Work, Costs and the Unexpected in the Academic's Creation and use of Games and Simulations in Teaching and Learning

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Abstract: Experiential teaching and learning activities such as games and simulations are increasingly popular in management education. The research has evolved specific clusters of concerns, principally; correlates of performance, the effectiveness in management courses, and what they can possibly teach. However, O'Flynn (2021) states that "the teaching viewpoint has been widely neglected." In management education research, costs, human or financial, of games or simulations, specifically towards the creator, the academic do not seem to be considered. Recent systematic reviews show the literature prioritising the effects of experiential learning, games or simulations and 'future research' guidance calling for more of the same. This leads to a simple research question "What are the actions, unexpected events, costs and risks in using experiential teaching and learning techniques, from the lived experience of academics?" This paper uses data from a British Academy of Management/Management Knowledge & Learning Division-funded project into the lived experience of management academics creating and using games and simulations. It presents an analysis of three cases that exemplify the categorisations created by this research to uncover costs, risks and emergent events that are generally unreported by the serious games and simulation literature.

Keywords: Simulation, Game, Management education, Lived experience, Academic

1. Introduction

Experiential teaching and learning activities such as games, simulations and practical activities are increasingly in-demand in management education. Chernikova et al. (2020) make the point that "real-life situations do not always provide enough practice opportunities…" Therefore, teaching and learning activities that can approximate to real-life in some way are desirable. This is where learning games and simulations come in. The role of simulation in management education is "…a simplified and contrived situation that contains enough verisimilitude or illusion of reality (or sufficient correspondence to the phenomena it purports to represent)" (Keys & Wolfe, 1990), so as to provide "interaction with a real or virtual object, device, or person and the opportunity to alter the flow of this interaction with the decisions and actions made by learners… to engage novices in practices that are more or less proximal to the practices of a profession." (Chernikova et al., 2020). Teaching that integrates 'doing' is valued by employers, academics and students alike (O'Flynn et al., 2021; Bradford, 2019; Wurdinger and Allison, 2017; Tomkins and Ulus, 2016). This situation has been lent a new imperative since the advent of ChatGPT and now the quest for teaching and assessment techniques cannot be corrupted by it. The cases of game creation and use here are all around strategy development and decision making. They develop discipline specific skills such as in the use of strategy tools, transferrable skills such a teamworking and also support the learning outcomes in terms of giving immediate opportunity to practice with the concepts communicated in the teaching programme.

The main research considerations in the literature in games and simulations in management higher education, according to Faria (2009), are; correlates of simulation performance, the effectiveness of business simulation/games in strategic management courses, and what business games teach (i.e. deFreitas, 2006; Kiili, 2007; Mayer, 2012). Recent systematic reviews e.g. Connolly et al. (2012), Chernikova et al. (2020), Manzano-Leon, et al. (2021), Subhash and Cudney (2018) and Zainuddina, Z et al (2020) tend to show the literature continuing prioritisation of the beneficial effects of experiential learning, games or simulations and 'future research' guidance calling for more of the same.

There is little on the lived experience of the academic that creates or uses these kinds of teaching and assessment technique and nothing on the costs and risks to them of doing this. Vlachopoulos and Makri (2017) metareview is rare in explicitly highlighting the importance of the "instructor's role as facilitator and motivator" in games and simulations. The creation and use of experiential learning techniques involves motivations, actions, unexpected events, personal costs and risks and is certainly not costless. Direction in the research for creating and using games and simulations seem to be normative statements on what academics should do in, rather than being based on recognition of what they do. The consequences of this under-research are that the academic is open to uncontrolled risk, which reduces the sustainability of games or simulations – in terms of avoiding wasteful-consumption of resources and in creating practices that can persist in use beyond the creator.

This leads to a simple research question "What are the actions, unexpected events, costs and risks in creating and using games and simulations, from the lived experience of academics?" This paper uses data from a British Academy of Management/Management Knowledge & Learning Division-funded project into the lived experience of academics creating and using games and simulations. It covers 13 cases of use of use of digital, in-person and mixed media games and simulations from classes of 350 to individual learners. This paper presents an analysis of three cases that exemplify the categorisations created by this research to uncover costs, risks and emergent events that are generally unreported by the serious games and simulation literature.

2. Brief Literature Review

Keys & Wolfe (1990) stated that, "second to the quality of the simulation itself, the administration of a game is probably the most important factor associated with a game's success." They also identified 'administration by the instructor' as a major gap in the literature around simulations. Fifteen years later, Arundell & Cioffi (2005) noted a research gap in practicalities of "preparing and implementing simulation in the classroom." More recently, there have been attempts in the literature to obtain the perspectives of academics using experiential education techniques. For example, Lund Dean and Wright (2017) with their experience of integrating experiential learning activities and methods in large classes. Tomkins and Ulus (2016) present a brutally honest account of their in-class performance. McCollom (1992) presents a first-person critical account of boundary setting in experiential education, dealing with challenges from colleagues and students. Jaaska and Aaltonen (2022) asked specifically "What are the benefits and challenges for teachers of applying GBL methods in project management education?" Hernández et al. (2010) identified roles of an instructor in simulations/games. Lameras, et al. (2016) gave very brief consideration of the teacher role in game activity. Wright et al. (2018) present a rare critique of the experiential learning concept regarding the ethics of academics in developing and using experiential education techniques. However, none of these look at how academics experience the creation and use of their games or simulations, the unexpected events, risks and costs.

Medical and legal education are important contributors to literature on the use of simulations. However, there too, there is little identification of the social, intellectual and physical resources required to develop a simulation. Through a systematic review, Zendejas et al., (2013) pointed out that even though researchers mentioned the term 'cost-effectiveness', there are no reported cost-effectiveness analyses. In legal education Ellmann and Kruse (2015) note that there are few specific comparisons of costs and benefits in experiential learning. Costs and risks in simulation literature are often conflated and obscured. Auman (2011) claimed to examine costs, but no actual costs are shown. In Mozier at al. (2006) it was found that main challenges arose from tangible resources - finance, physical and technological infrastructure, materials and academic support services; Intangible resources such as personal creativity and time; technical problems; student reactions; loss of control by the academic instructor over student learning. In reviews, risk is rarely named, instead talk might be of 'disadvantages' or 'unintended' events or outcomes. Any talk of cost or risk are mostly oriented towards the students, but some do consider those pertaining to the academic. Moizer et al. (2006) pointed out that simulations are more resource intensive during the development process, hence cost could be a barrier of developing simulations. Maloney and Haines (2016) show that the economic evaluation of the use of a finite resource should cover the question – "what is it that is being obtained, what do you need to give up to get it, and how does that compare to what you get with the next best alternative?" For those enthusiastic for experiential learning techniques, there could be a lack of enthusiasm for this question. Innovations and satisfaction could be threatened by a negative appraisal.

A project management life cycle can be a useful device for categorising the phases of the development of an artefact such as a game or simulation, such as Pinto and Slevin (1988) model of conceptualisation, planning, execution and termination stages. In education contexts, through their content analysis, Stewart, Denholm and Blackwell (2016) summarised the life cycle of developing simulations from three cases: initiation, development, in-use, on-completion. Cha and Maytorena-Sanchez (2019) pointed out that different efforts and competences are needed at each phase in a project life cycle due to different needs being targeted. Actions, unexpected events, costs and risks in creation and use of games or simulations can be set against these and such a categorisation also allows for comparison between cases of creation and use.

3. Methodology

In order to answer the research question, a purposive sampling of academics was made in order to maximise the available number of cases studies of the creation and use of a game or simulation. All participants, after agreeing to participate, were sent an introductory document featuring an explanation of the creation lifecycle

(see table 1) to help them order their memories. This lifecycle has been used in previous work by the author. There are alternative game design cycles, such as the iterative and complex GAMED methodology (Aslan and Balci, 2015), or Ramadan and Widyani (2013) and Roedavan, et al. (2021) GDLCs which are all based on the creation of a digital game. The lifecycle used here lifecycle is not limited to digital games, it also covers creation and use of in-person simulations and mixed-media simulations. The lifecycle is generally consistent with typical GDLC of pre-production, production, testing, and post-production. However, it goes into greater detail from the creator's point of view, from ideation through development to use in context, particularly integration into teaching and the wider organisation. It also focuses on the work of the academic throughout as they not only manage the game but also, teach. It is a tool for recall as much as it is a method for creation.

Table 1: The Work Lifecycle

Creation and Use Phase	Abbreviated description of Phase
Initiation Phase	The events or activities that put your mind onto innovating with a game or simulation This also includes preparing or negotiating with the institution for its use, consideration of learning outcomes, thoughts about integration with the wider teaching & learning programme and organisation.
Development Phase	The actual creation of the game or simulation, including activities to put it into use. choices about its degree of 'reality', activities, speed, tolerance and the integration or materialisation of the design into its physical aspects.
In-Use Phase	Students perform the work of the game, simulation or experiential activity and the lecturer works around it to ensure that it functions as intended. The intended learning outcomes may be obtained.
On-Completion Phase	All activities that have been designed to take place after the use of the game or simulation to ensure that learning is completed, obtaining student feedback, preparing for further use.

Data were gathered using a mix of guided email response and interview. As they recalled their experience in a systematic way, their mind was centred on three things of specific interest – 'normal tasks' in the work of creating or acquiring then using a teaching game or simulation, emergent or unplanned events in creation or use and then costs:

- Activities intrinsic to the nature of what you were doing, that were expected as part of the work
- Challenges that you were surprised by, that were unexpected and presented themselves in the course of the work. A 'challenge' is neither negative nor positive, it is simply an unexpected issue that presents itself in the course of performing the work, that requires response from you. It is a stimulus to action.
- A cost is what is given up or lost either in performing the expected and intended activities, or in making a response to a challenge.

Of the thirteen cases, three were selected for use in this paper. The cases were subjected to content analysis and categories emerged that were grounded in the data, rather than imposed from a theory or particular piece of literature. Ethical issues were around quality of recall, effects of disclosure and anonymising participants. The three cases selected for analysis are:

Case 1 – This was a case of an academic purchasing a simulation for use in an executive development programme. The simulation was to teach strategic management concepts, particularly the deployment of strategy through projects. He had no previous experience of using management simulations but knew that they were popular in business schools. He was connected to the CEO of a simulation creation company. He worked in a quite conservative culture so he knew to channel the resistance and questions his senior colleagues were likely to have, at the first meeting. He felt exposed to possible criticisms of the validity, credibility and legitimacy of his course. His case is marked by the social labour that had to be performed and the resistance from parts of his organisation, with one particular stakeholder actively diverting support resources from him. The actual work involved in running the simulation was lightened by the relationship that he had built with the CEO of the

simulation company and the collaborative attitude of the CEO in allowing him to shape it to the needs of his students. He was also aware of his personal brand and the brand of his institution and what leverage these gave him, also what success or failure would mean to those brands.

Case 2 - This was the case of an academic who had previous contact with management simulations whilst an employee of a leading aero engineering firm, on leadership development courses. After becoming a lecturer, he was asked to help facilitate a simulation on an MBA programme. However, he felt that the business simulations he had experienced were too simplistic and could easily be manipulated to 'win'. Therefore he decided to design his own. It was based on the design and engineering of a jet engine and the processes required to innovate and take it to market. It took time to design and there was no workload allocation for it, but he did not mind, because he enjoyed the work. The simulation was based on his own work experience and he was keen for students to not see it as a 'game' to be won, but an opportunity to address real life business challenges. There was considerable labour in supporting the simulation to move it along. Students needed to see the market reaction to their decisions, and the results of their competitors, before making the next set of decisions. A key part of the simulation was to be based on collaborating and competing against 3 other teams in the room, as in real life. He was surprised by how some students still found ways to manipulate the simulation and use the in-person relations between the teams in the room. It drove further innovation. He was clear on wanting to create something unique to him for his 'personal brand'.

Case 3 - This was the case of an academic who created a simulation based on an idea suggested to him by a student, following an intensive three-day programme built around a case study – why could the case study not be turned into a playable game? It was based on the historical case of Honda entering the USA for bike sales in the late 1950s, meeting with emergent events that transformed their strategy from the sale of large bikes to small ones, which finally established the brand in the USA. With this moment of inspiration, the game logic was quickly established along the lines of the story in the case. Additional research was needed to create all of the required variables, such as historically correct options and prices and how these could be assembled into an Excel sheet and made playable. The win condition was easy to determine – stay alive and win in the face of emergent events, as in the case study. A powerpoint was created to run alongside it to carry the narrative. However, in early tests, the simulation was too harsh and almost impossible to win, even for the creator. So, it had to be relaxed. There was no particular resistance to the innovation as the teaching module was entirely his. At first use, he was surprised and slightly embarrassed at the loopholes that students discovered, going back in time using the spreadsheet and running parallel universes to test out different choices. Students responded well to the simulation, but time taken in correcting flaws and in supporting the students to assimilate the instructions and routines of play meant that the debrief was compressed.

From the three cases, categories of activity, unexpected issues and costs across the game/simulation development and use lifecycle can be extracted as below.

4. Findings

Initiation phase

Normal events here included moments of inspiration from intentionally thinking back over the personal past or concerns with existing simulations or teaching activities. Existing solutions may be considered. There are immediate concerns with social relations within the academics context – seeking relationships and managing stakeholders, even before any development work is done. Game/Simulation mechanics are considered in parallel with pedagogic concerns. Unexpected issues emerge from seeking those organisational relationships, unexpected help or resistance emerges early. Tension between what is desired and what is actually possible manifests early and the work to integrate pedagogic concerns with game mechanics can reveal unexpected new information. Costs include Non-labour direct development costs, cost of materials, the paid cost of labour and unpaid voluntary work (hidden labour).

Development phase

The social work of seeking relationships and managing organisational stakeholders continues. Now the unpaid work on the simulation/game has to be balanced with existing work commitments. The tension between Game/Simulation mechanics and parallel pedagogic concerns continues, drawing in research, the developers personal past and new relationships. Within this tension are concerns over verisimilitude, delivery mechanisms or channels, integration with the wider teaching programme, integration with assessments. Outputs are now born from the materialisation of the ideas, viable products and support documentation, which are subject to testing or piloting. Deadlines and time constraints are manifest. Unexpected issues emerge from all of these

normal activities that continue to shape the game/simulation. Inspiration moments also emerge from this tension. Costs continue as before but as the ideas are now materialised, there are materials costs, with the additions of costs from negative relationships with others, meetings, investments and acquisition of specific resources such as licences.

In-use

The movement of the created object from the safe confines of the academic to the reality of the classroom involves labour. There is physical and mental/emotional labour. Interactions with students include facilitation, informational exchange, monitoring of their behaviour. Interactions with fellow academics or facilitators may occur in training and then running the game/simulation. Work is done to maintain integration with the wider teaching programme and to ensure any element required for summative assessment is delivered. There are tensions with time, which may run faster or slower than expected. Social labour with the organisation and stakeholders continues. Unexpected events arise from the normal work, specifically student behaviour being inconsistent with the instructions or operation of the simulation/game, also inconsistent behaviours from facilitators. More training might be required. Some unexpected developments might arise that are not necessarily problems – students can have useful insights, some features of the simulation might be more powerful than intended. Negatively, limitations of the simulation can be revealed in use, or errors are identified by students, emergency work by the academic or fellow facilitators is required to maintain the operation. Costs continue as before with the additions of physical/emotional/mental cost to the academic, labour also rises as problems require fixing outside of classroom hours. Time pressures can exacerbate all of these.

On-Completion

The completion of the simulation/game involves much the same labour as in-use. However, there are some distinctive works around debriefing. Feedback comes from students or organisational stakeholders through planned formal channels. Work is done to ensure integration with the teaching programme and the summative assessment. Unexpected events arise from how the simulation ends and the debrief. Feedback from students and organisational stakeholders can come from outside of the formal process. This can generate unexpected work in the debrief, but also it can be positive, leading to ideas for development. Successful completion can create opportunities to expand the game/simulation to other parts of the organisation. Completion that is less than successful can lead to impact on physical/emotional/mental state of the academic. Completion also marks the end of student activity, causing possible disengagement through relief, fatigue or excitement, before the debrief. Even in normal working, the fatigue created can impact on the debrief. The debrief can also be crashed by time constraints, especially if the simulation required unexpected works during use. The debrief can also be affected by the same unexpected events during in-use, especially students and facilitators not behaving according to the instructions. The costs remain the same as in-use.

5. Discussion

The Stewart, Denholm and Blackwell (2016) lifecycle of simulation development was sufficient to help respondents systematically recall their experiences and as a basis for categorisation of those.. The effects of social relationships are present throughout the lifecycle. However, O'Flynn (2021)'s comment that creation of experiential activities is done by lecturers creating together was not borne out by the cases. The participants appeared to act alone from the moment of inspiration, initially in an artisanal mode, with academics drawing from their personal histories and concerned about their 'personal brand'. Concerns with existing provisions are noted and those who are part of the existing provision might also be resistant. Consistent with Wright et al. (2018), there was no talk about ethics. Physical actions needed for both normal operations and emergencies in the mechanisms of the activity, resources or organisational context, lead to fatigue and inconsistent performance from the academic or facilitators. This is consistent with Tomkins and Ulus (2016) calling such innovating "a gamble one makes with one's body and one's self". Moizer et al. (2009) pointed out that simulations are more resource intensive during the development process, but in the data here it appeared to be at in-use phase.

In terms of costs, actual cash sums were hard to obtain. It was the first time that participants had been asked to consider this, which would suggest that the lack of cost and benefits analysis in the literature reflects reality. Costs that were obtained bore little relation to each other. It seems that the challenges noted in the literature review from medicine in Maloney and Haines (2016) hold true here, that diversity of techniques and variations in stakeholders, make generalisation difficult. The amount of unpaid labour was notable as was the human cost of dealing with negative relationships as the creator encounters resistance, inconsistent behaviour and the

limitations of their designs. Creations may start at an individual level, but to become part of an organisation requires interaction with others, eventually in meetings. The cost of meetings in the development of experiential techniques is not considered in the literature.

All other normal events and most of the unexpected events are consistent with Moizer et al. (2009), 'challenges', however there are some that are new to the literature. For example, the social work that must be done to build a lasting practice, to overcome resistance and the ways in which organisations can push back against the innovator. The limitations of testing - the test is still a work of the creator and under their control, with tacit compensatory work-arounds , but in use, the technique is truly exposed and used by people without an automatic love of it or the workarounds. Through the unexpected events, a categorisation of risks also becomes apparent, though not all unexpected events are risks, some are opportunities. Students finding errors or responding to elements in an unexpected way may indicate where improvements to instructions or operations could be made. Negatively, this can develop a bad attitude towards the activity and stress for the academic and evidence for those who would resist the innovation. Especially this is so where facilitators might give students clashing information, causing uncertainty. This forces the academic to act to correct under time pressure. The problem with planning for the risks identified here is that their true nature may not be revealed until the activity has achieved such scale in development or use that it arouses reactions to both the creation and the creator. Until that point, the game/simulation is someone else's problem.

6. Conclusions

This paper has presented a sample of findings related to our research question "What are the actions, unexpected events, costs and risks in using experiential teaching and learning techniques from the lived experience of academics?" The findings from the three cases show that intended actions of creation move the academic along in a process of creation where tensions between pedagogic concerns and game/simulation logic change into tensions between intentions and material reality. These are revealed in-use and unmanaged risks can manifest as unexpected events and generate costs. These costs can be generally categorised, but finding precise financial data was not possible. It is the intention of this research to reduce the 'unknown unknowns' that an academic developing a teaching game or simulation might discover. It also centres the academic's lived experience in creating and using games and simulations in teaching and learning, which is rare in the literature.

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