Shades of Grey 2.0: Educational Gaming for Ethics

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Abstract

The Shades of Grey education game is a team-based game that students play in a class setting, facilitated by their lecturer. The game fits within the quiz show genre and supports lecturers to easily add gaming elements to their lessons. Shades of Grey is used as a mechanism to encourage the student discussion and debate of the ethical issues raised in a series of ethically challenging situations. It is expected that this will increase student engagement with the subject matter and participation in discussion.

Since the initial development and testing of the Shades of Grey game (SoG) prototype in 2010 there has been significant change in the availability and capability of mobile devices in the classroom. More students are equipped with smart mobile devices, wireless networking technology is improving and technologies such as HTML5 are helping to improve cross platform internet experiences. With these changes in mind, the Shades of Grey research team have sought an internal research grant to fund the re-development of the game to make use of the mobile devices that students bring with them and to make it easier for teaching staff to customise the game for their own needs.

An enhanced second version of the game has been developed and to date has been trialled in an advanced auditing course in semester two 2014. Students who played the game were given the opportunity to participate in the study of SoG by completing a questionnaire. Findings from the questionnaire were used to uncover the perceptions of students towards the game which were overwhelmingly positive. These perceptions will be used in conjunction with the facilitator's observations to inform future development and the potential for its continued use in the programme and beyond. This presentation reports on those findings and the future of the Shades of Grey education game.

Introduction

The Shades of Grey (SoG) game has evolved over a number of years from a simple card based voting game to Flash based quiz game to it's current state as a modern web-app designed to run on a student's own mobile device. The game was initially designed as a tool to help improve the levels of engagement with candidates preparing for their PCE accounting programme. Facilitators had commented on the difficulties that they were having getting adequate levels of involvement from the candidates through traditional presentation based methods of ethics instruction. Observations that are echoed by Bligh (1998) who suggests that lecturing is relatively ineffective for teaching values, behavioral skills and for inspiring interest in a subject. It was thought that a game could help to motivate the students to engage in discussions with their fellow team members and help to re-invigorate them towards the end of a full day workshop. A view that is shared by Prensky, who argues that education games have enormous potential for motivating students and engaging them in the learning process (Prensky, 2005).

The candidates were grouped together and provided with a series of ethical problems to discuss with their team. Each ethical problem was accompanied by four possible courses of action. The teams would internally debate the merits of each course of action and would hold up a card (showing an A, B, C or D) corresponding to their choice. The SoG game encourages learning through a cylcle of questioning, feedback and collaboration, which Stewart and Gapp (2013) refer to as Double-loop learning, capable of supporting long term transformation. While the candidates clearly engaged with the material and indicated that they enjoyed the process, there also appeared to be some problems with the card based approach to the game. Some students had problems reading the scenarios from the projector screen and some teams allowed their choice to be influenced by that of neighbouring teams after seeing which card they held up.

It became apparent to the facilitators that technology could be used to improve some of the practical aspects of the game and therefore improve the learning experience for the candidates. The game was re-developed by one of the authors using a computer software platform called Flash, which enabled a number of efficiency gains for the facilitator and the candidates. Each team was loaned a netbook computer that ran an application which showed them the current question and enabled them to make a selection from the four options. Their responses were automatically collated on the facilitator's PC which showed the game "board" including a points table. This improved upon a number of practical issues that were highlighted in the card based version of the game, however a study conducted by the facilitators found that further refinement of the game was needed.

Of particular note, was a need to incorporate critical thinking in the game process. Some of the questions were complex enough that several courses of action could be argued for, and yet there was no way that this was incorporated into the game. It was felt that the introduction of more immersive situations would help to improve the learning experience. There was also a need for a more sophisticated evaluation mechanism for the game as it is a challenging task to measure the ability of a particular tool to improve a student's learning (Oldfield & Slessor, 2010). Significant changes have occurred in the world of mobile devices since this project began. These changes have introduced many new possibilities, and increased the complexity of developing a game such as SoG. As a result, the research team has increased in size and after securing an internal funding grant, has commissioned a programming company to develop the next phase of the game. This paper aims to

ascertain the student and lecturer perceptions of the effect of SoG on their learning experience.

Literature Review

Ethics Education

Debate exists over the merits of attempting to teaching people how to behave ethically. Orwin (2009) states that people simply do not change and therefore attempts to teach them ethics are fruitless. However there is still a strong belief that ethics as a skill can be taught like anything else (Rest, 1982; Andre & Velasquez, 1987; Williams & Dewett, 2005; ElZein & Alameddine, 2012). Rest (1982) suggests that significant changes can occur in young adults in their 20s or 30s and their problem solving strategies for dealing with ethically charged situations. This body of work goes on to indicate that educational attempts to influence students awareness and approach to dealing with ethical situations have been effective. Williams and Dewett (2005) offer three major goals for ethics education to enhance ethical awareness and sensitivity, promote moral development and encourage an appreciation of and skill in handling complex ethical decision making. A useful statement for consideration on the role of an ethics educator is that "It is not an educator's position to tell students how to behave or make decisions; nevertheless it is their job to challenge perspectives and highlight potential consequences for business students" (Stewart & Gapp, 2013, p. 17). Subramaniam, McManus and Cameron (2013) outline that the teaching of ethics is a significant yet vital challenge for accouting educators.

Games in Education

As gaming in the home is becoming more pervasive, the use of educational games in formal learning environments is becoming more widespread (de Freitas, 2006). A significant body of knowledge is developing around the evaluation of games in education. In a literature review, Connolly (2012) notes that there is a diverse range of research on the positive outcomes and impacts of playing digital games. Connolly has developed a framework to organise these outcomes and impacts. It was noted that the most commonly found benefits from the playing of games were knowledge acquisition/content understanding as well as affective and motivational outcomes. Burgos (2005) goes so far as to recommend that games be integrated fully into the learning process rather than used as 'add-ons'.

One of the key issues to be considered when developing an educational game is will educators adopt it within their classes. It has been shown that there are several critical factors to be considered to increase the likelihood of an educational game being adopted by educators. The importance of compatibility is clear, particularly with the variety of mobile devices students are now bringing with them to class. Games with low levels of complexity can be less daunting for instructors. A clear advantage must be shown through the use of the game, and the ability to trial it before use with students can help to encourage educators to incorporate it in their learning design (Kebritchi, 2010).

Developing Shades of Grey version 2.0

The research team felt it important that they were actively involved in the development process of Shades of Grey version 2.0. A development model was decided upon that would incorporate the lessons from the previous version of the game, along with the teaching expertise of a wider group of lecturers and a refreshed view of relevant literature. The research team combined with the design expertise of the software development company, through a series of meetings and demonstrations as SoG was developed. It was also informed by Amory et al's (1999) Game Object Model and it's subsequent version II (Amory, 2001, 2007).
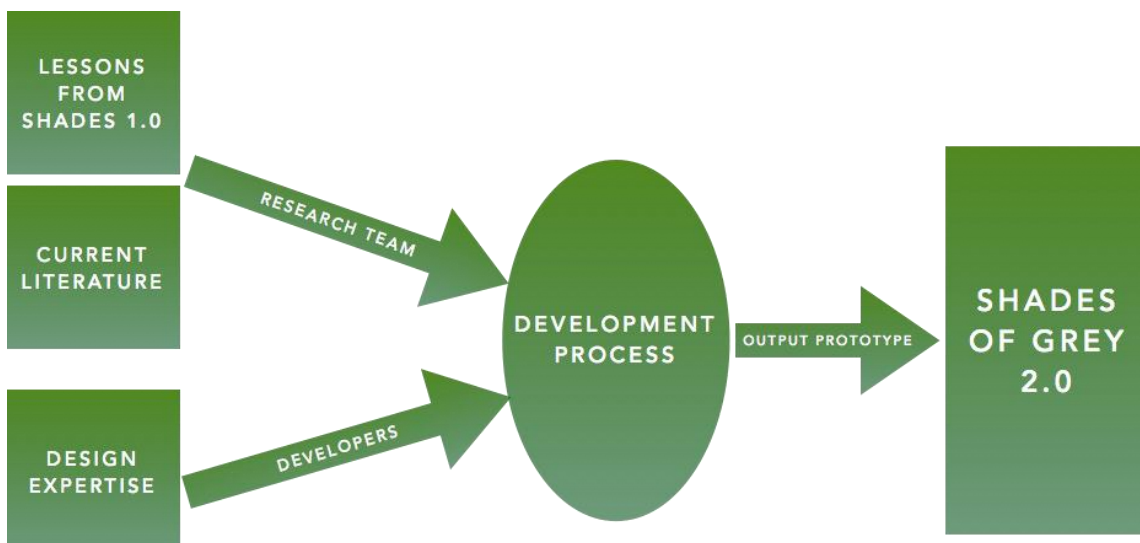

Figure 1 The Shades of Grey Development Process

Discussions over the initial meetings concentrated on the priority items to be included in this next version of the game, namely the introduction of critical thinking and a flexible new interface.

The Shades of Grey 2.0 game experience

Shades of Grey 2.0 allows lecturers to develop their own (text based) multiple choice quiz questions, with a variety of scoring options for each question. Lecturers can facilitate a session of the game in class, where students work in teams and join a game using a mobile device (laptop, tablet or smartphone) that they share with their team. They submit their responses to each question using their mobile device after debating the issues involved. Scores are automatically assigned to each team and the facilitator provides feedback to the class. The new game interface makes it easier for lecturers to create and manage games and for students to participate using their own device.

Students have the option to challenge the scores if they disagree, or feel that their answer should have received a higher score. Each team has one challenge which gives them the opportunity to explain to the facilitator why they felt that their answer should receive a

higher score and the facilitator can decide if they feel a higher score is warranted. If the challenge is upheld and the score increased, then the team keeps their challenge and can use it again on a future question. If the challenge fails, then it is lost and the team no longer has the opportunity to challenge future questions. The challenge feature is designed to encourage students to think critically throughout the game. The recent developments of SoG version 2 support critical thinking, competition and practice within story-lines through challenging and engaging play, as per Amory's (2007) model.

It is interesting to note that Citicorp introduced a similar corporate ethics game in the late 1980s, entitled "The Work Ethic: An Exercise in Integrity". This was in response to media publicity relating to several ethical breaches in the banking and investment sectors. In this case, the challenge or appeal process was to a senior management panel who attended each session. Benefits of the game were seen as raising awareness, creating a dialogue and describing potential dilemmas and how they may be handled by employees (Trevino & Nelson, 2014).

Methodology

The research group considered a number of courses that would be suitable for the initial testing of SoG and decided upon two final year accounting courses (7209 Advanced Auditing and 7212 Advanced Management Accounting). Both courses feature ethics as a topic and include students who have covered a wide range of accounting subjects. All students in each of the two classes were encouraged to play SoG as part of a regular class. A questionnaire was developed to ascertain the students perceptions of SoG and to gain feedback for future development. Completion of the questionnaire was optional and anonymous. The questionnaire was administered by a third party that was not involved with teaching or assessing the students to ensure they did not feel compelled to participate. All students who played SoG were given the opportunity to complete the questionnaire and the majority did so. It is important to note that the two classes used different sets of game questions to reflect their differences in subject matter. The results of the questionnaires have been analysed as separate sets to evaluate the impact in each situation and have also been combined to gain a picture of the overall impact.

Results

Students from the 7209 Advanced Auditing and 7212 Advanced Management Accounting courses played Shades of Grey using question sets related to their specific course. A total of 33 students from Advanced Auditing played the game and completed the questionnaire, while a total of 50 students from Advanced Management Accounting played the game and completed the questionnaire. The questionnaire included a section of likert scale questions asking the participants to indicate their level of agreement with a range of statements relating to SoG. It also included two long answer questions at the end where participants could indicate the things that they either liked or did not like about their experience playing the game. The following section highlights the key results from the questionnaires.

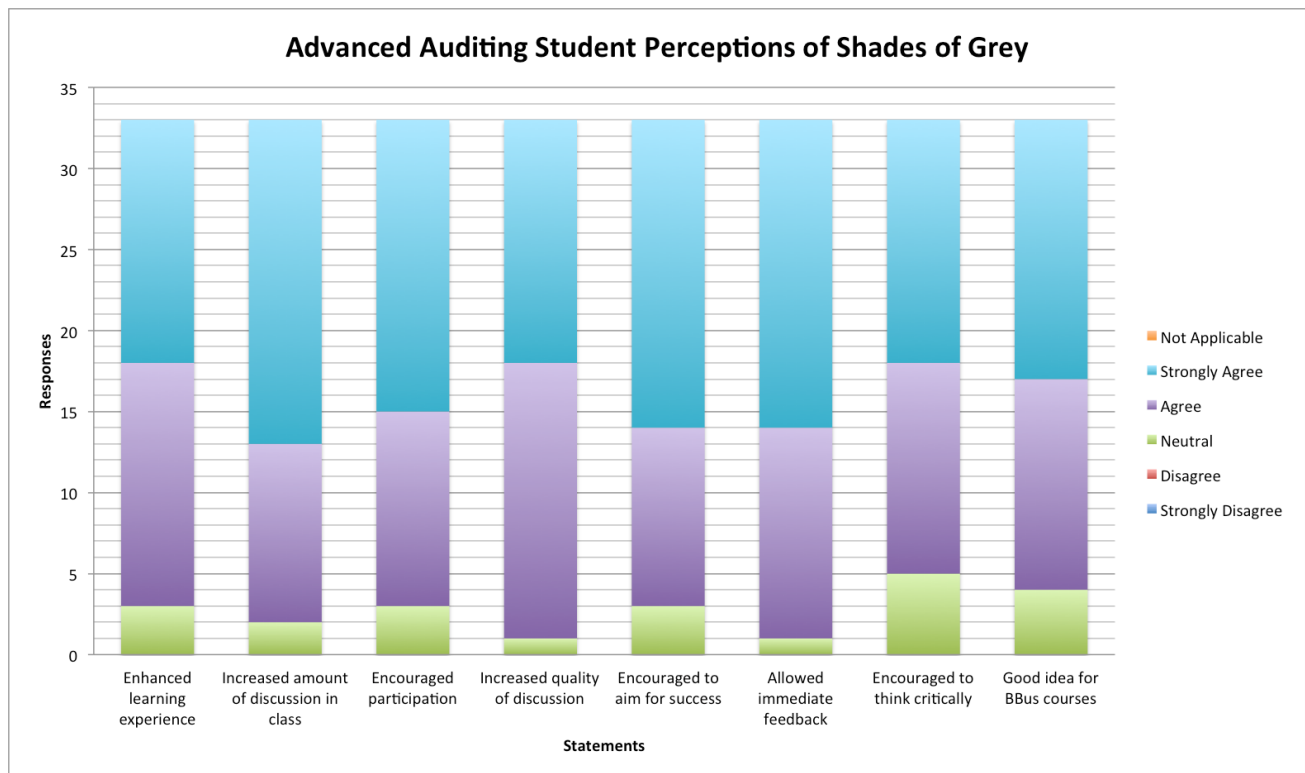# 7209 Advanced Auditing Questionnaire results

Figure 2 Advanced Auditing Likert Question Responses

The following tables summarise the written comments provided by respondents with a series of themes and their frequencies.

What the participants like most about playing Shades of Grey

Thinking critically	Discussion	Quick feedback	Fun	Teamwork	Thought provoking content	Application of knowledge to a case
4	8	1	3	5	2	2

What the participants liked least about playing Shades of Grey

The game was too slow	The game was too fast	Technical issues with the game
8	1	8

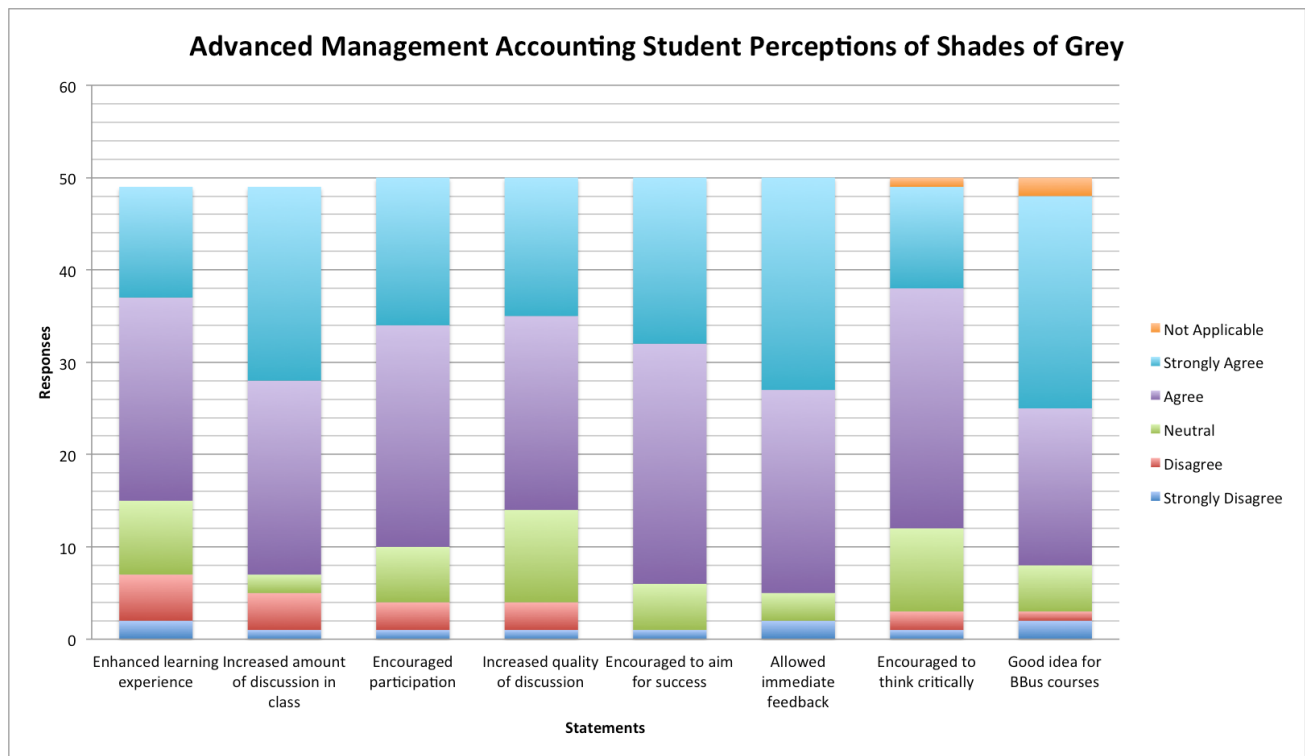# 7212 Advanced Management Accounting Results

Figure 3 Advanced Management Accounting Likert Question Responses

The following tables summarise the written comments provided by respondents with a series of themes and their frequencies.

What the participants like most about playing Shades of Grey

Thinking critically	Teamwork	Discussion	Fun	Feedback	Competition
2	10	6	3	2	4

What the participants liked least about playing Shades of Grey

Technical issues	Problems with the game questions	Timing of the questions	No ability to change answers
8	6	2	2

Lecturer Observations

The lecturer recorded a number of observations after completing the SoG game playing sessions.

Laughter, raised voices and team work are characteristics seldom associated with an Advanced Auditing class. The use of SoG allowed students to debate with their team

members the virtues of their opinions, occasionally in quite a vociferous manner. The group dynamics of a team needing to make a decision on an ethical dilemma within a 3 minute window, showed a unity of purpose: to get the best answer! It appeared that all students were competitive and motivated to win, regardless of language skills, gender and background.

As previously mentioned by Hummel (2011), drafting of the scenarios and the possible alternatives, requires skillful and clever wording. This is due to the need for clarity as well as not to give undue weight to any particulars that could be seen as emphasis or obvious. It is particularly important when each SoG questions has a time limit, to set a realistic but recognisable scenario, to assist understanding and minimise any confusion. The use of a scenario presented by multimedia, although not presently supported within SoG 2.0, added another element of visual impact and fun.

The most rewarding part of using the SoG game was seeing students take responsibility for their own learning, which can be difficult in some technical subjects, including accounting. Transferring the onus from the lecturer to the learner can be a challenge when the lecturer is more comfortable with content delivery than with interactive modes of education. Ethical principles can come alive in an interesting context, especially when there is team pride at stake.

Discussion

The perception of the majority of students was very positive despite several technical issues encountered with this prototype version of SoG. This view is particularly evident in the Advanced Auditing course, where there wasn't a single negative response to the likert questions. The positive response percentages ranged from 85% to 97% with between 15% and 3% having a neutral stance on the statements provided. In general the students appreciated the opportunity to be engaged with the learning process, to discuss issues with their peers and to challenge their lecturer.

A number of quite insightful comments were made by students regarding the aspects of SoG that they liked. One student in particular preferred the departure from the traditional lecture approach to ethics stating:

> "More thinking involved than in a straightforward ethics lecture (ethics can be dull when it is a component of almost every paper)"

Another student indicated how happy they were with being given the opportunity to debate their position with their lecturer:

> "Challenge feature. It allows us to think critically and challenge with lecturer"

There were also students who generally found playing the SoG game a fun experience:

> "Competitive nature of the game. Fun."

While the responses from students in the Advanced Management Accounting course were less possitive, they were still well in favour of the use of the game. 69% of students felt that the game enhanced their learning experience, while only 14% felt that it didn't. Meanwhile

80% of students felt that the game should be used in more courses within the programme and only 6% felt that it shouldn't. This group of students felt that the game motivated them as 88% agreed that it encouraged them to aim for success. They also appreciated the access to immediate feedback from the facilitator as 90% agreed that SoG allowed for immediate feedback.

The Advanced Management Accounting students liked a variety of aspects of the game, although, the teamwork and discussion elements were particularly popular. One student's comment highlights this point particularly well:

> "Increase discussion with class members. Fun and interesting."

Another comment showed that students enjoyed the change of teaching method and indicated that the game empowered them to work with new people:

> "It wasn't PowerPoint. I was able to do some teamwork with people I hadn't talked to before."

It is of note that one respondant strongly disagreed with each of the statements, then proceeded to provide positive comments saying that they liked the fact the game was "Intuitive, use of iPads, group activity and the questions were quite interesting". The participant responded "N/A" to the question asking what they liked least about SoG. Another participant strongly disagreed that they game had enhanced their learning experience, then strongly agreed to all other questions and wrote that they game was "Very good" and that they liked "The practicality of the game". Perhaps the structure of the questionnaire was confusing, or the participants did not read it carefully those two responses do not appear to make sense.

An unfortunate aspect of this study is that it has highlighted several flaws in the design of the game. In particular, a bug appeared that caused the challenge feature to be triggered at random for some teams. This interrupted the flow of the game and caused some teams to be disadvantaged. Another problem occurred where the scoring fell out of sync for some teams. This was likely due to the fact that classroom being used was not well equipped with wireless, unlike most other rooms used by courses in the programme. These two issues are the cause of almost half of the negative comments made by students.

Conclusion

The Shades of Grey game can be used in a classroom setting to engage students with the issues presented through ethical dilemas and motivate them to discuss and debate the best course of action with their team members. It enables a lecturer to easily create custom text-based scenarios and questions to tailor it to fit their needs. The majority of student perceptions indicate that SoG had a positive effect on their motivation, encouraged them to think critically, to discuss issues, provided them with immediate feedback and enhanced their learning experience. Most students felt that the game should be used more regularly throughout their degree and despite some technical difficulties they found playing the game to be a generally positive experience.

Limitations and Future Direction

The research team believes that the Shades of Grey game shows enough promise through the positive questionnaire results to continue with further development and evaluation. Both the study and the game itself currently have some limitations. The game is not yet robust enough to be made widely available and does not include any facilty for gather useful analytics data. It is also encumbered by several bugs which need to be addressed before it ca reach it's potential. The study itself was hampered by the use of a relatively simplistic evaluation tool which may have also been unclear for some respondants.

The team is actively seeking further research funding in order to develop the next phase of the game to fix existing bugs and to provide a more immersive depiction of ethical scenarios through the inclusion of multimedia. The intention is to enable the use of SoG at other institutions in order to evaluate its use in multiple situations. Further research is planned to apply an established educational games evaluation framework (De Freitas & Oliver, 2006) to the use of SoG in a range of contexts so that educators can make an informed decision on it's value in their context.

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Appendix 1

7209 Advanced Auditing Questionnaire Results

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	NA
Playing the Shades of Grey game has enhanced my learning experience			3	15	15	
Playing the Shades of Grey game has increased the amount of discussion in class			2	11	20	
Playing the Shades of Grey game has encouraged me to participate more actively in the class discussions			3	12	18	
Playing the Shades of Grey game has increased the quality of discussion in class			1	17	15	
The competitive nature of the Shades of Grey game encouraged me to aim for success in the game			3	11	19	
The Shades of Grey game allowed the lecturer to provide immediate feedback			1	13	19	
The challenge feature of the Shades of Grey game encouraged me to think critically about the feedback answers provided			5	13	15	
It is a good idea for Bachelor of Business courses to use the Shades of Grey game			4	13	16	

Advanced Management Accounting Questionnaire Results

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	NA
Playing the Shades of Grey game has enhanced my learning experience	2	5	8	22	12	
Playing the Shades of Grey game has increased the amount of discussion in class	1	4	2	21	21	
Playing the Shades of Grey game has encouraged me to participate more actively in the class discussions	1	3	6	24	16	
Playing the Shades of Grey game has increased the quality of discussion in class	1	3	10	21	15	
The competitive nature of the Shades of Grey game encouraged me to aim for success in the game	1		5	26	18	
The Shades of Grey game allowed the lecturer to provide immediate feedback	2		3	22	23	
The challenge feature of the Shades of Grey game encouraged me to think critically about the feedback answers provided	1	2	9	26	11	1
It is a good idea for Bachelor of Business courses to use the Shades of Grey game	2	1	5	17	23	2