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The Impact of Lecture Presentation Medium on Student Learning

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Review of Literature

    I.   **The Evolution of Distance Education**

Education has been a staple of American life since the Pilgrims landed at Plymouth Rock. From the small schoolhouses lit simply by candles of the early 17th century, to massive college campuses complete with Wi-Fi, technology-filled classrooms, and technology infrastructures to rival some of the Fortune 500 companies, education has evolved to reach millions, if not hundreds of millions. Over the last two decades, education all over the world has shifted to eliminate the boundaries of the traditional classroom. Thus, distance education has exploded onto the scene.

Technology evolved out of the invention of the personal computer. However, for many years the idea of creating computer software, not to mention more specifically, learning experiences, was limited to the relatively small percentage of programmers in the world. Even consumption of that software was limited to those fortunate enough to understand the technology and have a personal computer available. By the turn of the millennium this was beginning to change. In (2004) research published by McGreal and Elliott from Athabesca University in Canada, it was suggested that, "With the evolution of more user-friendly applications and interactive content encapsulated in learning objects, one need not be a coding expert to take

advantage of the learning opportunities that are becoming available on the Web." (p. 10) With learning opportunities becoming easier to experience via the World Wide Web, the idea of distance education was beginning to take shape.

Distance education, driven by technological advances, is fueled by a strong positive feedback loop. O'Brien, Hartshorne, Beattie, and Jordan (2011) concluded that the increased communication options were the driving force behind the expanding options for teaching and learning around the globe. Couple that with the student's desire for options, and there is significant growth in the options for teachers both in teaching and in research (p. 30). These options range significantly from strictly pedagogical options that relate directly to what is taught in the course, and various administrative or student management options that are included in many Learning Management Solutions (LMS). Olson and Wisher (2002) stated, "The flexibility of the Web enables it to be used for a variety of purposes, from course administration and management to complete course delivery" (p. 9). With these options came the rise of the options for how courses were delivered.

Hybrid courses grew out of the need to maintain the classroom experience but also take advantage of new Web technologies. O'Brien et al. (2011) found that, "For the teacher educator, having the choice of offering a hybrid course allows some options in matching content and skills to be taught in the best delivery option; this opportunity may be attractive to the teacher educator." By combining the great interaction of the classroom experience with the vast resources available on the Web, educators found hybrid courses to be especially useful.

The next step in the evolution of distance education was the fully online course. Olson and Wisher (2004) stated, "Web-based instruction…makes possible learning experiences that are open, flexible, and distributed, providing opportunities for engaging, interactive, and efficient

instruction" It became possible that students from Tokyo, Japan and Washington D.C. could learn together in an efficient and meaningful way. However, what became clear early on with fully online courses was that instruction from the classroom could not just be made digital and be effective. A number of studies and a significant amount of research was conducted to examine the difference between the two and how to make distance education via fully online courses as effective as classroom-based courses.

Research by O'brien et al. (2011) on teacher preparation programs found it important that "teacher preparation programs avoid getting 'caught up in the draft' of fast-moving online course development and use to the extent that the effectiveness of the learning experience does not match that of traditional, face-to-face course offerings" (p. 20). Earlier research, however, by Bonk and Kim (2006) suggested that while web-based instruction was not, by itself, as effective as classroom based instruction, there were various tactics that could improve student success. They found, "that training students to self-regulate their learning was needed most, followed by better measures of student readiness, [and] better evaluation of student achievement" (p. 26). Another interesting finding from that same research was that subject matter expertise came third in respondents' perception of skills needed to teach online. The first response was the skill of course development, and most importantly followed by the skill of facilitation and moderation. "In effect, the results indicate that planning and moderating skills are perhaps more important than actual "teaching" or lecturing skills in online courses" (2006, p. 27).

Further data solidifying Bonk and Kim's research is included in Olson and Wisher's (2004) paper which stated that, "The absence of a sturdy pedagogical underpinning for a Web-based 'instructional' program can diminish an otherwise worthy opportunity to improve learning" (p. 2). Thus, the role of course developer and moderator is again found to be more

important than simply having an expert-level knowledge of the content. Along the same lines, Beattie, Spooner, Jordan, Algozzine, and Spooner (2002) found that, "To be effective, distance education instructors must help remote students become part of the larger class and to "virtually" share the same instructional environment" (p. 130).

II.   Technology in Distance Education

Technology being the driving force behind the rise of distance education, it was inevitable that it become a heavily relied on tool for effective instruction. But the merits of technology in distance education were not simply pedagogical. Enabling diverse groups of students, such as the example above of the Japanese student and the student from the United States, to study together has brought new perspectives to the educational experience. Research by Osmanoglu, Yoc, and Isiksal (2013) showed that, "when members with diverse backgrounds come together in an online environment, they can reflect on and discuss real classroom situations more effectively" (p. 1302). The varying perspectives have provided an invaluable tool for educators to gather many different perspectives on any topic. Osmanoglu et al. (2013) go even further to suggest that, "Use of computer technologies makes it easier to bring members with diverse backgrounds together, and thus enriches the collaborative reflection" (p. 1302).

Besides just diversity, cost is an important factor in the rise of distance education. The costs, or more specifically the profit margins, for an institution to provide distance courses is significantly lower than classroom classes as a result of scale. In the case of Massively-Open-Online-Courses (MOOC) the scalability of the technology allows the institution to serve vast numbers of learners at a very low cost. An article by Marovich (2012) states that:

The pedagogical approach of many MOOC's is bare-bones: Students watch videos of brilliant professors giving lectures, do assignments that are corrected by a digital auto-grader, and in rare cases engage in forums or get "real" feedback from peers in the course. Thousands of students can enroll, simultaneously, in any one of these classes.

Flexibility also becomes a factor when using technology for distance education. O'Brien et al. (2011) stated, "With advancements in the functionality and usability of distance education technologies offered via the web, colleges and universities have opportunities for more robust online courses in either synchronous or asynchronous formats" (p. 19). With companies and organizations all over the world creating "building blocks" or small plug-ins to enhance the learning experience, it is possible to add just about any functionality to an online course.

There are, however, drawbacks to technology in distance education. For example, Edmonds' (2006) research studying the difference between online courses and classroom based courses in identical Psychology courses found that, "Considerable retooling of delivery of content and assignments is needed for the online course to become more 'learner friendly'" (p. 19). Such "retooling" is not only necessary, but led to distinct and noticeable improvement in student performance. For an instructor who is unfamiliar with online instruction, or who is not capable of taking advantage of the tools available to retool a course, it is possible that he/she could do detriment to student learning in his/her course.

It is important to note the tools that research has found to potentially help improve student learning in online courses. Moneta's (2002) research (similar to Edmonds) indicated that, "A likely explanation to the online students' improved applied-conceptual learning…is the access to interactive graphics, practice quizzes, and short games" (p. 431). Distance education, more specifically fully online courses, invite an instructor to embrace the Web as a resource and

point students to various third-party tools to help them learn. By taking advantage of online simulators, games, and even discussion forums, instructors can expose students to powerful tools without much additional effort on their own part.

Lastly, the factor that is often missed when discussing students' ability to perform in online courses, is the learning curve associated with learning online. Edmonds (2006) stated that, "Online classes tend to require more independent work, and perhaps are actually more difficult for students to complete and be academically successful" (p. 17). This independent work is not the only culprit. Moneta (2002) discovered that the performance drop that students entering college experience due to the adjustment of lifestyle, is similarly found in the adjustment to online courses. "Students' learning curve in facing new educational technologies has a social dimension that encompasses the whole college environment" (p. 432). Moneta (2002) also found that students taking their second online course were likely to be more successful than those in their first due to the learning curve associated with online courses (p. 431).

III.   The Online Video Lecture in Distance Education

Before looking at research on online lectures, an understanding of what is meant by "online video lecture" is important. An online video lecture, for the purposes of this paper, can take one of two forms. In one case, an online video lecture is a classroom-based lecture that has been recorded and posted online for streaming by the student. In this case there is some adaptation for the online audience but nothing substantial. The other type of online video lecture, is one that is developed solely for an online audience. It may be recorded via webcam with audio and video of the instructor, or it may consist of a slide presentation with narration. In any case, it is also posted online for streaming by the students in the course.

On the same note as Moneta and Edmonds findings that the online course is not the same as a classroom-based course, the online video lecture has been proven to be different from the classroom-based lecture beyond just the fact that it is watched online rather than live. First, in terms of effectiveness, Akiyama, Teramoto, and Kozono (2008) conducted extensive research on the online video lecture (using the first definition as stated above for an online course) as compared to the classroom-based lecture. Among their findings was the idea that different types of courses may be better suited to an online video lecture than others. "In the case of courses aiming primarily at transfer of knowledge…online [video] lectures seem to offer the same educational effect as conventional lectures" (p. 38). While the educational effect was the same, the student experience of the lectures was different. "Questionnaire surveys conducted among the students indicated that the online [video] lectures proved more comfortable. We also found that Web materials were highly helpful, and that the learning effect grew as the lectures were viewed repeatedly" (p. 43). In this case, the fact that the video lectures could be viewed multiple times, and on the students' schedules, and in conjunction with other web tools, made them more effective and better-liked by the students.

When dealing with an online video lecture that conforms to the second definition above, there has been extensive research done to discover how content and video length translate into student learning and comprehension. Young's (2008) research revealed that many, "professors who have ventured into online education have made the same discovery: Just because 50-minute classroom sessions are the norm on a college schedule does not make that the ideal duration for students outside the lecture hall" (p. A9). These professors discovered that a student's attention span was significantly shorter when watching an online video lecture than it was (at least perceived to be) in a classroom-based lecture. Young's research did not, however, reveal why

this was the case. Could the distractions offered by a modern day internet-connected computer have something to do with the shorter attention span? Or, could it be that video allowed students to skip through parts they didn't find important only to miss critical information?

IV.   Video in Distance Education

It is perhaps Beattie et al. (2002) who suggested the key variable that is investigated in this research paper:

> The type of presentation equipment (e.g., white board "on the fly" writing, or prepared overhead material, or material developed with electronic presentation software with appropriate images to illustrate content) that the instructor uses to deliver the content is another variable that could likely effect the outcome [of a course]. (p. 131)

Video as a presentation medium in distance education became possible as a result of the rise of video streaming. According to McGreal et al. (2004), "almost any video sample with educational value can be converted to a streaming format, and many will serve as excellent additional resources on an educational Web page or for classroom courses or online courses delivered synchronously" (p. 3). This advance in video technology allowed online lectures to come about. For the first time, faculty could record their lectures, or develop separate lectures entirely and put them online for students to consume at their own convenience. The researchers also noted that, "When implemented wisely, video can alleviate the "page-turning" boredom of many online courses" (p. 3).

Osmanoglu et al. (2013) found in their research that, "online video cases together with forum discussions have potential to create promising learning opportunities" (p. 1302). This experience can create an interaction similar to classroom based discussion while allowing for

asynchronous communication (via the forum discussion) and learners all over the world to take part at their own convenience. By attempting to closely mimic the classroom experience, it is assumed that the results and outcomes in terms of student learning and comprehension can be closely mimicked as well.

The future is bright for online video lectures. Quillen's (2013) research found that, "Some content providers…have found that as more of their consumers become familiar with creating their own videos through apps and mobile devices, they are more forgiving of lower production values, as long as the informational value doesn't lag" (p. S8). This indicates that the creation and use of lower quality videos as educational content is becoming acceptable. No longer does one need a television studio to create educational content. Anyone, anywhere, any time can create content worthy of the classroom. According to Quillen (2013):

> The future possibilities for educational video may lie far beyond how the medium can more effectively deliver content to students. The cameras and apps available on smartphones and tablets are already making possible the ability for students to conduct video analysis out in the field, especially in science subjects such as physics and biology. (p. S10)

V.   Summary

While it is clear that the technological future of online video lectures is bright, it is not yet known exactly how effective, if at all, online video lectures can be over their competitor, the written online lecture. And it is clear that courses containing online video lectures can be effective, research on the magnitude of effectiveness specific to the video content is lacking. In short, research to determine the specific difference in effectiveness between lectures presented as

text and lectures presented as video is lacking and needed in order to complete the perception of the online video lecture as an effective instructional tool.

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