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The best of all worlds: Combining the flipped classroom, game-based learning, and learning communities in a large technology integration course.

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Abstract

This paper presents the use of a combination of pedagogical strategies in teaching a large undergraduate technology integration course. Course revisions include a motivating game-based learning structure, practitioner-focused design, and the flipped classroom model. Students perceived each course change positively with suggestions for refinement.

Keywords

technology integration, teacher preparation, game-based learning, flipped classroom

Comments

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Course Overview

Digital Learning in the Secondary Classroom (CI 202) is a required course for students enrolled in secondary education programs at Iowa State University. This course enrolls over 100 students per semester. The licensure areas are varied and range from biology, mathematics, and history, to technical areas such as family and consumer science, physical education, and agricultural education. Due to the diversity of licensure areas, a one-size-fits-all approach could not provide the rich context necessary for effective practice in technology integration. The research on technology integration indicates teachers must be able to "navigate the spaces defined by the three elements of content, pedagogy, and technology, and the complex interactions among these elements in specific contexts" (Koehler & Mishra, 2009, p. 66). Therefore, a different instructional strategy was needed to improve the student outcomes in CI 202.

Course Revision 1: Game-based Learning

In 2013, the course was redesigned using game-based learning (GBL), where "specific problem scenarios are placed within a play context" (Tsai & Fan, 2013, p. 115). In curriculum designed with GBL, the teacher not only designs the entire game structure, but also delivers the game within traditional education contexts. From the core structure to the individual activities, the "classroom is a game" (Sheldon, 2012, p. xiv). The curriculum now emphasized teamwork using both collaboration and competition. Learning activities scaffolded in complexity over the semester, but allowed students opportunities for cycles of failure and success. This curricular change had a dramatic impact on student evaluations for the course; increasing student attendance, quiz completion, and overall satisfaction with the course (Nadolny & Halabi, 2016).

Course Revision 2: Breakout

Although students were more engaged with the material and each other, they still requested to have more experience with content-focused technologies. The most recent change to the course (breakout format) occurred in fall 2016 with the division of the course into three groups: the humanities group (English, history, world languages), the STEM group (math, science, agriculture, and family and consumer science), and the PE group (physical education and health). These three groups met for half of the semester as a large group, and half of the semester as smaller breakout groups. This allowed the students to not only have the benefit of a larger community of practice around common issues such as social media, copyright, and technology integration theories, but also provided the

opportunity for students to discuss technology application specific to each groups unique challenges. Each of the breakout groups utilized the content differently: (1) the STEM group discussed computational thinking, 3D printing, gaming, and coding; (2) the humanities group applied a literacies and equity approach to technology integration; and (3) the physical education/health group utilized mobile assessments, gaming, and drones. Student feedback reinforced the positive impact of this change, with one student commenting that she "really appreciated the breakout sessions with members of my own content area. It was easier to discuss how technology could be integrated into our lessons when we were discussing the same concepts and learning goals."

Course Revision 3: Flipped and Experiential

Guided by "learning technology by design," (Koehler & Mishra, 2005), we continued the course revisions in 2017 to help our pre-service teachers become *practitioners,* that is, we envisioned this course as a bridge between their personal knowledge and developing professional competencies through educational technology. Most students in CI 202 are first or second-year students and are still in the process of developing expertise (e.g., pedagogical, disciplinary, and other professional areas). One of the aims of the course was to provide supported learning opportunities for guided technological practice. In order to support pre-service teachers becoming practitioners of "learning technology by design," we structured the course to provide opportunities for high-quality, technology-enhanced learning through three elements: (1) digital learning activities (via flipped class once per week); (2) labs that provided "hands-on" (experiential) learning through playful, guided practice with content-area peers; (3) technology integration project (where they designed technology-enhanced curricula using a variety of digital media tools, platforms, and experiences. The Technology Integration Project was a high point of their practitioner knowledge, as they were able to identify a topic of their own choosing and design a unit to foster rich student understanding. Through this process, students demonstrated their technological, pedagogical content knowledge through curricula that matched digital media platforms with their expected pedagogical aims. For example, students used social media platforms such as Twitter to facilitate discussions and interactions, resulting in the exchange of multiple perspectives. Some tapped into the rich archival history, teaching students about the importance of online research using digital databases. Others used game-based learning theory and sites like Simbaloo to create learning quests that are engaging and inquiry-driven.

Discussion

The feedback from the students has been overwhelmingly positive, but also very honest when there were areas for improvement. For example, creating an online portion of the course requires attention to the small details, such as the recommendation that we "change the time of the quizzes due to being right before class instead of noon before class, or making them due at midnight the night before." The project in particular has taken several semesters of improvements, including the addition of small group writing conferences to work through the project's open-ended nature. In Fall 2017, one student commented that she "greatly enjoyed the project that we had to complete. Although it was difficult, it better prepared me on how to make a website design and incorporate technology use inside the classroom."

Conclusion

While large introductory courses are a staple of higher education, it is possible to design this course to facilitate engaging, authentic, and meaningful learning opportunities for learners. The redesign of our large lecture course emphasized game-based learning (challenge activities, competition, and collaboration), break-out format (allowing pre-service teachers to experience content-focused technologies), and experiential and flipped learning (focusing on online activities, hands-on lab activities, and scaffolded curricula). All in all, over five years, we attempted to design an experience where students became educational technology practitioners who learn technology by design.

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