

Digital Neophytes: Creating a Digital Technology Course for Pre-Service Teachers

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Abstract: This paper describes the design of a digital technology course for pre-service teachers in social studies and English Language Arts. We first provide a brief literature review that highlights the need to support pre-service teachers in using technology in the classroom. We then explain the components of our course. Finally, we provide preliminary findings from end of class reflections from pre-service teachers that capture their diverse experiences in the course. Findings suggest that most pre-service teachers had not evaluated technology for classroom use. Therefore, more courses are needed that allow pre-service teachers to develop a critical eye towards technology use in the classroom.

Introduction

The annual conference of the Society of Information Technology and Teacher Education (SITE) provides a space for researchers and scholars to gather and discuss issues of importance to the field of education. We address one of these issues in this paper, which is how to support pre-service teachers in learning to make informed choices about technology and online resources for use in the classroom. As we parsed the literature, we found that there is a dearth of research specifically addressing how to support pre-service teachers in identifying and evaluating online educational resources, with one of the few examples being a protocol developed by Mullins, Hicks, Ogle, Schilder, and van Hover (2016). Therefore, in this paper we discuss how we designed a course specifically focused on providing a space for pre-service teachers to evaluate online educational resources in the humanities.

Review of Related Literature

In the initial Guidelines for Using Technology to Prepare Social Studies Teachers, Berson, Diem, Hicks, Mason Lee, and Dralle (2000) argued, “As social studies teacher educators, one of our roles is to model appropriate uses of technology for our preservice teachers” (p. 107). When Hicks, Lee, Berson, Bolick, and Diem (2014) updated these guidelines, they noted, “... we recognized that as technologies have matured — particularly those we featured in the original guidelines article — and other technologies have emerged, these technologies, in and of themselves, are not necessarily prompting new or transformative learning opportunities” (p. 437). There is therefore, a need for a space where pre-service teachers can see technology modeled appropriately (Berson et al., 2000) and also have opportunities to think about and conceptualize to what extent these technologies will offer their students “transformative learning opportunities” (Hicks et al., 2014, p. 437).

While technology was somewhat of a novelty when it first emerged in the classroom, it is now something that is making its way into standards and curriculum, thus necessitating that teacher educators increasingly focus on it in teacher education programs. Furthermore, when examining technology use, literacy standards, and the Inquiry Arc, Hofer and Swan (2014) noted,

As these standards [Literacy Standards] are implemented over the next 15 years, teachers will be not only encouraged, but required to think about the ways in which technology can support these new aims. As teacher educators, we can work alongside teachers as they navigate these challenges and determine which digital technology tools and resources are best aligned to disciplinary skills and support students' curriculum-based learning needs. (p. 28)

Therefore, we as teacher educators have to begin conceptualizing what types of skills, knowledge, and dispositions are needed by pre-service teachers so they can use technology effectively in the classroom once they graduate from teacher education programs.

While pre-service teachers have been surrounded with this technology and have been deemed to be digital natives (Prensky, 2001a, 2001b), there is research that pushes against this conception and asserts that the concept of digital natives is unsupported in research (Bennett, Maton, & Kervin, 2008; Kirschner & De Bruyckere, 2017; Margaryan, Littlejohn & Vojt, 2011; Reeves & Oh, 2008). Furthermore, pre-service teachers have not had a reason or an opportunity to connect their prior technological experiences with how those technologies could align with or benefit classroom instruction.

Methods

Participants and Context

The course, entitled Inquiry Based Learning with Digital Technologies, was developed for humanities pre-service teachers, consisting of seven social studies pre-service teachers and eight English pre-service teachers. Additionally, one STEM pre-service teacher joined the course, bringing total enrollment to 16. Our course objectives were:

1. Explain the fundamental principles of student learning.
2. Apply fundamental principles of learning to the creation of effective instructional environments.
- 3a. Critically evaluate emerging technologies and digital humanities projects for instructional uses, literacies they evoke (and, potentially, supplant), and openings for content exploration, etc.
- 3b. Create multiple artifacts and exemplars for use in digital humanities projects and classroom instruction.
4. Explore methods of producing evidence of student understanding of the curriculum when working with digital technologies and digital humanities projects.
5. Investigate, reflect, demonstrate, and communicate how digital media and digital humanities projects can support wise practice and facilitate student learning.
6. Develop an awareness of digital footprints and the ramification of personal and professional footprints colliding in a fiery mess of abstraction.

We searched for examples of digital-technology focused course syllabi to use as a model for our course, finding that no course seemed to effectively capture our objectives. As a result, we built our course around specific experiences we wanted the pre-service teachers to have. In the following sections, we discuss the structure of class sessions, as well as the assignments we incorporated to allow pre-service teachers to learn about effective technology use in the classroom.

The Structure of Class Sessions

From the first day of class, we asked pre-service teachers to complete questions/write reflections at the end of class (when possible) as a way for us to gain an understanding about what they were getting from each class session. This allowed us to assess if the focus of class sessions was effective for the overall goals of the course. Although this was a digital technology focused course, in the first few weeks of class, technology was not a focal

point. We wanted to focus first on inquiry and what it meant to have an inquiry-based classroom. We did this by introducing such activities as The Mystery of Sam Smiley, which is an activity developed to teach students how to do inquiry in the classroom. We then transitioned into student learning, so pre-service teachers could begin making connections between inquiry and how students learn and acquire new information (Doolittle & Hicks, 2003).

After we felt that the pre-service teachers had a solid foundation in inquiry and student learning, we began introducing the class to technological tools for the classroom. We did this first by providing time and space within class sessions for pre-service teachers to explore websites and start making decisions about the utility, benefits, and limitations of certain platforms such as Twitter, Facebook, and Historypin. We then spent several weeks having pre-service teachers explore the possibilities of augmented reality (AR), virtual reality (VR) and 3D printing, by having opportunities within class sessions for pre-service teachers to spend time in AR/VR labs and 3D printing labs. Additionally, the pre-service teachers were able to experience how a local teacher utilized Breakout EDU Boxes (<https://www.breakoutedu.com/>) to teach inquiry to his students. We worked to arrange these experiences, so pre-service teachers would have a wide range of opportunities to explore the possibilities they could have as future teachers.

Outside of Class Work

In order to provide specific opportunities for the pre-service teachers to apply some of the information and knowledge they had acquired through their experiences in the class sessions, outside of class we developed the following assignments:

1. Writing a weekly blog post
2. Writing a weekly wiki post
3. Creating a Historypin interview/oral history for a specific location
4. Participation in a 3D Printing Library Workshop
5. Participation in a Teaching with Primary Sources Online Workshop
6. Developing an Interrelated Conference Poster and a Podcast

The nature and purpose of each assignment and how they relate to the focus and purpose of the course is described as follows.

Weekly blog posts. The required weekly blog posts did not have a common focus in the course. They were designed in this way so that pre-service teachers could use technology in an organic, naturalistic manner. For example, in real-world settings, nobody is forced to develop a blog around a certain topic. Therefore, we wanted to reflect this real-world usage in our course and teach blogging as a way for pre-service teachers to build a professional, online teacher presence.

Weekly wiki resource post. Each week pre-service teachers were required to post a digital resource on a class wiki page and write about its benefits and limitations for classroom use. We originally wanted the assignment to span the course of the semester. However, after 6 weeks there was an overload of resources. Therefore, we altered the assignment to make it more useful by having the students refrain from posting new resources in order to focus on organizing the wiki in a way that made sense to them as teachers; they were given class time to complete this work.

Historypin project. The website Historypin (<https://www.historypin.org/en/>) allows users to associate media, such as photos, videos, and audio, with places of interest and historical significance. In the Historypin project, we asked pre-service teachers to find a place of interest and conduct an interview/oral history with someone about his or her perceptions and experiences regarding that location.

Participation in a 3D printing workshop. The university library offered three separate 3D-printing workshops. Pre-service teachers were required to attend one of these workshops. The pre-service teachers then made a short video about their experiences participating in the workshop as a way for them to reflect on the utility of digital printing as a tool for teaching.

Teaching with primary sources online workshop. In order to ground pre-service teachers in teaching with primary sources, they participated in an online workshop offered by the Library of Congress that focused on different ways to teach with primary sources. This allowed pre-service teachers to be able to explore the resources available to them as teachers, while also teaching them specific strategies about how to teach with primary sources.

Developing a conference poster and a podcast. The poster and podcast are interrelated. The pre-service teachers first had to create a conference poster related to digital technologies on a PowerPoint poster template. These posters were a way to have pre-service teachers develop a snapshot of what they had learned over the course of the semester. The pre-service teachers then had to create a podcast in which they described and discussed the same strategies listed on their poster, which required them to synthesize and present their gained knowledge in a unique way.

Findings

After four weeks, the pre-service teachers began to realize that, as a teacher, they needed to make explicit decisions about how and when to use technology in the classroom. For example, in a reflection a one pre-service teacher noted, “I like the idea that as teachers, we get to make the pedagogical leap. It's empowering to know that technology still needs a person to check over it to ensure that it's useful and necessary to enhance learning.” Another pre-service teacher echoed similar sentiments, in which he identified how he knew there were many resources available, but had never actually spent time evaluating the classroom applicability of these sources. He remarked:

I really appreciate how we are spending time to explore all of these resources, and thinking of ways of application in the classroom. It is easy to google and find random untested educational resources, but what is apparent is the need to research and to be diligent and disciplined in seeing the reality of application.

Another pre-service teacher even identified how he had never had a space or an opportunity to evaluate online resources for classroom utility. He noted, “There is so much available, and there is not much structure to help teachers use it in a truly meaningful way.” Therefore, the pre-service teachers knew of the plethora of resources available, but had never considered how they would or that they had to make the pedagogical jump in the classroom.

However, the pre-service teachers also noted that they thought much of the technology they experienced during the course was unrealistic in terms of what they had seen, noticed, and experienced in their early field placements. One pre-service teacher remarked, “However, this class really didn't mesh with what I was seeing in my field experience.” The pre-service teachers had spent the semester in high pressure, high-stakes testing environments, where standards were the primary focus. This is exemplified by one pre-service teacher who said, “I thought the technology was cool, but maybe a bit unrealistic for basic use of technology in the classroom — especially given that we are all heading in [to] SOL [Standards of Learning] tested classes.”

Discussion

The term “digital native” (Kirschner & De Bruyckere, 2017, p. 136) is a term used, albeit incorrectly, to explain how those who have grown up in times of technological innovation have more knowledge and expertise than those who did not. The digital native myth (Bennett, Maton, & Kervin, 2008; Kirschner & De Bruyckere, 2017; Margaryan, Littlejohn & Vojt, 2011; Reeves & Oh, 2008) was apparent in our class, especially when we began asking the pre-service teachers how they would evaluate and use the large amount of technological resources available in the classroom. Up to this point, the pre-service teachers had never considered this question, especially from the position of an educator. Therefore, there is a need of more courses that focus explicitly on providing a space for pre-service teachers to consider such tough and compelling questions.

The fact that our pre-service teachers had never considered how to make the pedagogical jump in terms of using digital technologies is something that should be noted by teacher educators. For example, Hicks et al. (2014) argue:

However, we cannot assume a direct transfer from their [pre-service teachers] uses of technology in their private lives to their uses as teachers. There are important context-bound technology skills that preservice teachers are not well prepared for when they enter teacher education programs. Those skills require teacher educators' close attention. (p. 440)

Our findings stand in alignment with the literature in that, we too saw that skills associated with how to effectively and appropriately use technology needed to be conceptualized and taught in our course as well. Additionally, our course went “outside the box” so to speak, in that we arranged experiences so pre-service teachers could see that there is more technology available than simply relying on a Smartboard as the key resource in the classroom, which should be one of our goals as teacher educators. As Hicks et al. (2014) note:

Looking ahead, we see cutting-edge technologies as opening new opportunities for innovations in social studies to visualize information, work online in collaborative groups around a question, create an instant feedback loop between teachers and students, and augment reality to enable students to engage in places and experiences never before possible. (p. 445-446)

We also contend that technology has a possibility to provide “experiences never before possible” (Hicks et al., 2014, p. 445-446), but also realize that these experiences have to be carefully arranged and structured so that pre-service teachers can have a meaningful opportunity to explore these possibilities.

Lastly, our pre-service teachers seemed to think that technology use should directly adhere to teaching standards or it was rather unrealistic. However, this thinking is problematized by technology guidelines and expectations being integrated into the content standards, as noted by Hofer and Swan (2014). While this rhetoric of either/or thinking (Dewey, 1938) permeates public education and therefore, pre-service teachers’ thinking, we can work to address and correct this in our methods and digital technology courses.

Conclusions

There is a need of more courses that provide pre-service teachers with an opportunity and a space to develop a critical eye towards technology. Sometimes it is assumed that because students are “digital natives” (Kirschner & De Bruyckere, 2017, p. 136) they know how to use technology. However, we argue that if anything, in the context of our class, the pre-service teachers were digital neophytes. Similarly, Reeves and Oh (2008) note:

Although it is clear that middle and upper class Millennials are more likely to possess and use the latest high tech gear such as iPods, video phones, and game boxes, there is also evidence that their information literacy, especially with respect to judging the quality of information obtained on the Internet through search engines such as Google, is unacceptably weak (Oblinger & Oblinger, 2005). (p. 11)

Similarly, our pre-service teachers had never conceptualized how to use technology as an instructional tool up to this point in their lives. Therefore, simply being familiar with websites, technology, and digital tools, does not necessarily translate in an ability to use those tools in the classroom. Although there were mixed responses to the course, one pre-service teacher noted:

Before, I felt that digital technology was simply a bell or whistle on top of existing, more important, teaching. Now I see that, in a limited range of circumstances and with a clear pedagogical purpose in mind, digital technology can be used to promote learning.

We had several pre-service teachers that expressed similar sentiments. Therefore, the hope is that by providing a space for pre-service teachers to evaluate the plethora of online resources available, they can then develop a critical eye towards technology, so we can move forward as a society that questions data, materials, and information, and does not simply accept them at surface-value.

References

- Bennett, S., Maton, K., & Kervin, L. (2008). The ‘digital natives’ debate: A critical review of the evidence. *British Journal of Educational Technology*, 39(5), 775-786.
- Berson, M., Diem, R., Hicks, D., Mason, C., Lee, J., & Dralle, T. (2000). Guidelines for using technology to prepare social studies teachers. *Contemporary Issues in Technology and Teacher Education*, 1(1), 107-116.

- Breakout EDU. (n.d.). Immersive learning games platform. Retrieved from <https://www.breakoutedu.com/>
- Dewey, J. (1938). *Experience and education*. New York: TOUCHSTONE.
- Doolittle, P. E., & Hicks, D. (2003). Constructivism as a theoretical foundation for the use of technology in social studies. *Theory & Research in Social Education, 31*(1), 72-104.
- Hicks, D., Lee, J., Berson, M., Bolick, C., & Diem, R. (2014). Guidelines for using technology to prepare social studies teachers. *Contemporary Issues in Technology and Teacher Education, 14*(4). 433-450. Retrieved from <http://www.citejournal.org/vol14/iss4/socialstudies/article1.cfm>
- Historypin. (n.d.). Retrieved from <https://www.historypin.org/en/>
- Hofer, M. J., & Swan, K. (2014). Technology and disciplined inquiry in the social studies. *Contemporary Issues in Technology and Teacher Education, 14*(3), 25-30.
- Kirschner, P. A., & De Bruyckere, P. (2017). The myths of the digital native and the multitasker. *Teaching and Teacher Education, 67*, 135-142.
- Margaryan, A., Littlejohn, A., & Vojt, G. (2011). Are digital natives a myth or reality? University students' use of digital technologies. *Computers & Education, 56*(2), 429-440.
- Mullins, R., Hicks, D., Ogle, T., Schilder, E., & van Hover, S. (2016, March). Toward a useable protocol for identifying and evaluating classroom ready online educational resources for social studies. In *Society for Information Technology & Teacher Education International Conference* (pp. 2709-2721). Association for the Advancement of Computing in Education (AACE).
- Oblinger, D., & Oblinger, J. (Eds.). (2005). *Educating the Net Gen*. Washington, DC: EDUCAUSE.
- Prenkys, M. (2001a). Digital natives, digital immigrants. *On the Horizon, 9*(5), 1-6.
- Prenkys, M. (2001b). Digital natives, digital immigrants, part II. Do they really think differently? *On the Horizon, 9*(6), 1-6.
- Reeves, T. C., & Oh, E. J. (2008). Do generational differences matter in instructional design? In *Instructional Technology Forum, University of Georgia, 17*.
- The mystery of Sam Smiley. (n.d.). Retrieved from <https://www.fcusd.org/cms/lib03/ca01001934/centricity/domain/3853/the%20mystery%20of%20sam%20smiley%20packet.pdf>