

Ethics assessment via game play?

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Abstract— In a previous paper the ethical nature of academic staff at the University of Johannesburg (UJ) was evaluated. Since engineering education research is flourishing world-wide a serious question was raised about staff adherence to basic ethical standards. An internal research programme was launched to evaluate staff's ethical orientation using a survey based methodology. The results indicated that a significant percentage acted in ethically problematic ways. As a consequence the idea of using a role playing game (RPG) was mooted to further investigate academic staff's situational ethics. This paper discusses the proposed game playing device that was designed as a manner of investigating the staff's understanding of engineering education research ethics. This paper reviews basic material on nature of play and in particular ethical role play in RPGs and analyses the manner in which an RPG would have to be designed to ensure reliable data collection of the staff's ethical standards when applied to educational research. From the basic review of game playing ethics and the necessary design elements it was clear that it would not be possible to develop such a measurement device. It is an open question whether any form of situated ethics can be evaluated or taught using a closed form RPG.

Keywords— *Ethics research; role playing games; gamification*

I. INTRODUCTION

"In the end even playing evil in a video game can make one a better person." Schrier [1].

Considerable research has been done into the teaching of ethics to students in the undergraduate program [2], although whether the teaching of ethics has any real impact is a matter open to debate [3]. However, a review of articles about engineering education and ethics reveals that very little effort has been applied to analysing the ethics of academic staff, particularly with regards to educational innovation. Even if one is not directly concerned by the staff's ethical stance, it is clear from Vesilind [4] that students see staff as moral and ethical examples to emulate. As such, the ethics of staff have a wider impact than simply their own actions would appear to indicate.

This paper describes some unexpected results from an initial investigation into the ethical stance of engineering faculty, then proposes gamification as an approach to capture more authentic data on the ethical behaviour of faculty. The process of designing and developing an experimental ethics-centred game is described in detail. The game was pilot tested by two faculty members, and feedback from post-play interviews indicated some unexpected flaws in the gamification approach. These results will guide future studies into both studies of ethics in academia as well as the applicability of gamification in research.

II. PREVIOUS WORK AND INITIAL STUDY

In 2011 a reality TV programme (*FuelDuel*) which was integrated into the design component of senior students in Mechanical and Electrical Engineering at the University of Johannesburg (UJ). Three teams took part – while being filmed – in the 12 week *FuelDuel* competition. *FuelDuel* had two main goals: marketing of the UJ Solar Challenge vehicle and addressing a gap in the design curriculum of senior engineering students. The expectation was that students taking part in a competition format reality TV programme would, through immersion, gain greater insights into the actual problems facing design and construct teams. As has been previously reported, unforeseen ethical issues arose during the *FuelDuel* project which highlighted the importance of understanding the ethical stance of engineering educators [5, 6].

As a first attempt at developing an instrument to measure the ethical stance of academic staff, a survey was conducted of two departments in the Faculty of Engineering and the Built Environment (FEBE) at UJ. Some of the standard items of the Defining Issues Test (DIT2) [7] ethics questionnaire were incorporated into a modified survey instrument to allow for calibration of the measurements. Adding to the DIT2 allowed us to consider the differences between standard situational ethics and those situations that often arise in tertiary level teaching environments. The new questions were developed to specifically probe individual differences for multivalent situations, much like the use of Foot's Trolley Problem [8] in moral philosophy. Ethical dilemmas related to academic situations require problems formulated from real world situations in the teaching of undergraduates – situations far removed from the contrived Trolley Problem and its binary choices. Participants were made fully aware of the use of the data prior to their acceptance.

The results of the survey indicated a clear disconnect between the group's general and situational education-related perspectives. While in the general ethical area they appear to have an almost homogenous principled virtue ethics perspective, the same cannot be said of their responses in the area of situated education ethics. Many of the subtler situational ethics questions evoked a surprisingly broad range of responses that are indicative of either a pragmatic consequentialist or a utilitarianist ethical view.

An example question from the ethics questionnaire, adapted from the DIT2, is shown in Fig. 1. This scenario is a common ethical problem faced by faculty where there is pressure to integrate minorities into peer learning environments. This situation calls for a delicate management of the individual student's perception of why the placements are being done the

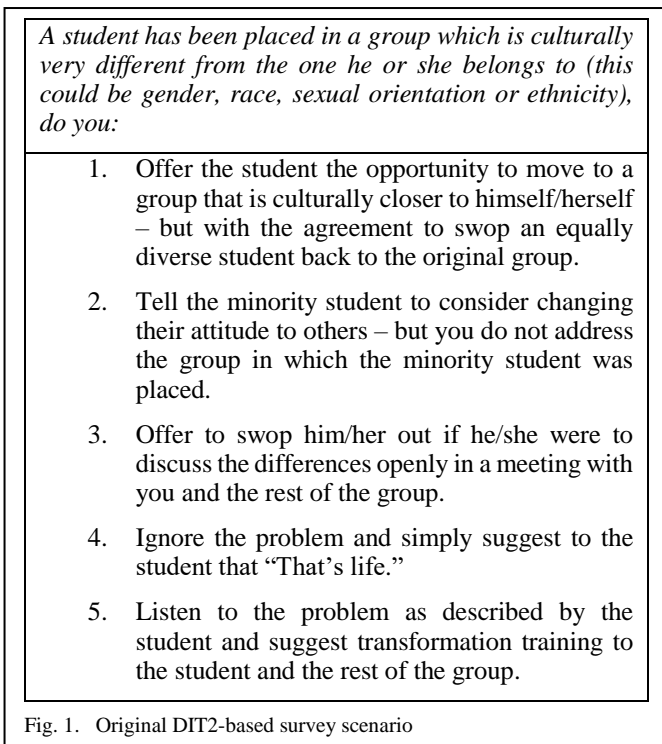


Fig. 1. Original DIT2-based survey scenario

way that they are. Most faculty surveyed chose options 1 (pragmatic consequentialist view, 35% of respondents), 2 (utilitarianist view, 31% of respondents), or 4 (hedonist view, 27% of respondents). What was surprising was that less than 10% of the survey respondents elected option 5 when taking the survey (which was the virtue ethics response expected to be the first choice of the majority of the faculty).

Unfortunately, the validity of the results was called into question by informal follow-up interviews, in which some participant responses did not corroborate their survey responses for actual classroom settings. The five interviewed survey participants made it clear option 5 may have been preferred, but weighed the anticipated impact of the preferred alternative with practical constraints, such as available time. During the interview discussions, all but one of the interviewees realised the importance of the need for interaction with both the minority student and the group to ensure that the correct message around diversity and its benefits was understood.

A review of the interviewee responses highlighted an ethical shift that can only be attributed to the brief ethical training intervention, namely, informal interviews. What appears to be most important is that the ethical aspects of some educational events had not been considered by the academics. It is postulated that the implicit ethical and philosophical stance maintained by academic engineering staff in FEBE is unlikely to change without additional training. The demonstrated disparity of the academic staff involved appears to have very clear implications for tertiary education in the departments of FEBE and for the larger engineering education community. Some key reasons for emphasizing the development of a better ethical understanding among engineering educators include the need to:

- train engineering educators to be sensitive to the changing ethical landscape that results from rapid educational technology change;
- develop methods to incorporate an acceptance of the changing educational environment;
- develop methods to train engineering educators in the ethical use of modern educational technology; and
- train educators to themselves interrogate the ethical traps implicit in some new educational technologies.

Forward looking educators must identify new ethical issues early in the development of educational tools so that early adopters can be sensitized to problems before they occur.

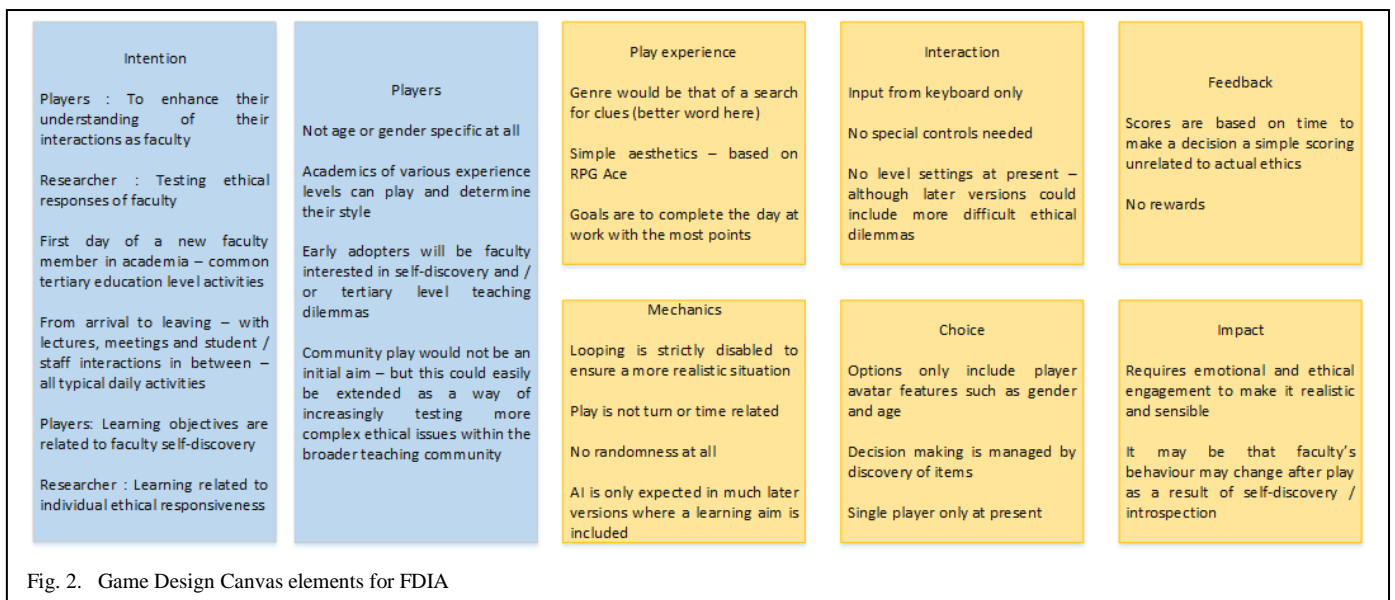
III. AN ALTERNATIVE APPROACH: GAMIFICATION

The disparity between survey questionnaire results and the informal interviews highlighted the need for an alternative data collection methodology. After a number of routes (such as interviews and an analysis of research outputs produced which would indicate possible ethical infractions) were investigated, the use of gamification was identified as an appealing possibility. It was postulated that a game play environment would make it possible to collect the ethically relevant decisions made by educators in a manner more consistent with their likely actions in a real educational situation.

Gamification can be defined as a “strive to leverage people’s natural desires for socializing, learning, mastery, competition, achievement, status, self-expression, altruism, or closure” [9]. Of value is to recognize the work of Sicart [10] in determining the role that games share – both unproductive entertainment and a rhetorical nature as suggested by Bogost [11]. It is specifically this dichotomy that led to the interest in gamification in education. The game *forces their users* to take part and take as valid the predefined set of rules defined by the *magister ludi* [12] that yields the game outcomes. Sicart argues that it is precisely in this “dialectic that the roots for the understanding of games as ethically dangerous experiences are to be found.” [10].

In most games acts of violence or treachery grant “evil” points, and positive actions result in a higher “good” score. Thus an implicit ethic is enforced via the rule engine implemented by the *magister ludi*. The externally enforced ethic, however, generates what Arendt [13] described as the “banality of evil” as a defence when individuals are critiqued for evil actions. To wit, if a player is doing what is expected by the system then the player cannot be held accountable for her actions.

Many games have been proposed for use in education and a few have even been mooted for ethics education of young persons [14]. Hodhod et al. [15] developed AEINS, “an inquiry-based learning environment, that helps 8–11 years old children to be engaged effectively in moral dilemmas” by making use of a modified Socratic dialogue structure to influence the scholar. There have also been game play researchers that have investigated the impact of ethical play and the development of ethics by players, such as [16, 17]. Attempts at creating games that are able to teach ethics are reviewed in [18] but actual applications discussed are limited to the application of ethics in engineering design contexts. There is however a real dearth of



games for ethical evaluation that are based on realistic and practical ethical dilemmas, and a common complaint by educators is that game-play is essentially anti-social and immoral [19].

The authors of this study hoped that, if constructed appropriately, a game environment could allow the analysis of the player's ethical stance without direct feedback and without an intrusive scoring system prompting decisions. If so, an educator's decisions within the game play environment would reflect decisions taken in real world settings with sufficient accuracy that conclusions could be reached about an educator's ethical behaviour in complex real educational settings.

IV. AN EXPERIMENTAL ROLE-PLAYING GAME

In hopes of producing more accurate and consistent data on the ethical stance of academics, a role-playing game (RPG) that confronts players with a variety of realistic scenarios linked to the practical application of ethics in academia.

The RPG which was designed for this ethical transaction estimation study, entitled "First Day in Academe" (FDIA), was constructed around a fictitious storyline (See Appendix) that allows the player to interact with faculty management, colleagues, students and administrators in situations which confront academic faculty on a daily basis. Most of the situations implemented in the first generation were those that formed the basis of the extended survey questionnaire which was a modification of the DIT2 instrument [6]. Various questions from the educational ethics questionnaire were converted into game-play scenarios within a short but continuous storyline that was meant to reflect a common day's situations in a tertiary academic setting for a faculty member.

A common design tool for serious game development is the Game Design Canvas format of Carey [20]. It was used in part (the commercial aspects of the game design were not used) to develop the high level structure and elements of the RPG to be developed for as shown in Fig. 2. Work from Brey [21], Caillois [22] and Mcgonigal [23] was also used in the game design of FDIA.

Each of the situations incorporated into the game was meant to test the player's decision making as a faculty member when interacting in the following situations:

Staff acting towards colleagues – related to interactions based on common ethical dilemmas developing from collegial relationships faced by faculty. In FDIA the situations related to either being asked to (a) adjudicate in a staff / student dispute where the colleague has clearly acted incorrectly (b) advise a colleague on publication routes to advance their careers with the present departmental structure or (c) to act in terms of the need to report certain data to faculty administrators.

Staff acting towards senior university administration – related to interactions based on common ethical dilemmas developing from collegial relationships faced by faculty. In FDIA this is investigated via determining faculty response to a request from the university administration to report on student based activism.

Staff acting towards student(s) – related to interactions based on common ethical dilemmas faced by staff but originating from student / faculty transactions. Example interactions in FDIA include the previously presented dilemma around (a) managing cultural diversity in student groups and (b) handling a student plagiarism case in a term paper context.

In FDIA, the apparently hypothetical question of cultural diversity from Fig. 1 becomes an active scenario. The player interacts with a small practical class in which there are a small number of minority group students. A project must be done in a group context (a common testing situation in engineering studies) and the project groups are to be selected by the faculty member in the class itself. The task to arrange the students in groups for cannot be accomplished without resulting in at least one group where there is a single minority group member in the project group. The minority student who is isolated then raises an objection to their placement in the specific group and the player as faculty is required to address this situation and resolve the diversity related issue. As in the DTI2-based survey, there are a range of possible solutions, none of which prevent the

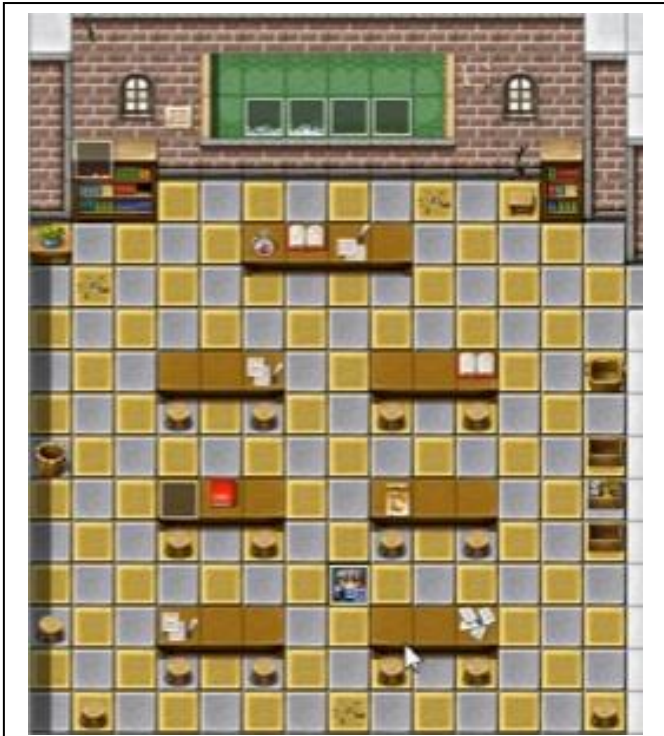


Fig. 3. Practical space in FDIA – used for game scene 5 (in this part of the scenario only the minority student is displayed)

problem from recurring. In FDIA, the scenario was expanded to include options such as “Ignore the objection completely and end the class” and “Ask the group to come with a solution themselves” and “Free format” option. (The “Free format” option allows for the player to submit an alternative action for recording purposes only.) A snapshot of the scenario as presented in FDIA is shown in Fig. 3, and a complete description of the nine in-game scenes is presented in an appendix. The responses and strategies attempted are then recorded for later analysis. Player choices are scored based on speed of response as well as on the propriety of the chosen action. However, the player is never led to believe that a choice was “correct” or “inappropriate.”

V. ETHICAL ANALYSIS VIA INFORMATIONAL ETHICS

The actions of the players of FDIA can be analysed using the informational ethics model of Floridi [24] who argues that all persons involved in informational technology should equally realise the ethical nature of the system interaction and structures. He expects that the role-playing aspect of the game would encourage participants to pursue actions in the game that reflect their own ethical stance and actions in real-life. Floridi posits an informational ethics where:

... the moral action itself can now be modeled as an information process, i.e. a series of messages (M), invoked by a , that brings about a transformation of states directly (...) affecting p , which may variously respond to M with changes and/or other messages, depending on how M is interpreted by p 's methods. [25]

Informational ethics of game design can be grounded in the following hierarchy of how any action in the total infosphere

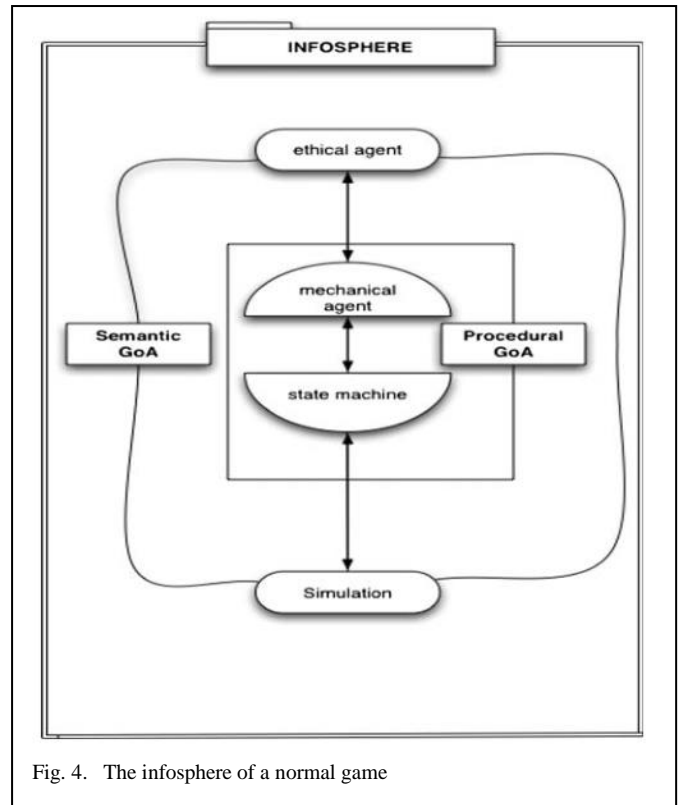


Fig. 4. The infosphere of a normal game

must conform to decision making in the informational system to be considered ethical.

- Entropy ought not to be caused in the infosphere.
- Entropy ought to be prevented in the infosphere.
- Entropy ought to be removed from the infosphere.
- The flourishing of informational entities as well as of the whole infosphere ought to be promoted [25].

The infosphere and the interlinked structure of the game player, game and outcomes are shown in Fig. 4 for a typical game – a highly idealized scenario suggesting that all actions in the infosphere can be connected to two so-called gradients of abstraction (GoAs). Each GoA is a set of linked levels of abstraction (LoAs) describing an aspect of the information process. The first, and simpler, Procedural GoA is related to the interaction between the player and game (described in Fig. 4 as the mechanical agent and state machine, respectively). This GoA is the one in which the direct actions relate in most games in the scoring and/or progress outcome of the game, and is at most a syntactic/mechanistic system interaction. The Procedural GoA was deemed less important in developing FDIA, incorporated into the familiar formulaic structure of a simple RPG.

The more complex Semantic GoA is related to the ethical interaction of the player and the game. This GoA includes the visual and aural aesthetics of the game, the implicit cultural markers appreciated by the player, the appropriateness of the interactions on offer and the ability to deviate from pre-determined role play into less defined or completely unstructured interactions. This level of both LoA and GoA involves more than simple surface design. In FDIA, the

minimalist aesthetics and option for freeform responses were aimed at encouraging the players to consider the ethics of their decisions beyond the context of the structured game play.

Taking these two GoAs into account, the infosphere elements from Fig. 4 are incorporated into FDIA as follows:

1. Ethical agent – the player as ethical agent is part of the infosphere but practically outside the mechanics and coding of FDIA – it is his / her decisions that lead to inputs to the game that result in outcomes that change the infosphere as a whole.
2. Mechanical agent – the RPG implementation of the action via an avatar that is controlled via a keyboard by the ethical agent – in consequence to changes instituted by the mechanical agent the state machine updates the game states and institutes programmed responses.
3. State machine – RPG allows the decision making within a particular scenario to be coded easily enough allowing significant space for encoding cause – effect types of action responses with graded outcomes.
4. Simulation – in FDIA little simulation is used since the game is more about the selection of options and the consequences than the effect of actions on physical elements in the game world.

FDIA attempts to protect the broader infosphere from decision making of an unethical form by localizing the decision making to the game and the player. At the same time, FDIA seeks an environment in which the ethical structure is contemplated by the player in post-game introspection. By separating the decision making from the broader infosphere it was hoped that the player's introspection would enable a more considered interaction with reality.

VI. FDIA PILOT FEEDBACK AND RESULTS

After initial development of FDIA the game was pilot tested by two senior staff members in order to find any logical/structural or semantic/syntactic flaws in the game, as suggested by [26]. They were given brief instructions on the game structure and a small handout with the relevant controls for play that were not directly intuitive. The players were left alone so that any consciousness of being watched would not influence their actions. From post-play interviews and a review of the players' game-play choices, several issues with the design of FDIA became apparent. Though some of the problems raised might be partly resolved with an improved design, the combination of the issues call into question the choice of an RPG style game, and with gamification for ethics research.

Without a clear motive – such as is implicit in single player shooter games such as Call of Duty [27] – both of the players felt at a loss what to do. While not unexpected – new faculty in real life also sometimes feel an uncertainty in their first few days – this uncertainty was problematic in terms of realistic game play. Obvious real-life actions are may not be obvious within games because of the artificial context. For example, neither player “switched on” the PC on the desk in their office and checked for email.

Neither player discovered all nine scenarios. Despite being seasoned academics and game players, operating in the same environment as the game designers, players missed obvious things such as checking for a class to present (missed by one player) and going to the tearoom at teatime (missed by both players). Hence neither player encountered game scenario 8 – leaving it essentially untested.

In the separate debriefings, the players were ambivalent about their choices recorded in the scenarios that they had taken part in. One made it clear that the choices made reflected “game play” and would not have been the actions taken in reality. One player articulated the difference as:

“I feel sometimes that I wish I could act as freely as I did in the game. I would however never be able [to] in my present department because [the] HoD is always watching.”

Neither player could understand the score feedback – both thought it was a timer based game format – one commented that

“I thought that the aim was to complete in some sort of time trial – left me wondering whether I was working too slowly.”

In a closely related issue, neither player recognized that giving an “ethics score” may guide them into making decisions reflecting the game designer's own ethical predilections, rather than revealing their own ethical stances.

This preliminary feedback makes it clear that the present FDIA, as designed and implemented, failed in at least two respects. Firstly, the game play mode of play led to choices that disallow the use for survey purposes. When players might not even encounter some scenarios, the “survey” is essentially incomplete. Unless a highly linear (and therefore unrealistic) game structure is imposed, there is no way to gain a complete response from participants. Secondly, and more critically, the players' expectation that some feedback would “guide” their actions invalidated the FDIA score-free design. Without feedback players do not understand the game, but any feedback inherently affects the players' ludic actions and negates the hope that in-game choices will reflect real life ethical stances.

These failings essentially called into question the appropriate use of gamification and RPGs to either train academics and students or to experiment in a riskless environment with ethical decision making. If an externally supplied ethic (or at least estimate of ethical achievement) is necessary for satisfying game play, then the moral irresponsibility from Arendt's discussion of the banality of evil becomes an inescapable aspect of the game play. Where this leaves the use of gamified environments in the search for ethical action and accountability by the player is still an open question with clear proponents of both positions.

VII. CONCLUSION

This paper describes the development trial of an RPG-based platform as a tool for gathering data on ethical decisions taken in the engineering educational environment. As such, the effort failed – not for want of capturing realistic ethical dilemmas, but because players could dispense with themselves as moral agents and take on a persona. Without feedback guiding their decisions (as real-world consequences provide in real life), the player's persona could act with impunity and adopt a morality

disconnected from that of the player. While this effect is commonly reported in the literature [28], it was thought that the players of FDIA would remain closely connected to their persona due to the unusually realistic nature of the scenarios presented. This disconnect must be resisted in future attempts at using games as an educational research tool, and may be an insurmountable obstacle to gamification for ethics research.

The implications of the failure of FDIA to capture realistic behavioural information has significant implications for future work in both the training of ethics for engineering educators as well as the measurement of the value of such training using automated tools – not just gamified tools. The failure of FDIA may also lead to significant discussions on the nature of ethics and actions from a completely different perspective in future.

APPENDIX: FDIA GAME SCHEMA

Game scene 1: Car park at which new staff member arrives. Students are outside the entrance to the building and they interact with the arriving staff. (Ethical dilemma – how to handle inter-group conflict.)

Game scene 2: Meeting with Dean – introductions and instructions for the new job. (Ethical dilemma – publication targets and how to achieve them – given comments from the Dean on particular conferences.)

Game scene 3: In the office – find first instructions and data from previous lecturer. (Ethical dilemma – determining what is an acceptable manner to present a class. The previous lecturer left notes that are unreadable and no clear class programme.)

Game scene 4: First lecture – interaction with class. (Ethical dilemma – how to manage a small group in the class’s request for a replacement assessment opportunity – a small percentage could possibly benefit.)

Game scene 5: Arranging a practical – splitting class up and ensuring diversity. (Ethical dilemma – how to handle diversity complaints and inconsiderate suggestions.)

Game scene 6: Assessing student submissions from previous lecturer’s classes. (Ethical dilemma – handling a case of possible plagiarism, at what point is copying actually copying?)

Game scene 7: HoD interaction. (Ethical dilemma – depending on the proposed action in game scene 5 the HoD scenario is one in which the faculty member is berated for his / her choice (whatever it was) and forced to defend their decision.)

Game scene 8: Collegial interaction. (Ethical dilemma – being asked advice from a colleague on the handling of co-authorship on a publication.)

Game scene 9: Administration requirements for downplaying a student violation are submitted to you to adjudicate. (Ethical dilemma – negotiating pressure from administration around ethical violations related to an academic transgression.)

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