# Panda Island

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## ABSTRACT

The Peace Foundation has identified a need for an interactive tool to complement their Cool Schools programme, which is aimed at primary school students to learn skills required to confront and solve their problems in everyday life. The team have developed a computer game that aids in the teaching of problem solving skills. The game has been available on www.pandaisland.co.nz since 27th of September 2012 and has been used by students from primary schools throughout New Zealand.

## Keywords

Conflict resolution, gamification, capstone
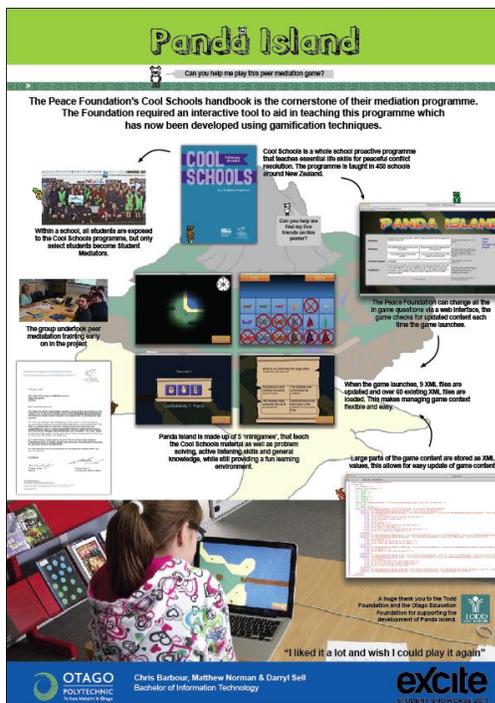


## 1. INTRODUCTION

The Peace Foundation has identified a need for an interactive tool to complement their Cool Schools programme, which is aimed at primary school students to learn skills required to confront and solve their problems in everyday life. The team has developed a computer game that aids in the teaching of problem solving skills. The game has been used by students from primary schools throughout New Zealand.

*Panda Island* used an iterative, agile approach which consisted of three iterations: conceptual, functional delivery and robust

delivery. The use of this methodology allowed for constant client communication and input, ensuring functional requirements match the client's requests. *Panda Island's* interaction design was focused on user testing feedback along with common game principals found through research.

The software architecture of the project took advantage of several open source Java libraries which allowed for an extendable and easily modifiable game engine. The XML system created for the Panda Island engine takes advantage of the engines extendibility and allows for instant content updates.

Feedback from testing has also reinforced the effectiveness of the deployed system. The game is ready to be included in the Peace Foundation's 'Cool Schools' programme. There is room for future improvements but so far it is proving to have a positive effect on students using it.

The Peace Foundation addresses the problem of conflict resolution and attempts to teach primary and high school students the skills to resolve their conflicts peacefully. Their method for this is to teach a select few students in each school how to mediate conflicts between two parties. These students are called peer mediators and are there to help once a conflict has arisen in an effort to resolve it peacefully. The issue with this is that only a few students, the peer mediators, know the skills to deal with conflict peacefully.

## 2. GAMIFICATION FOR TEACHING

The term *gamification* denotes the use of video games for non-game applications; during the last several years the use of video games as a teaching tool has become more acceptable and has demonstrated the ability to capture the attention of students more effectively than the use of traditional methods such as pen and paper. Why digital gaming, simulations, and social networking? Simply put, these technologies afford us the ability to convey concepts in new ways that would otherwise not be possible, efficient, or effective, with other instructional methods. In other words, these technologies don't just help us teach the old stuff in new ways – they can also help us teach new stuff in new ways.. Gaming is already a widespread activity in our culture —more than 45 million homes have video-game consoles. It seems only natural that using it to teach would be effective given its high attraction.

Our solution to the client's problem is a game which teaches techniques for solving conflict/problems in the real world. Panda Island is an interactive teaching aid in the form of a game which reinforces the learning of conflict resolution skills in an enjoyable way for all students. Previously this problem has been addressed using non digital media such as brochures and training seminars. The functional requirements for this project have been met with extras added to future proof the product. Each aspect of the game improves on the functionality of the game and the end user experience. The use of 'gamification' to engage students and teach them peer mediation skills shows as a technical achievement. The cross platform product also allows for any user

to enjoy this game, built in Operating System detection makes sure every school can use this software without a hassle. To further ensure the products on-going use an update web-side system makes sure the product keeps up to date with the client's current material.

# 3. Platform/Technology Justification

During the initial planning it was determined that a game would be the best way to convey the information from The Peace Foundation's Cool Schools programme to a larger audience. The client used Mac OSX, so it had to work on that, most computers run windows which meant that the game had to be cross platform. A requirement from the client was that the game was able to be easily scaled and extended to meet future needs. Right from the beginning the team focused on a modular design of the game engines which allows game engines to be removed or created without affecting the rest of the game.
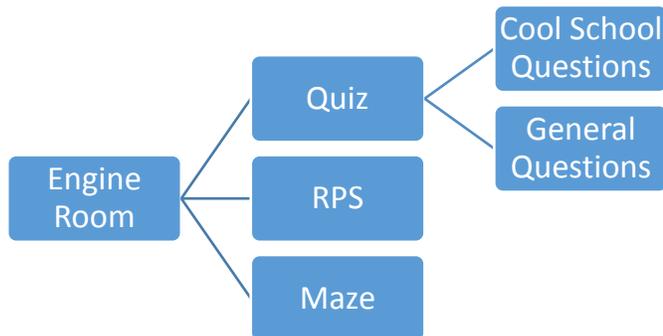


## 3.1 Game Engine

Panda Island consists mainly of engines and entities. The main controlling class, engine room, is responsible for controlling and passing information to each engine. Each engine/entity consists of a lot of built in methods which make it quick and easy to create new screens/games. The use of XML allows for extendibility however its use for controlling what NPC's do isn't as nice as it could have been, had a dedicated scripting engine been implemented from the start. The Panda Island game engine controls the loading of resources from the XML system, the audio system and keeps track of all progress the player makes within the game. The engine also uses its online update system to grab the latest quiz questions and answers from the webserver.

**FR1 - The System shall teach skills used in conflict resolution**

Panda Island makes use of quiz 'minigames' to teach conflict resolution skills, the player is taught the correct answer if they answer the question incorrectly.

**FR2 – The system shall inform users of different personalities**

Both the quizzes and a few NPCs (Non Playable Characters) teach the player about different personality types. When the player interacts with various NPCs they are informed of a particular personality type e.g. The Fox.

**FR3 – The system shall be cross platform**

Panda Island is programmed in java, a cross platform runtime environment, and has been tested on Windows, Mac OSX and Linux.

**FR4 – The system shall record the users' progress**

Panda Island automatically saves the users' progress when they

enter and exit a 'minigame' which prevents any data loss. There are also options to save and load a player's progress in the menu.

**FR5 – The system shall provide customised user profiles**

Panda Island allows the user to name their profile/save. This name will also be used on their automatically generated certificate of completion.

**FR6 – The system shall have unlockable content**

Panda Island uses boat parts as an incentive to play through the game, you unlock boat parts by completing 'minigames'. Players can use these boat pars to build a boat and race against NPCs.

**FR7 – The system shall have customizable content**

Panda Island through the use of XML allows for new characters and events to be added, as well as content to be changed without having to recompile the source code. The client wanted to be able to alter the questions of each quiz, to make this possible we created an easy to use web interface from which the game downloads the XML for each quiz when it launches. Ensuring that the game always has the latest content.

## 3.2 Technical Highlights

### 3.2.1 Created an extendable game engine
Panda Island's game engine is made up of the best parts of two LWJGL based game engines, Slick2D and MarteEngine. The adaptation of these engines allows for easy creation of multiple 'minigames' to be run within the main game engine.

### 3.2.2 OS Detection
Although Java is designed for wide cross platform support, some parts of Java, such as path detection and the way that graphics are rendered differ per platform. While LWJGL attempts to handle some elements of this Java shortfall, the team had to adapt the game engines to handle these differences as well. Panda Island has been engineered to run under Microsoft Windows and Apple Mac OS X, but also runs under most common Linux distributions.

### 3.2.3 Active Listening
The team has managed to create a digital model of the active listening concept, without using sound. Feedback is provided throughout the game; players can choose to use or ignore this feedback, but from research, to encourage the use of this feedback, a viewport has been added to parts of the game, to obstruct the view of the player, this restricts the visual feedback, making the player resort to other sensors to navigate; it has been noted that players very quickly work out that the feedback makes the game much easier to play, so adapt to utilise this feedback.

### 3.2.4 XML Content Management
Extensible Mark-up Language has been used to handle all the interactive objects contained within the game. This allows for rapid update of game elements as well as providing an easy system for a non-developer to change the content of the 'minigames'.

### 3.2.5 Web Management
A requirement that the Peace Foundation came up with late in the second iteration was that they require the ability to change the game content as their material changes. Since XML was already being used to store this content, a system was created using a PHP server to make changes to XML files. Each time the game launches, it checks the website for new game content and updates the values that are stored in the game.