UNIVERSITY OF
BATH

DEVELOPMENT OF AN EDUCATIONAL GAME TO TEACH SQL PROGRAMMING

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Abstract

To be written.

Acknowldgements

To be written.

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Outline of Project

To be written.

Chapter 1

Literature Review

1.1 Video Games

The video games industry is growing very rapidly. The value of the video games market was predicted at $108 billion USD in 2017, and is expected to reach $180 billion by 2022 [1, 2].

1.1.1 History

The interest in video games

1.1.2 Genres

To be written.

1.1.3 Platforms

To be written.

1.2 Educational Games

Instructional Games

An instructional game is defined as "a type of software function designed to increase motivation by adding game-like rules and/or competition to a learning activity" [3].

However, Hirumi et al., define an instructional game as "an interactive, digital game (e.g., adventure, strategy, role-play, action, and massive multiplayer online games) that is designed specifically to facilitate learning" [4].

Serious Games

There are many definitions for the term 'Serious Game', but most agree on a core meaning that serious games are (digital) games used for purposes other than mere entertainment [5]. Zyda, defined them as "a mental contest, played with a computer in accordance with specific rules, that uses entertainment to further government or corporate training, education, health, public policy, and strategic communication objectives" [6].

This dissertation aims to create a game for learning in educational contexts. Thus this game fits all the above definitions.

1.2.1 History

To be written.

1.2.2 Motivation

To be written.

1.2.3 Engagement

The design and production of video games involves aspects of cognitive psychology, computer science, environmental design, and storytelling, to name a few [7].

1.2.4 Learning

To be written.

1.2.5 Examples

(Not my words) Robocode (2001) is one of the first environments developed as an open source educational game in order to support java programming

1.3 Educational Game Design

Designing educational games requires a focus that is different from general game design; otherwise, we may end up designing fun games with little or no learning value [8].

Garris et al. describes a "tacit model that is inherent in most studies of instructional games". The model is as follows. Initially, we define a set of learning outcomes and objectives that we wish to achieve. We then design an instructional program which incorporates certain characteristics of games, that delivers the desired learning objectives. Subsequently, the program triggers a cycle that includes user judgments, user behaviours and system feedback. If the pairing of the instructional content with the appropriate game features is successful and effective, the cycle achieves recurring and self-motivated game play. Finally, this engagement in the game leads to the achievement of the learning outcomes [9]. This model is illustrated in Figure 1.3.1.
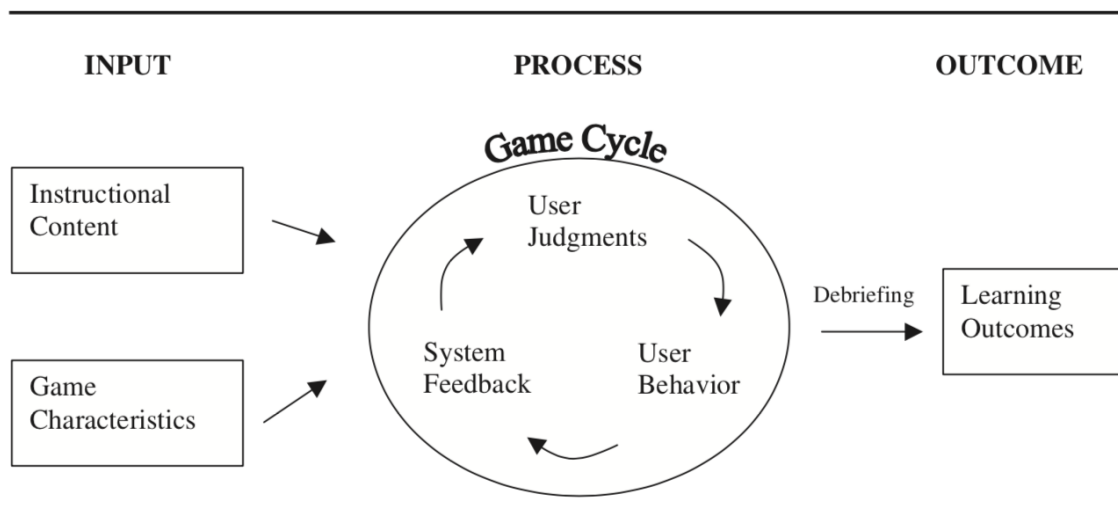

Figure 1.3.1: Input-Process-Outcome Instructional Game Model [9]

1.3.1 Frameworks

To be written.

1.3.2 Game Design Elements

To be written.

1.3.3 Features

(CHANGE IT UP) Barnes et al. ran a project that made University Students create games that would teach basic programming. They carried out evaluations to test participant learning from

the game, and made some interesting observations as follows: Clear instructions and game goals must be provided and accessible throughout the game, Learning goals must be clearly tied to in-game feedback that motivates the player (through, e.g. experience points, health), and penalizes guessing, Humor can be a motivation for in-game interaction [8].

1.3.3.1 Genre

To be written.

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Appendices

Appendix A

Uncertainty Analysis