# Keeping it Old School: Classic Video Games as Inspiration for Modern Student Programs

David Weintrop, Northwestern University
Uri Wilensky, Northwestern University

**Abstract:** The rise in low-threshold, media-rich introductory programming tools has made it possible for video game design and creation to be an early activity for novice programmers. With this creative flexibility, it is possible for learners to draw inspiration from and recreate their favorite games. Our analysis of 82 programs written as part of a high school programming class found that, despite the popularity, diversity, and ubiquity of modern mobile and console video games, learners more often draw inspiration from classic video game titles than from today's most popular games.

Introductory computer science classes are increasingly turning to programming environments that make it easy for learners to author multimedia programs that incorporate audio and visual components alongside basic programming instructions. Tools like Scratch, AgentSheets, and Microworlds Logo, make it easy for novice programmers to upload images, draw backgrounds, and include sound effects as part of creating a program to give it a desired look and feel. Using tools like these, introductory programming courses are increasingly including open-ended assignments that give learners the freedom to author video games and interactive stories of their own design as part of the curricula. This approach has been found to be an effective way to engage learners with the practice of programming early in their budding computer science careers (Maloney et al. 2008; Peppler & Kafai, 2007).

The rise of multimedia introductory programming tools coincides with a growth in popularity of video games. Where video games were once largely an activity for adolescent boys, they are now being played across age, gender, racial, and socio-economic groups (Lenhart et al., 2008). Given the increasing popularity of video games, one would expect that when given the chance to author their own video games, high school students would draw inspiration from the most popular current titles. In this paper, we report on a study that finds the opposite. When given the opportunity to create a video game as part of an introductory programming course, students were more likely to draw inspiration from classic video games, games released 20+ years before their first experience with video games, than recreate more contemporary games. An analysis of 82 student-authored games found that when students chose to recreate an existing video game, they were four times more likely to draw inspiration from a game that could be played on an Atari or in an '80s arcade than o an Xbox or Play Station.

## Methods & Participants
We analyzed the final projects of students participating in a study comparing blocks-based, text-based, and hybrid blocks/text programming tools. The data was collected during the first five weeks of a yearlong programming course. Students used modified versions of the Snap! programming environment (Harvey & Mönig, 2010) as an introduction to basic programming concepts including variables, conditional logic, looping logic, and custom procedures. The five-week graphical introduction to programming culminated with a weeklong project that allowed students to design their own games or interactive stories, with the only requirement being the need to incorporate the topics covered during the previous four weeks.

A total of 90 students (67 Male, 23 Female) participated in the study. The classes were 43% Hispanic, 29% White, 10% Asian, 6% African American, and 10% Multi-racial - a breakdown comparable to the larger student body. The classes included one student in eighth grade, three high school freshman, 43 sophomores, 18 juniors, and 25 high school seniors. Due to issues with data collection, we were only able to analyze 82 of the 90 final projects.

## Findings

Each final project was coded as either a re-creation of a classic video game, a re-creation of a contemporary video game, an original video game, or not a video game (which included interactive stories and trivia games). Games were coded as being re-creations of existing games if they shared a title with the game or if students uploaded images from that game along with implementing similar game play mechanics. Table 1 presents the result of this coding.

| Classic Game | Count |
| --- | --- |
| Space Invaders | 6 |
| Pong | 4 |
| Frogger | 3 |
| Pacman | 2 |
| Centipede | 1 |
| Snake | 1 |
| Breakout | 1 |
| Gauntlet | 1 |
| Mario Bros. | 1 |

| Project Type | Count |
| --- | --- |
| Classic Game | 20 |
| Contemporary Game | 5 |
| Original Game | 40 |
| Non-Game | 17 |

| Modern Game | Count |
| --- | --- |
| Flappy Bird | 3 |
| Plants vs. Zombies | 1 |
| Dance Dance Revolution | 1 |

**Table 1. Final project classification.**

**Table 2. Classic games breakdown**

**Table 3. Contemporary games breakdown**

Tables 2 and 3 show the breakdown of games that were re-creations of either classic or contemporary games. Of the 82 student projects analyzed, 20 projects were re-creations of classic video games while only 5 games drew inspiration from games released in the last 15 years. The 20 classic games projects covered nine different titles, while the five modern re-creations drew inspiration from three different games, two of which are mobile games and a third that is an arcade game. No student recreated a modern console game. There are a number of possible explanations for the higher frequency of classic games relative to more recent titles, including the simplicity of the game mechanics of classic games being easier to recreate, the graphics of newer games being harder to incorporate, or simply a preference for creating and playing classic games. Initially, we were inclined to think the first explanation most likely; that classic games like Space Invaders and Frogger are easier to implement than contemporary games like Halo or League of Legends. However, increasingly popular mobile games often utilize simple mechanics that are well suited for such introductory programming tools, with games like Flappy Bird and Subway Surfers being examples of games that can be easily recreated in Snap!

Regardless of the explanation, the frequency of classic arcade games authored by students who were not yet born when these games were at the height of their popularity suggests that classic video games may have found new life in introductory programming classrooms. With more and more novices learning programming through the creation (or re-creation) of video games using multimedia programming tools, it is possible that the next generation of great video game developers draw as much inspiration from the classics as they do from modern blockbusters.

## References

Harvey, B., & Mönig, J. (2010). Bringing "no ceiling" to Scratch: Can one language serve kids and computer scientists? *Proc. of Constructionism 2010* (pp. 1–10). Paris, France.

Lenhart, A., Kahne, J., Middaugh, E., Macgill, A. R., Evans, C., & Vitak, J. (2008). Teens, video games and civics. PEW Internet & American Life Project.

Maloney, J. H., Peppler, K., Kafai, Y., Resnick, M., & Rusk, N. (2008). Programming by choice: Urban youth learning programming with Scratch. *ACM SIGCSE Bulletin*, *40*(1), 367–371.

Peppler, K. A., & Kafai, Y. B. (2007). From SuperGoo to Scratch: Exploring creative digital media production in informal learning. *Learning, Media and Technology*, *32*(2), 149–166.