

# Pre-Service Art Educators Learning from Digital Game Design

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**Abstract:** This paper discusses the complications and complexities of teaching game design within the context of a pre-service art education course. It explores how drawing connections between game design, artmaking, and art education can help both pre-service educators, and their eventual students, meaningfully engage with this new medium. This study is the first in the field of art education to look at practical issues regarding teaching digital game design in P-12 settings with pre-service art educators. It is also designed to address social, economic, and cultural issues as related to game design and play. As such, it is important to begin to share this research with others in the field who are interested in the art educational possibilities for digital game design, as well as with those who may be skeptical of such claims.

## Rationale for Video Games in the Art Classroom

Games, specifically video games, display potential to provide meaningful learning experiences for K-12 students, yet most educational research using video games relates directly to the learning that stems from game playing activities (Gee, 2005; Holden & Sykes, 2012; Shaffer, 2006; Squire, 2004; Steinkueler & Duncan, 2008). Art education research has advocated the value of making games as art projects (Peppler, 2010), or critiquing video games as visual culture (Parks, 2008), however these studies do not look at the impact of making video games as programmable media in the art classroom.

NSF-funded projects like MIT Media Lab's Scratch project utilize a design-based approach to develop computational thinking with K-12 teachers, however have difficulty implementing design-based instruction (Brennan, 2012). Art educators, conversely, are well versed in design-based activities, using the spiraling methods of imagining, creating, experimenting, sharing and reflecting to create project-based artworks in studio activities (Resnick, 2007). Consequently, the art classroom may be particularly well suited to affording game design experiences.

## Rationale for Teaching Video Game Creation as 21<sup>st</sup> Century Art Skills

How can art educators best support a design-based approach to cultivate computational thinking through game making? The national K-12 art education standards currently being revised include digital technology by introducing a media arts component where students are expected to "gain fluencies in the evolving languages of interfaces, mediation, codes, and conventions" (National Coalition for Core Arts Standards, 2012).

Identifying these new media standards highlights a notable lack of art educators who are technologically qualified and skilled to teach these tools and forms of media. In addition, many digital art courses emphasize the use of commercially-available digital art making tools, which makes artists beholden to the interests of software developers (Rushkoff, 2010). This study examines the problem of changing attitudes of art educators towards programmable digital media through game making. The researchers measured changes in art educators' attitudes towards technological skills and creating programmable digital content, before and after participating in an art-based game curriculum in the context of pre-service education.

## Video Game Curriculum for Pre-service Art Educators

The subjects of this study were ten undergraduate pre-service art educators enrolled in a "Technology in Art Education" course. All were traditional students taking this course during their sophomore year. Of the ten students, nine were women. Students led daily "skill shares" with their peers, introducing elementary design concepts and related programmable content, which accumulated over the semester prior to the assigned game design project. Effort was made to draw meaningful connections between traditional media art practice and game design, asking students to link the subject of their skill share ('movement,' 'gravity,' etc.) to a traditional media artists' practice – encouraging them to frame these new and abstract concepts in a familiar and concrete context.

After students learned how to make a video game by scaffolding their cumulative skill share knowledge, their final project required them to make a new video game based on the concept of agency. The concept of agency in games was linked to the avenues for (inter)action afforded the audience by the medium, i.e. the "verbs" afforded to the player by the system. Pre-service teachers critically and aesthetically scrutinized the "verbs" of a number of

games, from the clichéd jumping and shooting of conventional games to more inventive “verbs” like growing old, mourning, or manipulating time. The aesthetic impact of different mechanical ways of implementing these “verbs” was also discussed. Students were then encouraged to reflect on avenues for agency they hadn’t encountered in the example games explored, and to devise a new game, built around an unconventional “verb” that might afford a new form of player agency.

Students were given required parameters for their final video game such as variables, multiple levels, and metaphoric actions. Students had the option to also create a physical computing device to play the game with. A survey measuring students’ self-identified growth in their ability and confidence to create games and programmable media was distributed at the end of the course. Students reported significant gains in their ability to create digital art, to create programmable media, and viewing video games as a medium for artistic expression from taking the course. And when new opportunities to teach video games to K-12 students became available, several pre-service students requested to interview for the teaching positions.

## Conclusion

By making video games as programmable media, pre-service art education students were introduced to computational thinking as art content. Through skill shares, students were encouraged to see how game actions connect to concepts and activities of traditional art practices. At the end of the course, the pre-service teachers gained confidence in their abilities to create programmable digital art, recognizing the value of video games as art content. Through this process of making video games, art education students are more prepared to teach the skills and knowledge required of the 21<sup>st</sup> century student.

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