature of learning. Virtually everyone enhances their learning by contact and dialogue with others. The presence of high-speed communication networks has only magnified this ongoing dynamic across longer distances and more disparate groups.

As an example of this ongoing dialogue with the world outside the classroom, some instructors have asked students to make significant contributions to Wikipedia. This has involved challenging students to research new information, dialogue with experts willing to

contribute their viewpoints, and create new or clearer knowledge (Neo & Tk, 2002). Another example is the staging of a Shakespearean play by a drama class and streaming it live on the Internet. This involves buying advertising, active promotion, content delivery, and most importantly, seeking communal feedback. Students are frequently amazed at how many Shakespearean devotees either tune in live or consume the taped presentation. If creatively staged, the feedback can be instructive not only in perceptions of acting ability, but also interpretive differences that were previously not contemplated (Koszalka, 2003)

Advantages

The advantage of this higher interactivity, as previously referenced, is the enhanced interactivity and the excitement that students frequently report. Many students feel that their preference for social sharing is validated by its presence in the classroom (Liu, Maddux, & Johnson, 2004). Although they may not have seen this platform as potentially instructive or a source for growing their academic knowledge before, when utilized they see new connections and opportunities. Synchronous events, when hosted properly, lend an immediacy and relevance to courses that students can rally around. Although many instructors feel that “desktop-less” students will miss out and potentially not participate, that approach ignores modern technology norms (Kinshuk & Chen, 2005). To many students, their smartphone is their preferred device. Regardless of location, they would still participate on their mobile device and not a traditional computer. Lastly the involvement of groups and individuals outside the classroom expands the width and breadth of student learning to regions previously not considered. This practice of extending the contact with information outside the “four walls” and reaching out to a global community is reported by many students to be more educational and hugely rewarding. The

enhanced rewards come primarily from being able to project and translate their learning into a larger relevancy.

Disadvantages

The disadvantages are primarily related to the increased training for instructors and students. Training on the part of teachers and students involves a time commitment that many find intractable. Digital divide issues can also be encountered (Jin & Bagaka, 2005). Frequently, though, they prove surmountable through careful review of needs and potential solutions. Generally speaking, college computer labs are always available as an option for on-campus students. Outside the classroom, the declining cost of mobile devices and the commitment of many institutions to supply low-cost basic devices to disadvantaged students also offer hope.

Common Touchpoint Systems – Future Vision – Higher Connectedness Levels

The future visions of potential e-Teaching are closely related to ongoing research and development (R&D) underway. Some applications have left R&D and are in current use today. They represent competing visions for what education can become in the near future. Others are still in labs and being developed for widespread use. The advantages and disadvantages of these various initiatives are generally not well established and only their future maturity will begin to provide those answers. A few examples will be detailed.

Full Duplex Social Media

While full duplex communications involving simultaneous two-way feeds have enjoyed some applications in telephony and certain websites, not all social media have participated. Half duplex one-way communication has generally represented the domain of social media. User contributions are made to a common touchpoint, but it is generally unidirectional. Even when

two individuals are posting or contributing at the same time, the common touchpoint can only recognize content elements sequentially. Participants are essentially communicating with the touchpoint and not directly with each other. Part of the reason for this is that social media interaction was never architected to be true peer-to-peer. Also user preference, established early by what the web first offered, has engendered an early acceptance of asynchronicity. Obviously opportunities for real-time two-way streaming video have been available for some time. Only recently though have affordable systems existed allowing multiple users to concurrently share their collective user experience (Carvalho & Machado, 2000). Technologies such as Bluetooth and Near Field Communications have begun the practice of connecting devices peer-to-peer (Al-Bataineh, 2008). Extended across telecommunication networks, extended peer-to-peer platforms that cross vast distances are slowly becoming a reality. As this evolving use of social media becomes more widespread, inevitable changes will occur. The expectation of immediacy that students have for dialogue and information sharing will accelerate. Email and texts will increasingly start to resemble current attitudes about posted letters. Ironically, the future of social media platforms will transform education towards a stronger resemblance to its origin of face-to-face communication. With full duplex peer-to-peer technology it will drive towards many-to-many interfaces extended across disparate environments and times. A digital field trip where a group of students wear headsets and essentially “take” the rest of the class through a learned review of an art museum is a reality. A trip to study Greek ruins could be made socially available to all devices with interested users. Even the monetization of this content to help defray the trip cost is not unrealizable. Undoubtedly these creative uses of full duplex communications would spur student learning and growth.

Virtual Learning Environments

Although not in widespread use, virtual learning environments hold special opportunities for interaction not fully imagined. Platforms such as Second Life, Virtual Worlds, and Open Simulator provide the opportunity to immerse students in a rich 3-D environment that closely mirrors modern gaming. This gaming schema is particularly attractive to younger learners (Sogabe, Mase, & Finley, 2000). Younger learners, better grounded in gaming infrastructure, have progressed from single-player (Sims, Rollercoaster Tycoon), to multi-player (Call of Duty, Journey), to group-centered multi-collaborative (World of Warcraft, Second Life) environments. Many believe this progression has created learning schemas more open to a higher appreciation of social learning networks. Additionally, exposure to gaming schemas has contributed to greater facility with allocentric and egocentric learning models. These macro and micro orientations give gamers a more flexible cognitive map of how information is assimilated through digital means, especially in virtual platforms. Given the immense size of modern global gaming which is projected to reach \$70 billion by 2015, future educational deployment may be more necessity than choice (Takahashi, 2010).

The world of virtual learning opens up possibilities previously unimaginable. Psychology students can be exposed to virtual patients and attempt to apply their knowledge to diagnose their mental health. Medical students can perform different surgical procedures and not risk patient injury or death. Researchers studying racial bias can prepare social experiments where subjects perform job interviews of avatars with different ethnicities. The interviewer's different questions and reactions are monitored and studied for social science. Inversely, subjects can be put into virtual social settings to experience how the behavior of others in a virtual environment is affected by their avatar's appearance and ethnicity. All these offer

opportunities to study different learned schemas within increasingly realistic settings. It should be noted that since the 1960's, pilots have been successfully using virtual flying to maintain proficiency and even practicing difficult to simulate scenarios. So much confidence has been expressed in these virtual simulations that some of the hours can count as actual flight hours in their logs.

Virtual learning environments can also contribute to future success in the business world. Companies such as UPS and Hilton Garden Inn have successfully created both synchronous and asynchronous virtual learning environments that have been embraced. UPS has created virtualized warehouses where avatars load and unload trucks in real time to highlight the importance of certain safety procedures. Likewise, Hilton Garden Inn has various customer interactions and room services virtualized to allow employees to experience them from various perspectives. Since students will presumably be working in these environments, exposure to virtual reality will increasingly become a job requirement for some. The lessons learned through contact with these virtualizations will not only contribute to future student success but also to that of their companies.

Intelligent Voice Recognition

The focus on voice recognition (VR) tends to overstress its ability to replace the mouse and touch screen as the input dialog with a computer. While significant, VR's future is thought to be much larger than as a mere input source. The technology's true revolutionary potential in education is in its ability to blur synchronous and asynchronous teaching. Currently, the educational systems that employ limited VR capabilities are relatively crude systems that can handle some discussion blog entries and rudimentary aural posting. Often the intention is more

to provide a different source of input source rather than a superior one. However, with the recent improvements in VR technology like Apple's Siri and Android's Tap and Speak, progress is slowly being made. Although the deployed versions of these applications still lack seamless integration with users, continuing investment is driving improvements. Already VR systems are being developed in labs that for the first time begin to sound significantly like humans. Airlines for years have improved their airline reservation systems enough to begin fooling unsophisticated users into thinking the voice might be real. Even the mechanistic voice tones are starting to become more natural and, ironically, less perfect to mimic true human speech patterns. This technological shift could herald huge changes in asynchronous education. A reflection of future changes might be illuminated by Nuance's Nina (Nuance Interactive Natural Assistant) project. Nina is an attempt to create a digital virtual assistant that would power a myriad of business applications. The applications for airlines, insurance companies, and banks could provide realistic implementation of VR between businesses and consumers. From the user's perspective, the goal is to make the interface seamless and appear to be synchronous and interactive. In reality the program is processing asynchronous requests for information and handling them as if a human were on the phone. Interestingly, the service can also authenticate users based on their biometric voice signature, effectively eliminating passwords and identification processes.

For education the potential downstream effects of a system like Nina could be significant. An instructor could have virtual teaching assistants that would handle common questions or direct the students to available resources online. Teaching platforms like Blackboard or eCollege could have menu-driven commands replaced with spoken student requests that are recognized by the servers (Domingo, Garcia, & Ruiz, 2001). The servers would then authenticate the specific

user and perform their desired action. Inversely, Nina could contact students and make them aware of important announcements or deadlines that are approaching. Progress in the course could also be communicated to the instructor and student with possible corrective actions communicated to forestall problems. With voice authentication in place, the learning system could also recognize who is interacting and based on internal student metrics meter the course at different rates by individual.

Although Nina only currently understands U.S., U.K., and Australian English, additional languages are scheduled for early 2013. This could potentially provide wider access to classes in the United States overseas and international classes onshore. Although the effortless exchange of different languages is currently only in testing, this change alone could profoundly change conventional education. Language exchange symmetry has generally not been possible globally but VR's capacity for real-time translation could make it a reality (Bonkowski, Q. Cheung, & L. Cheung, 2000). Before potential skeptics dismiss these efforts as overly optimistic, they should note that Nuance is the current database engine behind Apple's Siri (Lardinois, 2012). Nuance also began piloting Nina with their first partner, USAA financial services group, back in August of 2012 (Lardinois, 2012). Based on early testing, widespread deployment will begin early next year with airlines and banks astutely watching. Other competitors such as Microsoft, IBM, and MModal Inc. are also testing intelligent VR systems and this competition will only serve to invigorate the industry (Anderson, 2010). As these systems increasingly come into contact with education, the potential for a web 3.0 experience is not dismissible. These systems truly hold the potential to severely blur the differences between asynchronous and synchronous educational consumption.

Conclusion

The ability of e-Teachers to harness the right tools for their courses has never been more important. As educational platforms progress, instructors increasingly feel like they are on a treadmill running at breakneck speed. This sense of acceleration however merely reflects the realities of the information age and the explosion of complementary knowledge in new and unpredictable directions. Instructors buried in the rudimentary push systems will be challenged to keep up with student demands and their very employment may be threatened. Those who have adopted the higher levels of interactivity found in touchpoint systems hold more promise of improvement for their students and knowledge growth for themselves. While not everyone will use all capabilities from day one, the slow progression upward is the true mark of an effective e-Teacher. As they successfully incorporate more synchronous events, social media, and the extension of student learning communities, they effectively prepare themselves and their students for the future. With the promise and challenge of cutting-edge innovations in full duplex social media, utilization of virtual learning, and intelligent voice recognition, much change has yet to occur. Having the vision to leverage these changes to maximum educational advantage is always the e-Teachers dilemma. However, ignoring these coming advances and their effects on the future of education is no longer an option.

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