Chapter 36

Students Using Indigenous Knowledge in Video Game Creation to Develop Design Thinking Skills

Neil Anderson
James Cook University, Australia

Lyn Courtney
James Cook University, Australia

ABSTRACT

This chapter describes an educational intervention to introduce and develop design thinking skills with two groups of Australian Indigenous high school students in Far North Queensland and reports on the first phase of the data collection. The initial data collection involved interviewing key personnel at the two sites to gauge their perceptions about the feasibility of the project. This project represents the first time that Australian Indigenous students have participated in videogame creation with an emphasis on using Indigenous knowledge to develop design thinking skills along with literacy and numeracy skills. During the intervention, Year 10 students will be introduced to design thinking skills in the context of developing computer video games using Australian Indigenous knowledge (e.g., a simulation game involving a fictitious island in the Torres Strait).

INTRODUCTION

Computer gaming has been shown to empower learners to assume “control and mastery” (Turkle, 1994, p. 159) in their own lives through stories, play and learning. Mainstream education does not always build positive self-perception of Australian Indigenous students, particularly in the areas of academic self-perception and self-esteem. Gee (2005), in a more spiritual vein, referred to alternative educational activities, such as creating and playing video games as nourishing for the soul and,
If people are to nurture their souls, they need a sense of control, meaningfulness, even expertise in the face of risk and complexity. They want and need to feel like heroes in their own life stories and that their stories make sense. They need to feel that they matter and that they have mattered in other peoples stories. If the body feeds on food, then the soul feeds on agency and meaningfulness. I will argue that good video games are, in this sense, food for the soul, particularly appropriate food in modern times (p. 4).

This emerging sense of control, and food for the soul, can enhance scholastic, individual and community well-being. This project will concentrate on evaluating the initial computer and design thinking skills of Indigenous high school participants, their level of academic motivation, and track student’s academic progress in these areas over a three year period (Years 10, 11 & 12). The explicit design thinking skills to be targeted include:

- Programming skills;
- Critical problem solving and understanding game logic and rules;
- Reverse engineering (e.g., being able to look at other student’s completed work and explain the steps that they might have followed to achieve that result);
- The ability to articulate and defend design ideas used in the game or game plan; and
- System-based thinking (e.g., ability to understand the software system used and the social system of the game).

. Indigenous community attitudes to the work produced by the students will also be investigated.

**Project Aims:** The design thinking intervention program is expected provide a model to improve Australian Indigenous high school student’s engagement with education with the following specific aims:

1. To monitor the development of design thinking skills acquired by Indigenous students over a three year period (Years 10, 11 and 12), through the introduction of computer video game creation programs (Scratch, Flash and Torque) that promote design thinking.
2. To evaluate the acquisition of design thinking skills (pre- and post-intervention).
3. To monitor school attendance and motivation (pre- and post-intervention).
4. To assess the impact of the design thinking intervention on student learning.
5. To evaluate Indigenous community attitudes toward the effectiveness of this program.
6. To make recommendations about the efficacy of this intervention program.

**Value of videogames and design thinking skills:** Serious academic research on the value of video games in education commenced in the late 1990’s and continued with the seminal work of Gee (2003), who outlined key learning principles that were evident in the design of high quality, engaging video games. This work encouraged other academics to investigate properties of video games, situated learning (Lave & Wenger, 1991), and the associated educational value of playing or designing games (Anderson, 2007; Pumpa, Weld & Adkins, 2006). Recently a review by Hayes and Games (2008) concluded that the emphasis on designing video games as a means to teach programming skills should be changed towards an emphasis on design learning. They stressed the “value of explicit attention to ‘design thinking’ as a goal of game making in education” (p. 309). Previously, Gee, Hull and Lankshear (1996) predicted that a designer mentality would be a fundamental skill needed for full participation in the knowledge economy. In the world of business, CEO’s of large companies have recently stressed a desire to employ people with design thinking skills. For example, Newsweek (October, 2006) featured major international companies (e.g., Intel, General Electric) who were seeking in-