

Where's the Bling of the Thing? Ethics, Gaming and PBL-I

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Abstract

This paper describes an evaluation of PBL-Interactive (PBL-I), an authoring tool for an ethical decision making game, within the Dip ICT course, ET600 Ethics and professionalism, at Christchurch Polytechnic, Institute of Technology, (CPIT). The tool was developed through the e-Learning Collaborative Development Fund (eCDF) for use in online and face to face delivery. While the prototype was developed and the usability testing conducted with student volunteers returned positive results, the limitations of the authoring tool in a multi-linear gaming environment outweighed its affordances. In particular, the authoring mode interface lacked ease of use and functionality for advanced features such as video and audio required to develop multiple ethical choices to motivate students with advanced gaming experience in online and face to face learning environments.

While scenario based problem solving can be used as games in ethical decision making, authoring tools for tertiary educators should be easy to use to create them, including multi-linear scenarios. Otherwise, when playing an ethical game in PBL-I's present player mode, deep thinking is displaced by astute guessing of a "right answer" from a list. Rather than groups working through the game scenario in multiple ways, with the potential for students to create new ethical episodes for future participants, ethical decision making is constrained, more simplistic, and deterministic. Cross cultural issues may be used stereotypically, without developing insight or empathy. Opportunities for international students to make a contribution as subject matter experts may not eventuate.

Keywords: Ethics education, ethical decision making, multi-linear gaming, PBL-I, practitioner research, cross cultural issues, scenario based problem solving.

1 Introduction

The purpose of this research project was, as an early adopter, to use PBL-I as an authoring tool, to develop the ethical decision making game, *Hidden Dragons*, based on the Markkula ethical decision making process. It was developed for use in online and face to face delivery, to motivate students to engage in developing ethical decision making skills.

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Integration of technology into the delivery of the curriculum is a powerful tool to engage students in their learning and is widely reported in educational literature (Cairncross & Mannion, 2001, Mayer, 2003; Oliver & Stoney, 1999).

This practitioner research, to meet a post graduate multimedia in education course requirement, sought to explore two issues. Firstly, the ease of use and functionality of the PBL-I as an authoring tool to convert a text based scenario into a multi-linear ethical decision-making game. Secondly, through usability testing, trialling the prototype with student volunteers to assess its effectiveness as a learning object. The students were first year students in the second semester of their two year programme.

This research project is located in the course *ET600: Ethics and professionalism*. It is a semester based compulsory course within the programme of the two-year Diploma of Information and Communications Technology, delivered throughout New Zealand to business computing students enrolled in polytechnics and institutes of technology (ITPs).

In *ET600*, students are expected to be able to justify their decisions, and that their decisions should be ethically sound. Ethical decision making, according to Bloom's Taxonomy, is problem solving: analysis, synthesis and evaluation. It is suggested that case studies and simulated exercises are used as a method of teaching and learning these skills (ITPNZ, 2004).

Providing engaging problem and case based scenarios is also seen as a way of more broadly meeting social, economic, and environmental issues which are of strategic importance to our nation state, (Massey University, n.d.). Increasing the capacity of ICT within the economy is part of The Digital Strategy (New Zealand Government, 2005) including business interests, as reflected in NACCQ's curriculum guidelines (ITPNZ, 2004). State funding is being provided for this purpose.

The tool selected, PBL-I, (Massey University, n.d.) was developed as a Massey University-University of Queensland project funded through the e-Learning Collaborative Development Fund (eCDF), administered by the Tertiary Education Commission (TEC) on funding policy developed by the Ministry of Education. The project deliverables included the software, exemplars, training materials, and a web site. The roll out of the 'free' software and manual to all state tertiary institutions occurred in August-December, 2006.

2 Literature Review

Brunlett (2001) strongly advocates the innovative use of multimedia in education. He cites Papert, an early adopter, as suggesting that educators need to have their own vision for using this powerful technology in ways that far exceed their previous expectations. He cautions us that we need to develop our own learning objects for use in our own programmes, rather than use commercially produced products that constrain or dictate to us. He suggests we can use existing multimedia, and develop ways of integrating them into our work, develop our own materials, and produce re-authored materials from resources gathered from the Web.

Orngreen (2004) considers the possibilities and problems of case based elearning (cbe-L). Students often do not usually carry out the kind of high level analysis of a case that this teaching paradigm claims to encourage. Whichever model is used, either the Harvard model, based on a real case, or the interpretative European model, reporting events to decisions and first results, case based learning analyses the situation, and devises viable strategies or evaluates decisions taken. Students work as individuals, in small groups, and then discuss it in class, with the final part being considered vital to the learning process (Lenders and Erskine 1989, Heath 1998, Orngreen and Bielli, 2001, cited in Orngreen, 2004).

Orngreen (2004) describes cbe-L as a constructivist and experiential approach to learning. Students acquire knowledge through analysis and active discussion with peers, in ill-structured and complex situations, and relate the case to one's own work experience, which may or may not be limited. It is difficult for educators to create a theoretical frame around the case, which motivates students to analyse it through using a model, and then discuss how that theory applies. Often educators expect active participation in discussion and analysis but seldom give students directions on how to do this.

Students need to know how to analyse the content, which may be web based, and benefit from collaboratively analysing in small groups. If students tend only to draw from their own experience, they may not critically reflect on the case. They may comprehend the content, but not engage in deep thinking at the level of analysis or evaluation required by the curriculum. Cross cultural issues may be stereotyped, and not develop insight or empathy. Potential exists for international students to make a contribution as subject matter experts, (Orngreen, 2004).

An authoring tool for cbe-L should support case development based on these learning objectives and teaching processes, with high-level collaborative analysis of cases and a sound practice-theory relationship. The tool should be developed as a strategy to promote empirical research based education. Orngreen suggests that cases are developed iteratively, with design specifications, revised design, and prototypes user tested in a simulated walk-through of case development and case of analysis situations, prior to the final production phase.

The tool should coexist with the currently used platform and be used with synchronous chat and asynchronous forums. As teachers vary in their ability and motivation to develop a multimedia web case, and the cases vary in size and complexity, the tool should be flexible enough to meet these needs. Students and teachers are rarely trained to use the case method, so the tool could give guidelines to students and enable a systematic and reflective analysis as well as collaboration with peers, Orngreen, (2004).

The use of role-play and simulation is also emerging with the support of technology. Web-TRECS and DECT at Deakin University (Parker & Swatman, 1999, and Joyce, 1999, cited in Orngreen, 2004) were early examples in e-commerce. The learning paradigm is shifting towards more action based objectives such as just-in-time actions in a simulated dynamic world rather than analysis based on models and theories of cases (Beach & March, 2006). Role plays and simulations can stimulate and motivate students to engage with the material even if there is not dynamic case content. The concept of the case is visualised by the stakeholders but the user cannot actively change the case or the course of events. Downes (2006) encourages educators to see that new forms of learning are emerging for net generation learners, and to work within this new paradigm, connectivism. Learning takes place as on ongoing conversations and interaction sharing, with creation and participation embedded in meaningful activities such as games.

In summary, based on Brunlett, Orngreen and Downes, a learning object for cbe-L should ideally have the following affordances:

- provide a sound practice-theory relationship for multi media and learning theory
- focus on students and be developed collaboratively with peers
- enrich and motivate students, including those from a Non English Speaking Background (NESB).
- be located and resourced within the ethos of connectivism
- support student just-in-time actions in a simulated dynamic world
- enable students to engage in a systematic and reflective analysis
- enable students to participate in high-level collaborative analysis of cases
- adapt flexibly to an appropriate scale for the educator's skills and needs
- be usable with learning management systems, chat, and forums
- support empirical research based education for educators

3 Method

The research project used two methods to gather and analyse data. Firstly, the ease of use and functionality of the tool in authoring mode were assessed through the manual based training with an exemplar. Once the text based scenario was converted into a written draft scenario, the ease of use and functionality were evaluated by authoring the prototype ethical decision making game.

Secondly, the *Hidden Dragons* Game was evaluated as a learning object. The prototype was usability tested using student volunteers. Usability testing was conducted in two stages. Firstly, following Barnum (2002), the draft scenario was evaluated as a 'prototype walkthrough', before authoring. The shell prototype was then usability tested using groups of 'tolerant users', in authoring mode, to evaluate the game's potential to engage students in ethical decision making, and to identify any authoring issues that needed to be addressed.

3.1 Rationale of Tool Selection

PBL-Interactive (PBL-I) is a web based authoring tool and player developed for use with distance students to participate in problem solving scenarios from within their learning management system, such as Blackboard or Moodle. It can also be distributed by DVD, and used by face to face students in either delivery mode.

The tool was selected to gain experience of the software in Semester 2, 2006, as an early adopter, and to encourage its use at CPIT with the e-learning and web development team which supports the professional development of academic staff.

3.2 Planning the Scenario

The scenario was adapted with permission from the case *The Million Dollar Decision*, from the Markkula Centre, University of Santa Clara, California. It used the Markkula Ethical Decision Making Model. Both documents are available from www.scu.edu/ethics.

The scenario overview localised the episodes, locations, and tasks in a New Zealand setting for an interactive role playing game renamed *Hidden Dragons*.

In brief, Pegasus International, a wireless communications company, is planning to expand its business into China, a country in which there is a history of bribe taking that is considered a normal part of doing business. The case considers the ethical responsibilities of the CEO in developing company policy, in the face of conflicting values and ethical positions that can be adopted.

The game's draft concept plan consisted of the visuals, text, and actions to be interacted with by the players in each episode. Planned resources included background documents on the company, and its values, and links to web sites providing business intelligence.

It was planned so that students could work in teams to consider the issues in each episode and make ethically based decisions from the viewpoint of the manager, in response to the pressures from colleagues and the CEO.

3.3 Usability Testing Objectives and Methods

Before beginning authoring, the author conducted usability testing of the concept plan. The purpose of the initial testing was to collect information about how the students related to the *Hidden Dragons* Project scenario, and whether they experienced difficulties using it with the Markkula process.

Barnum (2002) suggests the most useful approach with an existing product is to assess the ease or difficulty of performing specified tasks.

Because the software was already developed, the focus of the usability testing was on a summative evaluation of its use by students in the game scenario using the Markkula method, (Barnum, 2002). The objective was to see how the users responded subjectively to the specific tasks.

The following tasks were identified for evaluation:

- ease of use of role playing within the scenario
- ease of use of navigating the PBL Interactive player mode screen
- ease of use of navigating within the scenario
- ease of use of accessing support materials
- ease of use of locating relevant facts in support materials

The first task was evaluated by the focus group, before authoring. Then all the tasks were evaluated by tolerant user testing groups after the shell of the prototype was authored in PBL-I. The prototype was tested in a lecture theatre setting on a laptop in player mode.

3.4 User Testing Profile and Selection

Nielsen, cited in Barnum, (2002), suggests that small groups can effectively evaluate usability of a product, as long as the sample reflects the user profile. Classes typically comprise 70-90% male, 33% NESB, with an age range of 17-25, with about 10% as mature students.

A focus group was recruited from one of the 2006 Semester 2 face to face classes in ET600, for ease of access and feedback. A protocol offering confidentiality, and explaining the purpose of the project was signed by the student volunteers.

Students then filled in a pre-evaluation questionnaire, to establish their personal profile. Three students who represented the class profile were selected. They were then emailed, offering them a place in the group. All selected students accepted.

The focus group comprised one male student aged under 20, and two male students aged 21-25. One student did not have English as a first language (NESB). The group did not contain a female student, as it was an all male class.

Five voluntary groups of tolerant users from the two classes tested the shell prototype.

Group A, male Africans and a male Fijian, tested before a class. Group B, two mature women, 25+, tested during a class activity and break.

Group C, a Chinese student from the focus group and his Chinese friend, and Groups D and E, male European-Pakeha students, including the leader from the focus group, tested during a class activity.

3.5 Scenario Walkthrough

The first evaluation of the draft scenario was a prototype walkthrough, (Barnum, 2002). The focus group met for an hour after their scheduled class.

Students gave feedback on the paper prototype, before it was authored in PBL-I. They gave feedback on the planned visuals, text, and expected student responses.

They gave a response to the overall scenario, and rated how subjectively engaging it was. An older student emerged as a leader, with consensus on points raised being confirmed and elaborated by the other students. Responses were recorded in writing.

3.6 Tolerant User Testing

The game was authored and prepared for tolerant user testing. The issues raised were considered, the plan adapted, and the game authored to the point of creating a shell prototype, with all the locations, environments, tasks (choices) and text complete.

Some of the episodes had full audio. Links to supporting documents and web sites, and the creation of final visuals and audio were still under development.

Tolerant user testing involved sympathetic users working through a prototype scenario to deliberately find the flaws (Barnum, 2002). They may be prompted or not by the tester, as the users see fit.

4 Findings

The PBL-I authoring tool was difficult to use, time consuming because of its limitations, due to poor functionality and lack of documentation.

The project was abandoned and the game was not completed past the final prototype stage.

The *Hidden Dragons* Game received positive feedback from the male students, at both draft and prototype stages, regardless of age, and language background, and engaged them in collaborative ethical decision making of a cross-cultural nature.

The mature women students were less positive, and asked for direction.



Figure 1: *Hidden Dragons* in authoring mode

4.1 Affordances and Limitations of the Authoring Tool

4.1.1 Affordances

The scenario is developed in author mode, and then tested in player mode. This enables the pathways through the scenario to be checked and corrected. The opening screen is shown above.

The tool uses a MUD like environment of four panes, which enables the creation of locations, environments, actions, and text for each episode within the game. Actions are embedded within each location. Actions are set as prerequisites, linked to actions and locations.

The tool enables video and audio to be used within the episodes.

4.1.2 Limitations

To edit a new episode, and check that it is functioning correctly, the authoring tool has to be reset to the start of the whole scenario, which is time consuming. The authoring should be able to be resumed at any point within the scenario. This lack of functionality adds unnecessary time to authoring and acts as a disincentive to its adoption by tertiary educators and e-learning teams who are the target audience.

To create multiple pathways through the scenario, actions are linked to prerequisites. However, the lists of actions are created in common to all the locations, regardless of where they are used, and are displayed one by one in a small slotted authoring window.

The more actions, the longer the list, and the harder it is to ensure that cause and effect are properly sequenced. It is very difficult to set sequences and correct errors. The linking of actions and consequences, a key element in ethical decision making, should be embedded within their location. The interface for authoring tasks and their prerequisites needs to be redesigned as a large box, or a button linking tasks.

Audio files have to be located in a pathway so that they can be embedded, and have to be written in HTML code. This is a cumbersome approach, and unsophisticated. A button to embed audio and video would make this feature more useable.

4.1.3 Lack of documentation

To discover advanced features, each exemplar needs to be read, and the features listed by hand. The PBL-I manual lacks technical documentation, and advanced features are learned by trial and error, without online help. Apart from the simple practice scenario in the manual, which has a video, there is no description of how to use all of the features effectively. This needs addressing in any future editions.

4.2 Usability Testing

4.2.1 Results of Prototype Walkthrough

The focus group feedback, in summary, was as follows:

- the group affirmed the organisation of the interface
- they responded to the concept positively and characterised it as an interactive, problem solving, role playing game
- they believed they could “learn by doing”
- they felt the case was rich and engaging
- the NESB student was concerned about the amount of writing and reading in English (and asked for translation buttons)
- the NESB student wanted clear progression signalled to the next frame
- they wanted the game non-linear, with rewards for effectively following the Markkula process
- they suggested multiple choice boxes or a drop-down list of options to prompt possible actions
- they asked if the game could be one player or a group and whether a class exercise or done from home online
- they asked that only essential documents be provided to read as background and that the Markkula process could be referred to during the game
- they suggested rewards for complying with the purpose of the game, and punishment if not

4.2.2 Results of Tolerant User Testing

The responses of the tolerant user groups varied, by gender and age as follows:

The males actively engaged with the game. They had a high tolerance for making mistakes, approached the task as trial and error, were not concerned with

incompleteness, were intrigued and highly motivated, with a sense of humour.

They asked about the purpose of each pane, experimented, restarted when shut out of the game, persisted, and completed the whole game within 19-21 minutes.

They looked for visual cues, discussed which action to take and why, using logic and problem solving, rather than randomness and guesswork. They made positive suggestions, to synchronise actions, experienced the testing as looking for flaws to help develop the game, rather than as testing their gaming competence.

The NESB students did not appear to experience any difficulty interpreting the text, the sequence, or the way to interact with the game, and did not need prompting. Cultural differences were explored in the scenario, with the Chinese students able to make a contribution in mixed groups.

The focus group leader, having suggested that students who acted unethically were shut out of the game, was nonplussed when this happened to his group. The issue that arose was related to “face” and ensuring the working relationship between different cultures could continue unimpaired.

In personal communication later, by email, the student agreed that decisions were contestable, and that the students should be able to comment on their reasons, and perhaps invent other scenarios that could be incorporated into the game.

The male groups were intrigued by the use of Voice Cloak software, and found the game enriched by the use of audio for the characters.

In contrast, the women students were slower, more critical, repetitive, and cautious, did not express enjoyment, and saw error as a sign of their personal failure rather than within the game.

However, after 28 minutes, they accounted for their personal failure of not progressing past two locations by blaming perceived shortcomings in the game.

They were hesitant to read the content pane for cues, said they didn’t understand the text, wanted an explanatory screen that described the panes, how to interact with them, and what they were doing and why “How can I know what to do if you don’t tell me?”

4.3 Using Games for Teaching Ethical Decision Making

In spite of the constraints of the PBL-I authoring tool, this was a valuable experience exploring the potential for using gaming for teaching ethical decision making.

The outcomes of the tolerant user tests of the *Hidden Dragons* Game were illuminating, and led to further adaptations of the prototype, before the project was abandoned due to technical difficulties with the authoring tool.

5 Conclusions

5.1 Using interactive scenario based games for teaching ethical decision making

The potential for using gaming for teaching ethical decision making was clearly demonstrated with computing students in a polytechnic setting at Level 6 diploma level.

Male students, including NESB students, showed a high level of motivation and engagement with the prototype, and that interactive scenario based games could be used effectively to explore the ethical issues, and learn to apply an ethical decision making model within a cross cultural scenario.

Chinese international students were able to be subject matter experts, and there was a high level of student acceptance of the notion of an ethical decision making game.

Women students, who were mature students, expressed more caution and less enjoyment, which may have reflected their relative inexperience with gaming related to their age, rather than their gender. This needs further research, as these findings may not apply to younger female students with gaming experience.

5.2 Using usability testing for collaborative development of interactive scenario based games

Usability testing (Barnum, 2002) is an effective, collaborative, learning object developmental tool to gauge student interaction and gain feedback about improving its ease of use and functionality.

This was applied throughout the project, as authoring proceeded from a paper scenario to a shell prototype for testing with students.

Had the project been completed, the final version would have been user tested with specific goals related to its purpose, ease of use and functionality in computer suites, and in learning management systems such as Blackboard, with online and face to face students.

Focus group and tolerant user testing provide rich and relevant data to assist in this feedback and improve its functionality and student subjective learning experiences.

It is suggested that practitioners can recruit their students and use simple usability testing in classroom settings to ensure that complex learning objects such as scenario based games are engaging, with full functionality and ease of use.

5.3 Using PBL-Interactive as an authoring tool for an ethical decision making game

The authoring limitations outweighed the affordances, particularly in the setting of navigation sequences and the use of advanced features such as audio (and video). These limitations made it too hard to ensure that the game was not predetermined, and was multi-linear, as is befitting

the complexities of collaborative human interaction and choice in ethical decision making.

While the game or scenario may be complex in its pedagogical goals, and the level of thinking that the learning object requires, the authoring tool should be easy to use to foster a strong uptake among tertiary educators.

Teachers need encouragement to adapt or create effective learning objects for scenario based learning for distance and flexible delivery modes, with online and face to face students. The ease of use of the tool needs to be upgraded. The lack of technical documentation for PBL-I needs to be addressed in any amended editions of the manual. Otherwise, it will sit unused as a wasted resource.

5.4 Future Development and Research

The potential for developing and using engaging locally based ethical decision making games for teaching ethics at tertiary level in ICT, applied sciences, engineering, and other fields such as business studies, medical and nursing studies, and teacher education, for example, is huge.

The author is exploring other tools and modes of authoring *Hidden Dragons*, for face to face and online students, especially virtual worlds, as her next project.

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