Unpacking Student Perceptions of Board Game Mechanics

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Abstract: The boardroom challenge is a custom developed board game used as a formative assessment in an undergraduate business management course. The course forms part of an Accountancy degree which culminates in the professional designation of members to the South African Institute of Chartered Accountants (SAICA). Students are required to develop skills and competencies towards future membership of their professions professional body. To this end an industry employer and training company partnered with the University to develop students' business acumen utilizing gamified learning in the form of a custom developed board game. The boardroom challenge has taken place annually from 2015-2019 and commenced again in 2022 when Covid-19 regulations permitted. On game day students compete in randomly assigned groups of six with an industry game master at each table as a facilitator. Students and facilitators complete questionnaires after the boardroom challenge providing feedback and suggestions. Open ended feedback from 2015-2019 has been thematically analysed to evaluate perceptions on game mechanics. Game mechanics include rolling the dice to determine which scenario students need to address. During the game students have to answer theory questions or address scenarios, depending on what the dice causes their game piece to land on. Correct answers earn currency in the game and students display their new rank in the organisation with each correct answer. Moving up the salary scale tops out at CEO after which students can begin to earn shares. Turn taking is regulated by a timer, to ensure everyone has sufficient turns while industry based game masters make the final call on the appropriateness of answers to open ended scenario type questions. The board game generates great excitement and engagement from students with several preparatory activities scaffolded into tutorials before game day. Students' perception of the various game elements and mechanics indicate their evaluation is dependent on how they have conceptualized the impact of specific mechanics on their marks. As a mitigating factor, the data was gathered and analysed over many years.

Keywords: Game based learning, Gamification, Board games, Serious games, Management education, Game mechanics

1. Introduction

The focus of this article is a bespoke board game, this serious game was developed as a partnership between the University, an industry partner, and a consultancy company. The purpose of the board game, which is known as the boardroom challenge, is to function as a tool for instruction and assessment that develops students' business acumen. The boardroom challenge takes place once a year when all the enrolled students (between 350 to 550) participate, sitting six at a table with an industry expert game master. The students participate individually in the challenge, after a round of quick fire questions the winner picks the industry they will represent throughout the game. Next students conceptualise a company name and business card and they have to address the questions that arise throughout game play from the perspective of their company in the selected industry. Students roll the dice and have to respond to theory questions or contextual scenarios in the form of risk, enabler and world event cards. Their primary aim is to progress from accounting clerks to the CEO's of their companies, earning game cash with each correct answer and progressing to earning shares, whilst risking demotions and losing cash for wrong answers. As time has gone by iterative changes have been made to the board game rules as well as to the preparatory activities for students and training for game masters. In this article game mechanics as well as the development of serious games will be discussed in the literature review. An overview of the board games mechanics and their development as well as students perceptions of these mechanics follows, culminating in a discussion of insights gained and areas for future research.

2. Background

The undergraduate students that participate in the boardroom challenge are working towards a chartered accountancy qualification and ultimately membership of the renowned industry association, the South African Institute of Chartered Accountants (SAICA). The learning outcomes that students need to achieve in order to attain membership are well articulated and require members to be technically proficient ethical, critical thinkers (SAICA, 2019). The course in which the boardroom challenge takes place is an undergraduate business management module and in addition to module specific learning outcomes, students need to develop an understanding of the complex and multidimensional world of business that they are preparing to enter. The SAICA competency framework emphasized that as future chartered accountants they should have "business and entrepreneurial skills which make effective responsible leadership in the business context possible". The board game qualifies as a serious game due to the learning outcomes that students are intended to achieve

through their participation. The board game aims to play a role in developing the requisite skills which are also more broadly addressed by additional instructional initiatives in the course, including preparatory activities to support student readiness to engage proactively in the board game.

Figure 1: The business card where each student designs their company logo and records their performance

The board game was first developed and played in 2014, the authors involvement in facilitating and helping to evolve the board game started in 2015. From 2015 to 2019 the boardroom challenge took place annually, in person teaching was disrupted in 2020 and 2021 due to the Covid-19 pandemic and luckily the challenge could commence in person again in 2022. Student and game master feedback was solicited annually to inform updates and improvements for subsequent iterations. This article will focus on student perceptions of gameplay as they relate to mechanics. Part of the value of having a clear definition for game mechanics is so that it can be productively used to analyse games (Sicart, 2008), however the definition is also needed to productively inform game design. Consequently, the primary and secondary mechanics and their evolution merits investigation.

3. Problem Statement and Research Question

One of the primary purposes of developing and annually hosting the boardroom challenge is to develop undergraduate students' business acumen. A gamified approach was selected and the resultant board game is an experiential learning activity as well as an assessment. Based on annual student and facilitator feedback the matters that students raise as suggestions for improvement are focused on what they perceive will improve or optimize their grades. As students indicate they have had limited previous exposure to board games and gamified learning assessments their consequent concerns are with rule changes they perceive as beneficial. Adopting student suggestions influences game mechanics and presents an interesting dynamic to the game designers and facilitators. Students comment on what they experience and would like remedied, and the board game designers must conceptualise changes and updates with regard to operational considerations, such as the training of game masters and how much uniformity of play should be introduced relative to the desired customized learning experience. As a result, this article intends to;

Explore a board games mechanics, through the lens of student perceptions.

4. Review of the Literature

Games can be thought of as systems which include game mechanics, rules and challenges, in the course of playing the players develop agency and can also behave in unpredictable ways (Sicart, 2008). The literature review will discuss the definition of serious games and how players learn in the context of these games and conclude with a discussion on game mechanics.

4.1 Serious Games

At first glance the term serious games seems to be an oxymoron, but historical evidence supports the use of games for learning as an established idea (Ma, Oikonomou and Jain, 2011). One of the first definitions of serious games comes from Abt (1970) who describes serious games as having an explicit educational purpose and therefor the game is not primarily played for the purpose of enjoyment. According to Ma, Oikonomou and Jain (2011: p.45), "games are extraordinary learning tools and motivate players to explore the edges of their competence, their skills, and their knowledge". Consequently, the idea of learning in the context of games can be referred to as serious learning, finding its theoretical roots in the theory of transformative learning. Games create a possibility space, which not only sets the scene for transformative learning, but also encourages the development of agency and growing competence as players engage with the serious game.

While there is evidence that learning can take place during gameplay, the questions of what and how players learn through gameplay and the issue of pedagogical effectiveness has room for empirical support (Gee and Hayes, 2010; Ma, Oikonomou and Jain, 2011). Bateson (1972) describes learning as a relational phenomenon with logical levels. The levels of learning identified by Bateson (1972) were reconceptualised by Ma, Oikonomou and Jain (2011);

- Learning ***in*** serious games – involves linear interactions where players collect information about how the game works and then act and memorize.
- Learning ***through*** serious games – involves 'framing' and attributing meaning by interpreting the information gathered, in this context decisions are made between alternatives.
- Learning ***beyond*** serious games – this refers to an important aspect of serious learning where what is learnt in and through the game are transferred, transforming the players approach to future problems.

With regards to the evaluation of whether serious games helped learners achieve learning outcomes, O'Neil, Wainess and Baker (2005) concluded that the pedagogical effect of games was insufficient when not supported by educational instruction. In other words, instructional strategies that support learning outside the game, support learning in and through the game and especially beyond the game (Ma, Oikonomou and Jain, 2011).

4.2 Game Mechanics

Game Mechanics connects the actions of players to the purpose, and main challenges of the game. Game mechanics guide players interaction with the game world created during play (Sicart, 2008). Rouse (2005, p. 310) describes game mechanics as "what the players are able to do in the game world, how they do it, and how that leads to a compelling game experience". Cook (2006) explains that game mechanics are the system based on rules that enable a player to both explore and learn what is possible in the game by understanding the game properties though the games feedback measures. Järniven (2008, p. 254) relates game mechanics to player agency, taking experiences of gameplay into consideration, meaning mechanics "guide the player into particular behaviour by constraining the space of possible plans to attain goals". A further clarification comes from Juul (2005) who states that game designers need to create the mechanics that are used to interact with the game, which ultimately modify the game state. In this view, game mechanics are often designed to overcome challenges that can occur in the game state. A game specifies certain core challenges that players need to overcome and then the game designers have to create game mechanics that players can use to overcome these challenges (Sicart, 2008). Game mechanics interrelate and it is also important to consider the effect of game mechanics on players' experiences and emotions.

In some cases no distinction is made between game mechanics and game rules (Lundgren & Bjork, 2003). However, Avedon (1971) and Sicart, (2008) distinguish between game mechanics and rules. The rules of the game create possibilities for players regarding their interactions with the game. Games that use algorithms are in fact relating the rules of the game with game mechanics which result in game state changes as a result of the rules being applied (Sicart, 2008). In this description rules and mechanics can be observed to be related but distinct aspects of game design.

Games can have primary (core/central) and secondary mechanics and it can be valuable to distinguish them (Sicart, 2008). Primary mechanics help players to overcome central challenges in the game in order to achieve the primary goals of the game, whereas secondary mechanics influence player experiences and can add to the flow of gameplay but do not necessarily relate to core game challenges. Another interesting perspective is that of contextual mechanics. A game can be designed to map multiple mechanics to one action by players (Järvinen, 2008). By design games have desired end states that players are focusing their actions and agency on achieving and there are a set of core mechanics which are directed at supporting players achievement of the desired goals (Sicart, 2008) .

5. Methodology Utilised

Data was collected from 2015 to 2019, unfortunately, Covid-19 caused all assessments to move online for 2020 and 2021. The Boardroom challenge was held in person again in 2022 and data collection is set to resume in 2023 at the annual Boardroom challenge. A thematic analysis was conducted on the open ended question posed to students; "Do you have any other comments about 'the Boardroom Challenge' that you would like to

make?" The data included the researchers' reflective diary, including meeting notes and reflections about game changes, as well as rules and training material as additional data points.

5.1 Data analysis

The discussion of boardroom mechanics is based on document analysis, using the reflective diary, rules, annual changes and updates and training material for game masters and students as data. Student perceptions about game mechanics have been analysed using a thematic analysis, as outlined by Braun and Clarke (2006); the first phase involves becoming familiar with the data, in the second phase initial codes are created. The next step involves refocusing the analysis at the level of themes and then proceeds to refining the themes that have been identified. Once themes have been crystallised they need to be defined and named, followed by the final step of reporting on the results.

6. Findings and Discussion

The first part of this section will discuss the mechanics of the boardroom challenge taken from the documentary analysis, after which the thematic analysis of student perceptions will be presented.

Figure 2: The Boardroom Challenge board

6.1 A Closer Look at Mechanics – the Flow of the Game

The Boardroom challenge does prescribe goals, such as climbing the corporate ladder, from accounting clerk to CEO. As such player actions and the strategies they conceive within the boundaries of the rules are designed to achieve a higher job status in the game, ultimately earning shares once they have reached CEO status and earning game cash.

Mechanics involve player agency and how players interact with the game itself. As set out in the literature review, mechanics are designed to help players overcome challenges in the game and achieve desirable game outcomes. Accordingly, the **core mechanics** of the boardroom challenge relate to reaching the highest organisational position and earning game cash;

- Players can be promoted to higher levels
    - This mechanic relates to the analogy of climbing the corporate ladder. Players all begin as accounting clerks and through correct answers to risk, enabler and world event cards can increase their rank in the organisation (figure 3). Each organisational rank represents a salary level, which is factored into students' final score. Players cannot be promoted beyond CEO and correct answers after that final promotion enables them to earn shares. Players can also avoid being demoted by answering theory cards correctly.
- Points are awarded by way of game cash earned
    - Correct answers to risk, world event and enabler cards attract instant cash (alongside promotions) in the game. Incorrect answers to risk, world event and enabler cards result in forfeiting game cash. Correct answers to theory cards only earn or lose cash, not resulting in promotions.

The core mechanics stated above are also examples of contextual dynamics identified by Järvinen (2008), because a correct answer achieves both a promotion and earning game cash which help players achieve the ultimate goal of the game.

There are other elements to a game that also influence players interaction with the game state but are more accurately described as secondary mechanics (Sicart, 2008). These mechanics could be described by the rules of the game, although they are not synonymous with rules. Examples of secondary mechanics that are relevant for the flow of the game are;

- **A true and false quiz** to determine who picks their industry and rolls the dice first.
- **Designing business cards** (figure 1), to help students immerse themselves in the game by naming their company and outlining their core business. This allows students to contextualize their game play, for example if they choose the automotive industry, they can choose to be an electric vehicle manufacturer or a manufacturer of component parts, however all subsequent questions have to be answered from that vantage point.
- **Leaderboards** – around each table, each player has a card holder which displays their "chair rank" and organisational level to co-players
- **Reward systems** – In 2016 shares were added to the game for students to earn after reaching CEO status. Earning shares have an important impact on game day performance and grades as students have then achieved the primary goal of the game.
- **Loss aversion** – An update in 2017 meant that students can also avoid demotions after incorrect answers to risk, world event and enabler cards by correctly answering a theory question.
    - **Timers** – Another early frustration for students were untimed lengthy answers which slowed the progress of all players at a table. Facilitators also took their mentorship role seriously and gave plenty of feedback to answers, unintentionally slowing down players' and negatively affecting their marks. However, most students were unwilling to say anything to the game master as an older person with industry experience whom they did not want to offend. Thus the timing had to be communicated to students and formalized in the game master training to eliminate unintentional consequences and power dynamics. The use of timers was primarily instituted to ensure a game pace that optimized everyone's opportunity to increase their chair ranking and cash earned by having more turns.
- **Feedback systems** – In addition to displaying their chair ranking, there are also announcements on the day and small prizes awarded to the first students who achieve CEO status.
    - Customized feedback also comes from game masters at each table having the final say in whether an answer is correct and explaining why an answer may fall short and what students would need to address in order to 'get it right' next time. Not only is this an example of mentoring, it also plays a role in learning ***through*** and ***beyond*** the game (Ma, Oikonomou and Jain, 2011).
- **Lucky break cards** – the first two students that land on the pot of gold icons can receive lucky break cards. These cards provide immunity which students can use if they don't know the answer and want to avoid demotion. An interesting example of students using mechanics in unintended ways emerged as certain students held on to their lucky break cards hoping that they will count for marks (an unspecified outcome), instead of using those cards to avoid demotions or losing game cash (which students knew would result in lower marks).
- **Game masters** – employees of the industry company are game masters on the day, fulfilling a mentoring role and contributing towards the corporate social responsibility of their company. Originally one game master oversaw three to five tables, just checking in and advising. This left it up to students to decide if answers provided by their peers were accurate. Some students seemed to think that they need to "hold back" other players at their table in order to do well and sabotaged them by saying their answers were incorrect. To mitigate this risk, each table had a game master allocated who stayed with their table as the arbiter of whether answers are correct. Within the allocated time they could ask questions, giving students the opportunity to expand on their answer. If the answer was incorrect they could explain afterwards what elements students need to consider to get future answers correct. The explanation of the board game was also adapted to emphasize to students that they are each running their own race as hopeful CEO's of their respective industries.
- **Top ten gameshow quiz** – a formula is used to identify the top ten students on the day. Shares and cash are the two components that have a multiplier effect on student results in order to identify who makes the leader board. The top ten participate in a gameshow like quiz where the ultimate winner is the student who answers the most multiple choice theory questions correctly. Students final course marks are calculated using a slightly different formula which weighs the elements they have the most

control over highly and benchmarks their performance to the average performance at their assigned table (to take contextual elements of gameplay into consideration).

Figure 3: The types of cards students receive in the game

6.2 Thematic Analysis

The codes over the years of data collection were aggregated into three themes which can be seen as different ways of experiencing the board games mechanics. The themes are presented visually in figure 4 and could be considered an evolution of student perspectives, from being caught in the minutae to focusing on the bigger picture, although admittedly not all students expressed all these sentiments.

Theme 1: When luck is on your side…or not

The board game board contains the icons displayed in figure 3 and a roll of the dice determines the scenarios students have to address during their gameplay as they pursue promotions and earning game cash. A consistent aspect of feedback over the years relates to experiences of luck being an unfair dimension of the game, having a limiting effect on their marks. Some sentiments relate to the gamified equivalent of the student adage, "I knew all the answers, you asked all the wrong questions". Examples typifying student sentiments follow;

2015_8 "I don't think its correct to test a persons' knowledge by the role of a dice because some cards had more money earnings than others"

2015_13 "It should not count for marks as this is an unfair way of testing whether a student understands and remembers the work"

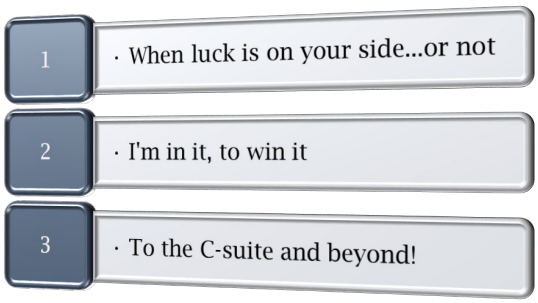

Figure 4: Overarching themes

2015_36 "(I) felt the boardroom game was not really fair on me as my success was dependent on the people in my group whom in my opinion (I) felt they were very selfish"

2017_38 "It would be much more fair if the whole game was based on theory only, because not everyone has the ability to think under pressure and provide logical answers about world event, enabler and risk questions in just 1 minute. Hence I feel the mark received I will not be a true reflection of my knowledge"

2017_52 "The facilitator was too observant. People crashed my points in order for them to win."

2019_19 "I feel that the game should not be based on the luck of where you land or constrained by time in order to get to the top 10"

2019_58 "Some people ask follow up questions so that they can only crush you and not that they would really like to know the response."

In 2015 the most feedback was received about unfairness. Iterative improvements are made every year and the frequency of these concerns have decreased as a result of game master training updates, and rule changes as well as adjusting the weighting of different components as they relate to student marks.

Theme 2: I'm in it, to win it

While theme one comments aligned more with an extrinsic locus of control, another category of student feedback revealed a different perspective, highlighting student agency. While students still highlighted aspects of concern, they were more focused on providing suggestions for improvement. Some suggestions showed that students had moved beyond the abstract game experience to think about how certain mechanics function and how they could be 'fixed', aligning with Ma, Oikonomou and Jain's (2011) phase of learning *through* serious games;

2015_2 "It was really a fun day, maybe the instructions can rather be made into an instruction video with a basic or small demonstration on how to play the game instead of having the facilitators explain the rules and how the game works."

2015_14 "Please include a TIME LIMIT to questions because one's success ultimately relied on how many opportunities one had to gain money."

2015_15 "I think the facilitator should have the say on the whether the answer is correct or not. The reason for this is because the people in the group may be more lenient or more critical than others, therefore disadvantaging them."

2015_22 "I would suggest, that the risk, enabler and world events have a few bullet points as guidelines for answerers and that a time limit is set for each answer."

2017_138 "I think it should be stressed enough that people should study for it and people should be t(au)ght how to think when faced with the challenges in the game one lecture before and after the game"

2018_21 "It would be much more interesting and very easy for other students to earn more points if they can volunteer to answer the question of others if they are unable to answer."

Theme two started to reveal students' awareness of game dynamics and the positive tone of their suggestions that would benefit their peers in future intakes.

Theme 3: To the C-suite and beyond!

Students clearly had different levels of awareness about game mechanics. Many students were 'in the moment' focusing on what Ma, Oikonomou and Jain, (2011) describe as learning *in* and eventually *through* serious games. However, some student feedback revealed reflections about lessons learnt through the game and their potential future relevance, referencing learning *beyond* the serious game and hopefully sentiments showcasing transformational learning;

2015_20 "The board game made me realise how valuable the theory we learn in class is in the organisation and changed the way (I) viewed commerce completely. (I) now understand its importance and will try to understand more than learn the information for an exam situation."

2017_21 "What made playing the game a great learning experience is the fact that whenever an answer was not adequate, afterwards our facilitator would explain to us how she would've solved the

particular scenario and the contributing factors she would've considered in real life. This made the experience a lot more fruitful."

2017_87 "The game created a very big difference in how i think and made me realise how important it is to fix my attitude towards life."

2017_161 "It taught me the importance of being broad minded and how to face my opponents even though I felt intimidated by them."

2018_35 "The boardroom challenge help me to communicate with people I never talked to and it taught me that in the outside world communication is a main source to help someone who is a businessman or business woman solve complex problems."

2019_30 "It was a great learning experience. It forced me to think out of the box, as well as forced me out of my comfort zone, which is something I really liked."

7. Ethical Considerations

Ethical clearance was granted by the University. While all students were asked to provide feedback, only students who consented to their responses being analysed form part of the sample and their feedback was anonymized. A link to the questionnaire was hosted on the learning management site and students could respond at their own convenience and were not compelled to provide feedback.

8. Limitations

The questionnaires that students and game masters completed are subject to self-reporting bias. Students with strong opinions about their experience and consequently the influence of the Boardroom challenge on their marks were most likely to complete the questionnaire. This implication is mitigated by the feedback being collected from cohorts across multiple years and the researchers' reflective diary as an additional data point, providing another source of data triangulation.

9. Suggestions for Future Research

Measuring learning ***beyond*** the board game can lead to deeper insights into how to better prepare students for the world of work and the extent of transformational learning that has taken place. A focus group with game masters who participated in the game as students and are now working with the industry employer, could also provide insights into the extent of transformational learning.

10. Conclusion

Gathering and incorporating annual suggestions for improvement provide an interesting lens for how game mechanics are experienced. Interestingly, in student feedback the different phases of learning ***in, through*** and ***beyond*** serious games could be identified. More reflective feedback by students, exemplified in theme two, also made suggestions for game improvements, revealing development of student agency. Analysing game mechanics through the lens of core, secondary and contextual mechanics was also revealing, as the core and contextual mechanics clearly related to the primary challenge of the board game, climbing the corporate ladder.

References

Avedon, E.M. (1971). *The structural elements of games*. In Avedon, E.M. & Sutton-Smith, B. (eds.) (1971), *The study of Games*, New York: John Wiley and Sons.

Braun, V. and Clarke, V. (2006) "Using thematic analysis in psychology", *Qualitative Research in Psychology*, Vol. 3, No. 2, pp 77–101. DOI: 10.1191/1478088706qp063oa.

Cook, D. (2006). *What are game mechanics?* Available at: http://lostgarden.com/2006/10/what-are-game-mechanics.html

Gee, J.P. & Hayes, E. R. (2010). *Women and gaming: The Sims and 21st Century Learning*, New York: Palgrave Macmillan.

Järniven, A. (2008) *Games without frontiers: Theories and methods for game studies and design*. Available at: http://acta.uta.fi/english/teos.phtml?11046

Juul, J. (2005). *Half real: Videogames between real rules and fictional worlds*. Cambridge, Massachusetts: The MIT Press.

Lundgren,S. &Björk, S. (2003). "Game Mechanics: Describing computer-augmented games in terms of interaction". *Proceedings of TIDSE 2003*, pp 45-56. Available at:http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.13.5147

Ma, M., Oikonomou, A. and Jain, L. C. (2011) *Serious Games and Edutainment Applications*. London: Springer.

O'Neil, H.F., Wainness, R. & Baker, E.L (2005). "Classification of learning outcomes: Evidence from the computer games literature". *Curriculum Journal*, Vol. 16, No. 4, pp 455-474.

Rouse III, R. (2005). *Game design theory and practice*. Plano, Texas: Wordware Publishing Inc.
SAICA. (2019). “Competency framework detailed guidance for the academic programme: The initial test of competence”, pp 1-228. Available at: https://www.saica.co.za/LearnersStudents/Examinations/Informationonwhatwillbeexamined/CompetencyFramework/tabid/780/language/en-ZA/Default.aspx.
Sicart, M. (2008) "Defining Game Mechanics", *Game studies*, Vol. 8, No. 2, pp 1–21.