Game Genre and Computational Literacy: Situating Design and Programming Practice With Kodu

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Introduction

In this paper we investigate an after-school program that uses the *Kodu Game Lab* software to teach young people ages ten to thirteen about computational literacy and game design. We argue that young people's development of computational literacies is tied to their understanding of both *game genre* and the *design grammar* of creation tools.

Theoretical Framework

Game creation tools like Kodu and Scratch employ high-level programming languages to teach youth *computational literacy* (sometimes called computational thinking) - thinking algorithmically about complex problems (Disessa, 2000). These tools, however, have their own *grammar of design* (e.g. Kress & van Leeuwen, 1996) that presents users with unique creative possibilities. Moreover, game genres produce distinct activity spaces that subsequently shape computational literacy development (e.g. Schon, 1983).

Methods

This study employs multimodal semiotic analysis (Lemke, 2012) to examine the genre-linked design grammar of participants' game artifacts, and utilizes ethnographic Discourse analysis (Gee & Green, 1998) to examine changes in participants' participation over nine-weeks time.

Data and Research Context

For purposes of length we focus on two pseudonymous participants' cases: Enrique, age 13; and Alan, age 11. Over four weeks, the participants learned to make a racing game like "Shy Guy's Beach" level in *Mario Kart Wii* (see Figure 1), which both had played extensively.

Data analyzed is drawn from Kodu's game creation files that researchers archived each week, audiovideo recordings of participants' activity, and researcher field notes.

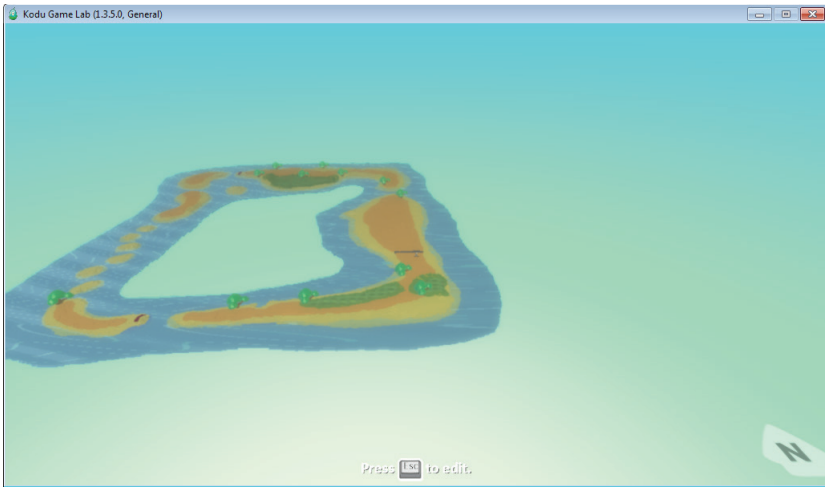

Figure 1: A researcher reconstruction of Shy Guy's Beach

Results

The two participants' understandings of the relationship between game creation tool and game genre influenced their development of computational literacy. Enrique's designs focused on the primary elements of the racing

game genre – object collection, scoring and finish locations. Alan, in contrast, attended to shooting and combat, secondary elements of the racing game genre. The participants' final products showed differences in genre and tool competencies. Enrique used event-driven programming to craft a racing level with multiple opponents, objection collection and competitive scoring (see Figure 2).

Alan, in contrast, struggled to craft a level that he said would combine elements of third-person shooter and racing game genres, but in the end could fully implement neither (see Figure 3).

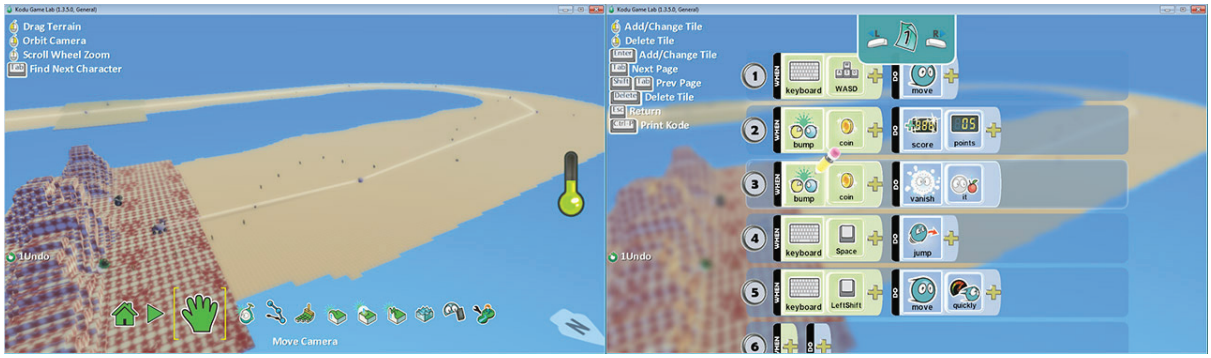

Figure 2: Enrique's level and character programming

Figure 3: Alan's level and character programming

Enrique's work exhibits a beginning understanding of programming using events and conditionals. Alan's product seems to indicate that he struggles with said concepts.

Conclusion

Game creation software is often treated as a transparent instructional medium and youth engagement of game design is tacitly regarded as a homogenous activity. However, this investigation suggests that the relationship between participant's prior knowledge of game genres shapes how participants engage with the computational problem of design. What then are the implications for computational literacy learning environments that employ game creation tools?

References

DiSessa, A. A. (2001). *Changing Minds: Computers, learning and literacy*. The MIT Press.

Gee, J., & Green, J. (1998). Discourse analysis, learning, and social practice: A methodological study. *Review of Research in Education*, *23*(1), 119–63.

Kress, G. R., & Van Leeuwen, T. (2006). *Reading Images: The grammar of visual design*. Psychology Press.

Lemke, J. L. (2012). Multimedia and discourse analysis. *Routledge Handbook of Discourse Analysis*, 79–89.

Schön, D. (1983). *The Reflective Practitioner: How professionals think in action*. New York: Basic Books.