Podcasting in Middle School: A Case Study and Implications for Teacher Education

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Abstract: Currently, podcasts in education are used by instructors to deliver content; additionally, most research is about university courses. This paper presents a case study of the curriculum research, development, and implementation of student-created podcasts in two classes offered as a continuum at a middle school. The first course was seventh grade English; the second was eighth grade computer literacy. In English, the curriculum was already strong and established. In computer literacy, the curriculum was in experimental stages. Student-learning considerations and results of implementation are described, as well as the different approaches used by both teachers and the resulting student outcomes. The paper concludes with a discussion of implications for teacher education when preparing other educators to use this emerging technology.

Introduction

In colleges around the nation, there have been efforts to leverage technology to scale up large lecture courses, deliver courses online, and decrease face-to-face time required for content mastery (Waitts & Lewis, 2003). Tools such as learning management systems, videos, slideshow presentations, and videoconferencing are utilized by university instructors around the nation. Yet, Schaffer and Clinton (2006) lament that even with the use of the new technologies, there is still a lack of successful endeavors that support cognitive, collaborative, and social interactions. With technology's decreased costs and increased presence in schools around the nation, Serim and Schrock (2007) aptly state that "the…challenge in keeping current with the shape-shifting technologies coming into view is understanding how they can be used to improve learning" (p.13).

One of the newest delivery mechanisms is the podcast, which began as an audio program that could be accessed via a personal MP3 player. Podcasts now contain video elements as well and can also be accessed online without a player. Podcasts have been shown to be effective instructional tools (Ogawa & Nickles, 2007), but few studies have identified the production of an actual podcast as an effective learning tool. One such study is

Frydenberg's (2006) work with business students where the students, instead of the instructor, designed and developed the instructional podcasts. Although the research focused on student learning, the sample was college students, and issues of age, development, and experience are greatly different than the K-12 population. Grace Poll of Jose Mari Middle School in New Jersey won an innovation award for her use of iPods for enhancing reading comprehension, for learning proper grammar, and improving speaking skills. She will later have students writing stories to be turned into podcasts (see http://web.mac.com/gpoli41/iWeb/Site/Podcast/Podcast.html). However, while interesting, her successful podcast implementation is anecdotal, not research on podcasting as an effective learning tool.

Podcast, a term coined by Ben Hammersley (Cohrane, 2005), is a term that is a combination of the word broadcast and iPod. It is "audio content available on the Internet that can be automatically delivered to your computer or MP3 player" (Geoghegan & Klass, 2005, pg. 5). iPod is a popular portable digital media player designed and marketed by Apple. Though there are many portable digital media players on the market, the iPod is used to generically describe the type of player, much like Kleenex is used to describe facial tissue. Subsequently, the podcast is also a generic term for an audio program and plays on many portable digital media players, not just the iPod. The inherent nature of a podcast is to be shared, with the widespread nature of sharing dependent upon public interest.

This paper describes the efforts of two middle-school curriculum developers at the University Laboratory School in Honolulu, Hawaii in using podcasts as a project-based assessment mechanism, to engage students in collaborative learning, and to prepare students to be contributors to an increasingly digital society. The goal of this description of the implementation is to contribute to best practices in teaching, learning, and research.

Background of the Study

During the 2006-2007 school year, two curriculum developers at the University Laboratory School started to explore podcasts as a creative expression mechanism for their students. The curriculum developers also served as the classroom teachers and will henceforth be referred to as the teachers; both are also the authors of this paper. The two classes being described in this study are the seventh-grade English taught by Ms. Hamilton and the eighth-grade computer literacy classes taught by Dr. Nguyen. The podcast is first introduced in seventh grade and further augmented in eighth. The research, development, and implementation of student-created podcasts in two classes is offered as a continuum. The technology infrastructure was already in place in the school and both teachers were already familiar with podcasting and the creation of podcasts.

In the English Class

The goal in seventh grade is to have students write a story and record it as a podcast. The podcast is used to enhance the existing curriculum. In grades six and seven, students produce both individual and collaborative writing and performance projects in the spirit

of old-time radio performances. Students are encouraged to develop a sense of story and character, while paying attention to sound effects and music that will engage a listening audience. The project was initially designed for students to use the technology available at the time, audio tape recorders, but as the technology has changed so has the project, and students now use the software program GarageBand to record podcasts. The class listened to a few educational podcasts and developed a rubric with requirements for the podcast. The students expected that the story needed to make sense and be exciting. They decided the focus should be on well-developed characters and their dialogue, so no narrators were used except in the introduction to the story. The students revise their stories and dictation into the computer as many times as needed until they are satisfied with the final product.

With the requirements in mind, students adapted well-known children's tales, from Greek mythology to *Harry Potter*, as well as local tales, such as the legend of Hi'iaka and the ghost at Morgan's Corner. Groups put their own spin on the tales and experimented with the features in GarageBand.

In the Computer Literacy Class

The goal for eighth grade is to have students teach a skill or share an idea that they learned in their computer literacy course. The podcast in eighth grade is an integral part of the curriculum. In addition to writing a script and narrating their piece, the students also added images that enhanced their message. Students had to use a myriad of productivity tools to develop their podcasts, from scripts to storyboard and digital image capturing and selection.

The final podcast topics included lessons in Internet safety and responsibility, tips and techniques for word processing, guidelines for adding animations and transition in presentation software, how to lessons in creating graphs and charts, and advice on developing effective Web sites.

The Podcast Pedagogy Problem

In introducing podcasts into their respective curricula, the two teachers were cognizant of the need to retain essential elements of learning without getting caught up in the proxy of technology. The four elements were strongly emphasized by Roschelle, Pea, Hoadley, Gordin, and Means (2000) and delineated as the following: (a) active engagement; (b) participation in groups; (c) frequent interaction and feedback; and (d) connections to real-world contexts.

The Teachers

The two teachers described in this paper are not low technology users and they feel that they experienced support for their endeavors from school administration. They are described here because the preparation and support of teachers is often seen as a limitation of technology use in the classroom (Walcott, 1986). Much attention has been

given to the technology integration perceptions and experiences of teachers (Gerber & Scott, 2007; Ertmer, Ottenbreit-Leftwich, & York, 2007) and impact of technology since "classroom educators have a ringside seat for technology's transformative powers" (Rother, 2005, p.36). The teachers consider themselves high-level technology users who are very comfortable with the use of technology for teaching and learning.

The teachers are also curriculum developers and researchers in their respective fields—one in English/language arts and the other in science and technology. Both teachers were also aware that technology is not something that is just plugged in; it must spawn inquiries, focus on deepening content and pedagogical knowledge, consider the design of instruction and assessment, and thereby encourage a more general spirit of inquiry about teaching and learning (Shulman, 2000; Vrasidas and Glass, 2004). Though some research suggests that technology-mediated instruction and projects may not have any significant difference on student outcomes (Jones & Paolucci, 1998) and others argue that "new computational tools problematize the concept of thought within current sociocultural theories of technology and cognition (Shaffer & Clinton, 2006, p.283), both teachers believe that technology skills still provide an important opportunity in terms of access to knowledge. Grant & Branch (2005) espoused that student abilities could be effectively traced via artifacts through project–based learning. In this case, the artifacts were the podcasts.

While retaining the elements described above, the teachers were also careful not to mistake technical mastery for content mastery. Gerber and Scott (2007) caution against determining successful technology implementation as successful learning. They state the following in their description of developing a master's level research course:

> A deterministic view of technology can lead one to put the technology first and to develop curriculum around it. In turn, by making superficial connections between features of the specific technology and principles of learning, the curriculum designer can view successful technology implementation as a proxy for learning… [A]ctive learning is associated with construction of knowledge, and interactivity is associated with social learning. (p.464).

The teachers were cognizant of the differences between determinism and constructivism and designed their activities accordingly.

Designing the Podcast-based Projects

As stated previously, both teachers proceeded with different core reasons for introducing podcasts. In the English class, the podcast was used to enhance cognitive, collaborative, and social interactions amongst the students, as well as meet the needs of the English curriculum. The use of the computer to create a podcast in the seventh grade was to enhance the existing curriculum, where an activity originally called for audio tape recorders. A podcast is the most recent technology that serves the same purpose.

However, it is important to note that a podcast project was not essential here; writing and performance were the essential learning goals. The active engagement, group work, interaction and feedback, and connections were made to the stories, which engaged the audience.

In the second course, computer literacy, the curriculum was in experimental stages. The purpose of the podcast was to provide another means of technological expression, thereby increasing the students' digital literacy. As a final project, the students were to take what they learned and attempt to teach it via a podcast. The concept of teaching and sharing was not new to the students at the school. In mathematics, the same students take what they learn and attempt to explain it to other via a digital Elmo. Additionally, students were to transfer their previous experience with the podcast in the seventh grade and associate writing, performance, story, and character into teaching computer literacy concepts. The teacher was attempting to draw upon skills developed in other courses and reinforce them in the podcast project. Unlike the English class though, the podcast itself could not be replaced by another technology. Learning how to podcast was the actual project. This teacher took a deterministic approach to the use of technology in the classroom, whereas the English teacher took a constructivist approach. The nature of the computer literacy course itself lends credence to the deterministic notion. After 10 weeks of large group demonstrations, small group practice of skills, and individual time for mastery, students were given seven entire weeks to formulate their own timeline for three tasks—a PowerPoint presentation, a Web site, and a podcast. For the podcast, each group was required to complete a script, to select images, and to construct their podcasts. The students were allowed to choose any topic and worked in self-chosen groups of four. In this class, students were also expected to add complementary images to their podcasts. The addition of images to support their podcast was a new skill that was, for the most part, easily acquired.

Students and Data Description

There are fifty-four students each in grade seven and eight in the school. At the time of this writing, twenty-three students were common between both classes. The remainder of the students will experience computer literacy in the spring semester. Four students in the eighth grade fall computer literacy class were new to the school and did not experience the English class in the seventh grade. Of note is that the new students did not have any experience with creating podcasts in their previous schools. Based on a demographic survey administered to the students at the start of the school year, 27 of 27 own computers at home with Internet.

Three general sources of data were used in this study. The first source was student scores on a podcast rubric developed by the computer literacy teacher. The rubric scores were compared from the start of the course to the end of the course for technical skills. The second source was a survey administered at the end of fall 2007. The survey included both likert-scale and open-ended questions. The survey was administered via the World Wide Web. Students completed the survey mostly from their home computers, though a

few also used lunch periods and free class time to answer questions. The third source of data was observations and notes taken by the teachers themselves.

Findings

Increase in Technical Skills and Content Knowledge

In a comparison of student scores on podcast projects from the start of the classes to the end, it was expected that students would increase their technical mastery of completing the podcast. After accounting for the content differences in their rubrics, the teachers analyzed the data for gains in technological literacy. In English, none of the students had prior experience with creating podcasts. In the following year at the start of the computer literacy class, the average technical mastery was already 14 of 20 points. Students retained a significant amount of technology mastery from seventh grade to eighth grade. At the end of computer literacy, students averaged 19 of 20 points, demonstrating a gain in skills. The authors recommend that the technological content skills rubric be standardized across grade levels so that a more accurate comparison can be made.

In terms of content mastery, it was more difficult to assess because no comparison could be made to a true control group. The authors recommend reanalyzing the results of the content mastery from classes prior to podcast implementation with the classes described here. The nature of the experimental laboratory school may provide for the dataset needed for that comparison.

The Freedom to Fail and Try Again

At the end of the semester, the twenty-seven students were asked to reflect on the processes involved in the four computer literacy projects and how each project contributed towards their preparation towards digital literacy. One hundred percent of the responding students (N=25) strongly agreed (48%) or agreed (52%) that they improved in the area of presenting their work via the four mechanisms provided to them. The two missing responses were due to illness on the last few days of school. The students especially appreciated the opportunity to learn and "to fail and try again till it was right." In particular, the podcast graded projects showed significant gains in achievement and understanding of subject area content. The student scores were also reflected in the results of the survey where students self-reported whether they felt they were "really good at" creating podcasts. All students improved in their podcasts skills, especially the four new students to the school who had never created a podcast. Though students learned quickly how to add images, they had difficulty in determining what pictures to use. There were more disagreements about visual representation than there were about the script.

Group Versus Individual Work

After reviewing the survey data and coding the open-ended responses, one theme clearly emerged—students seemed to prefer working individually on podcast projects, but

constantly requested feedback from fellow classmates. Of all the final projects, only 3% chose podcasts as their favorite. Of the 15 students who chose podcasts as their least favorite project, 11 cited group work dynamics as a major factor. During group discussion in class, students indicated that they generally liked the podcast work better when they had complete control over their work. In addition, one student wrote that "it was probably because [I] have already done this last year…so that was when [I] was really excited about and when [I] had fun with it" and another wrote that the podcast was "a little harder, because we chose a topic to make a story, and with a story, you need it to have pictures, and more of an emotional feel to the recording, a certain tone, and the right sound effects."

Observations from the teachers

Overall, both teachers felt that the projects were extremely successful in terms of student engagement and well received by students as an additional means of digital expression. Following are some common themes that emerged from their observations.

Provide more structure prior to recording

Writing. Both teachers feel strongly that a solid written piece of writing needs to be completed prior to recording and adhered to throughout the project. Ad libbing resulted in too much time being wasted. In addition, the written piece should be rehearsed a few times for familiarity before recording. In the case of the computer literacy class, benchmark deadlines need to be established for completion of scripts and storyboard within the seven free work weeks as some groups were more motivated than others.

Examples. Also, the difficulty in assisting students can be alleviated by providing more large class examples and tutorials before recording. Providing written how-to instructions will give students one more way of problem solving on their own before asking for assistance. In computer literacy, more time could have been spent on the digital image issues of the podcast window. Though digital images are a large part of the computer literacy curriculum, the square window of the podcast was not discussed. Students were capturing the standard 3:4 image and having parts cut off. This caused frustration among the group.

Inform and enforce copyright and media laws

Of strong consent between the two teachers is that copyright laws and the fair use doctrine must be adhered to, even for middle-school projects. After a lesson on copyright laws, students will be well informed about the restrictions on using the work of others. Musical typing will be taught to the class to encourage students to develop their own music. In computer literacy, copyright, fair use, and public domain were discussed frequently throughout the semester. The awareness of these laws and doctrines made the students more conscious of the need that sounds, music, and images they were adding to their work needed to be open source or self created.

Be cognizant of collaborative groups or individual effort
Both teachers observed group dynamic situations when developing the podcasts. The computer literacy teacher commented that perhaps a dyad situation would be better suited to the podcast work than a quad due to group disagreements. A podcast is generally a single person's viewpoint that is broadcast to the world. Capturing the viewpoint of four different individuals into one podcast seemed to be too taxing for some students; four individuals deciding on the one best image added to the frustration. At times, the aggravation involved in coming to consensus caused some groups to abandon the project for the day or even entire week. The English teacher further commented that students might perform better in collaborative groups if they have had a chance to learn the program on their own first. This idea will be implemented soon in the English class and observations and student self-assessments will be collected. Even after this reflection and after some consideration, the computer literacy teacher will not implement any changes for the remainder of the school year so that she can make comparisons between the fall semester students and their spring semester counterparts.

Conclusion

The overall goal of both classes was to use podcasts to effect positive student learning. Both teachers were encouraged by research that determined instructor-created podcasts to have positive effects on student achievement scores, motivation, and retention at the college level. They hoped the same conclusion could be made about student-created podcasts. From their experiences, the authors conclude that the podcast was a positive experience for the students and that effective learning did take place. The authors reserve statements of significance, however, as more valid instruments of assessment needs to be developed.

Additionally, the authors were able to demonstrate that technological skills were transferred from one year to the next as shown by the retention of mastery from the end of seventh grade to the start of eighth. Further studies will be conducted with a second set of students who have yet to enroll in the eighth grade course. The current results show promise for scaffolding technological skills, whether for podcasts or any other emerging technology.

Implications for Practice

The findings from this study support the use of podcasts as an assessment tool. A podcast can be used by students to present their learning, just as they could present it in a PowerPoint or in a report to the class. The podcast, however, requires knowledge about the technology that not many teacher preparation institutions are providing. The question to be asked here is if podcasts will become another common technology and if it will become another section of teacher preparation courses.

The findings in this study support the notion in technology and teacher preparation that knowing the purpose for using technology—is it to learn the technology or as a tool to communicate another learning—is of utmost importance (Gerber & Scott, 2007;

Roschelle et al., 2000; Serim & Shrock, 2007; Ertmer, et al., 2007). Though the computer literacy teacher initially designed the unit around the acquirement of podcast technical skills, she realized later that it became more about the content of computer literacy and not the technical skills. The communication of knowledge became central since the students had already demonstrated mastery of the tool.

The statements about group work and podcasts supports Morena and Valdez's (2005) notion that cognitive load plays a significant role in student organization of projects. The choosing of pictures to enhance words in multimedia environments is not a simple task and constant feedback from peers, not teachers, is needed to optimize design. However, if podcasts were to be implemented as a common skill that students should acquire, much like PowerPoints and the building of a Web page have become standard, then more focus needs to be placed on the individual or group learning effectiveness. This is a wide implication for educational technology programs that prepare teachers to use technology in the classrooms.

Also, though the teachers in this study were high-level technology users, the authors caution that any teacher who plans on undertaking a podcast project should become comfortable with the technology before using it with a class as is emphasized by Ertmer et al. (2007). Teachers need to think through the process—what support do my kids need at each step, what support do I need, what will I do with the final projects? The bottom line is that technologies, even podcasts, are a tool for learning and teaching, and that any endeavor should be grounded in a content focus and the technology made as transparent as possible.

The teachers recommend that podcasts can be an important self-assessment tool for students in developing concepts and ideas, stories, but it may not be the optimal form of formalized assessment since the grading would be highly subjective. However, if rubrics of achievement are developed and validated, perhaps the podcast can become a sufficient assessment tool. The authors suggest that further research be conducted for the validity of the rubrics used in both courses.

References

Cochrane, T. (2005). *Podcasting: The do-it-yourself guide*. Indianapolis, Indiana: Wiley Publishing, Inc.

Ertmer, P. A., Ottenbreit-Leftwich, A., York, C. S. (2007). Exemplary technology-using teachers: Perceptions of factors influencing success. *Journal of Computing in Teacher Education. 23*(2), 55-62.

Frydenberg, M. (2006). Principles and pedagogy: The two p's of podcasting in the information technology classroom. In *Proceedings of the 23rd Annual Conference for Information Systems Education* (pp.1-10). Dallas, TX: EDSIG.

Geoghegan, M. W. & Klass, D. (2006). *Podcast solutions: The complete guide to podcasting*. New York, New York: Friends of Ed.

Gerber, S. & Scott, L. (2007). Designing a learning curriculum and technology's role in it. *Education Technology Research & Development. 55*(5), 461-478.

Grant, M. M. & Branch, R. M. (2005). Project-Based Learning in a Middle School: Tracing Abilities through the Artifacts of Learning. *Journal of Research on Technology in Education. 38*(1), 65-98.

Jones, T. H., & Paolucci, R., (1998). The learning effectiveness of educational technology: a call for further research. *Educational Technology Review, 9*, 10-14.

Morena, R. & Valdez, F. (2005). Cognitive Load and Learning Effects of Having Students Organize Pictures and Words in Multimedia Environments: The Role of Students Interactivity and Feedback. *Education Technology Research & Development. 53*(3), 35-46.

Ogawa, M. B. & Nickles, D. (2007). Improving the Podcast as a Lecture Content Delivery Method. In C. T. Ho (Ed.), *Proceedings of 12th Annual Technology, Colleges, and Community Worldwide Online Conference* (pp. 91-96). Honolulu, HI: TCC.

Roschelle, J. M., Pea, R. D., Hoadley, C M.,, Gordin, D. N., & Means, B. M. (2000). Changing how and what children learn in school with computer-based technologies. *The Future of Children*, *10*(2), 76-101.

Rother, C. (2005). Is technology changing how you teach? *T.H.E. Journal., 33*(3), 34-36.

Schaffer, D. W. & Clinton, K. A. (2006). Toolforthoughts: Reexamining thinking in the digital age. *Mind, Culture, and Activity, 13*(4): 283-300.

Serim, F. & Schrock, K. (2007). Naming the digital jelly to a virtual tree: Tracking emerging technologies for learning. *Learning & Leading with Technology. 35*(4), 12-16.

Shulman, Lee S. (2000). Visions of the possible: Models for campus support of the scholarship of teaching and learning. Retrieved February 10, 2005 from the Carnegie Foundation Library Web site http://www.carnegiefoundation.org/elibrary/docs/printable/visions.htm.

Vrasidas, C. & Glass, G.V. (2004). Teacher professional development: Issues and trends. In C. Vrasidas & G.V. Glass (Eds.), *Online professional development for teachers*. (pp.1-12). Greenwich, CO: Information Age Publishing.

Waits, T.& Lewis, L. (2003). *Distance Education at Degree- Granting Postsecondary Institutions: 2000–2001.* U.S. Department of Education, National Center for Education Statistics, Report NCES 2003-017. Washington, DC.

Walcott, P. (1986). Funding computer technology. In J. C. Arch (Ed.), *Technology in the schools: equity and funding* (pp. 17-33). Washington, D.C.: National Education Association.