Gamification of e-Learning: An investigation into the influence of gamification on student motivation

by

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Abstract

Traditional teacher-centred learning is being confronted by an increasing awareness of the value of student-centred learning. E-learning, despite its limitations, is often presented as a solution to learning challenges prevalent in teacher-centred learning since it affords students greater control of the learning process. Combined with this, academics are increasingly competing for students' attention and struggle to motivate students. However, students, when confronted with the array of games and social media platforms available, willingly dedicate several hours glued to their screens socialising, engaging and gaming. Such willingness to engage these so-called distractions whilst displaying reluctance to engage their academic work may be attributed to a lack of motivation. This is even more prevalent in the domain of e-learning.

Adopting an embedded mixed methods case study design, this study explored the influence of gamification of e-learning on motivation. Herein, expectations and factors influencing experiences of gamification of e-learning were explored. Furthermore, through Self-Determination Theory (SDT) & Intrinsic Motivation Inventory (IMI) as theoretical lenses, this study explored how gamification of e-learning influences motivation. Gamification is conceptualised as an objective-driven user-centred technique which integrates game mechanics, dynamics and game aesthetics into real-world contexts to motivate behaviour. Gartner envisages that by 2020, gamification will be deeply integrated into the prevalent higher education structures. Whilst many applications of gamification aim towards enhancing classroom-based learning, the exploration of gamification of e-learning in higher education, particularly in a developing country, remains an emerging domain of research.

This research found that participants experienced gamification and various game elements differently, based on their BrainHex gamer profiles. In terms of SDT, whilst progression through the gamified course was guided and consistent, with all participants progressing as a single group, they experienced a sense of autonomy. Participants also experienced a greater sense of competence and relatedness in engaging with the gamified course. In the context of IMI, participants' experiences suggest that gamification was valuable, increased curiosity and was effective for learning. However, they reported experiencing tension and a high degree of effort required by the gamified course.

Students expected transparency in terms of scoring and raised queries where required. They generally preferred visual cues whilst engaging with the gamified course, expected almost real-time feedback in terms of scoring and resolution of queries, but had varying views on which game elements motivated them. Essentially, it was found that gamification positively influenced participants' motivation. However, it must be noted that whilst gamification motivated students, some experienced demotivation. Contributing factors include not understanding the game from the outset, being demotivated by not earning frequent rewards and losing progress in the game due to external factors.

Keywords: e-learning, gamification, motivation.

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1. CHAPTER ONE: INTRODUCTION TO THE STUDY

1.1. Introduction

Since the inception of e-learning, enrolment rates in e-learning courses are increasing. Coupled with this is an ongoing decrease in retention and completion rates, with dropout rates ranging between 40% and 80% (Bawa, 2016). In essence, whilst e-learning presents a multitude of opportunities, it is also confronted by obstacles which relate primarily to motivation. These obstacles contribute to poor retention and completion rates, and a lack of engagement (Karnad, 2014; Lee and Hammer, 2011; Zhang, Zhao, Zhou, and Nunamaker Jr, 2004). If ignored, these obstacles could negatively influence the sustainability of e-learning and its evolution in the future (Hill, 2012).

Various interventions have been explored, with varying degrees of success, towards overcoming these obstacles. One such intervention is gamification. Whilst research into gamification has been gaining momentum over the past few years, there remains many unexplored avenues and unanswered questions (Nacke and Deterding, 2016). One of these avenues, which is explored in this study, is the influence on gamification of e-learning on students' motivation.

The first chapter in this dissertation commences by providing the background to this study whilst briefly introducing gamification as an approach to enhance students' motivation. Thereafter, the motivation for the study is highlighted. The problem statement and research questions are then outlined. Once the aim of the study and objectives of the study are identified, this chapter proceeds to reflect on the unique contribution of this study whilst acknowledging the limitations. Experiences of the research which give context to this study are then shared. The chapter concludes with an outline of this dissertation.

1.2. Background to the study

Gamification may be described as the utilisation of game design, game dynamics and game mechanics to engage and motivate people in non-game contexts (Burke, 2014; Iosup and Epema, 2014). Organisations across the globe use gamification both internally and externally. Internal organisational applications range from employee training to motivating sales teams (Burke, 2014) whilst external applications extend from enhancing marketing and brand awareness to encouraging client engagement and loyalty (Burke, 2014).

Industry research into gamification has gained prominence in recent years. In 2011, gamification was highlighted by Gartner as a trend with an expectation that more than 70% of the world's largest organisations will adopt gamification elements within an application by 2014 ("Gartner Predicts Over ", 2011). Despite the expected growth, caution was extended, in 2012, by way of a projection that 80% of gamified projects would fail by 2014, primarily due to poor design ("Gartner Says by 2014," 2012). Notwithstanding this, they further projected that, by 2020, gamification will increasingly

influence domains like innovation, employee performance, technology-driven education, personal development and customer engagement (Burke, 2012).

In the field of education, gamification has been integrated into various teaching and learning activities from pre-primary level through to tertiary level. In higher education, gamification has been proven to have the potential to provide extensive benefits (Nacke and Deterding, 2016; O'Donovan, Gain, and Marais, 2013). These benefits include, but are not limited to, an increase in class engagement, reduced absenteeism from lectures, an increased understanding of content and ultimately, an improvement in student performance (O'Donovan et al., 2013).

While the application of gamification to university courses is more recent in terms of its technological implementation, the concept of challenges, levels and badges is essentially a metaphor for what has been in existence for hundreds of years. If one were to consider the current process of obtaining a tertiary qualification, individual examinations are passed (quests or challenges) across a number of years (levels) to yield a certificate (badge of honour) (O'Donovan et al., 2013).

Through these arguments, it has been suggested that gamification has the potential to make this metaphor more explicit and more immediate thereby motivating students and encouraging engagement. While this has been achieved in the past using various non-technological methods, the prevalence of online social gaming and various learning technologies provides opportunities for gamification to be extended and applied to e-learning environments (Johnson, Adams, Cummins, Estrada, Freeman, and Ludgate, 2013).

1.3.   Motivation for the study

With the rapid advancement of technology and the pervasiveness of Internet and cloud-based services, e-learning has emerged as a potential solution to many of the issues faced in classroom-based learning whilst driving a shift from teacher-centred learning to student-centred learning (Zhang et al., 2004). These challenges include a lack of adequately skilled teachers, scarcity of teaching resources and the inability for students to engage with course content whilst receiving support at a pace suited to their individual learning abilities (Boxser and Agarwal, 2014). It may be argued that the most widely debated e-learning challenges centre around motivation and include a lack of student engagement and high dropout rates (Karnad, 2014; Lee and Hammer, 2011; Zhang et al., 2004).

The urgency for solutions to overcome these challenges is driven by arguments that recent approaches, like massive open online courses (MOOCs), which has its roots in e-learning, will significantly alter the existing structure of higher education institutions in the future (Vardi, 2012). Within the South African context, the climate of the #FeesMustFall and other student protests forced institutions to suspend face-to-face lecture sessions. To regain lost lecture time, institutions resorted to providing resources to students through e-learning platforms or learning management systems

(Bornman, 2016). Whilst this was seen a contingency measure, it also presented a potential benefit of exposing students to e-learning tools. Aside from this, the researcher believes that it further escalates the level of urgency associated with addressing the existing challenges. Furthermore, the sustainability of adopting e-learning, particularly in the longer term, may be threatened if challenges are not addressed.

Since gamification has the potential to motivate behaviour, it may serve as a viable solution to the cited challenges. Applications of gamification in classroom contexts may or may not involve technology. Techniques range from introducing specific game elements like stickers or star-charts through to web-based tools like Kahoot! to facilitate gamified quizzes. Within the context of e-learning, gamification may be built upon existing courses or integrated into the design of new courses.

The potential of gamification is echoed by Souza-Concilio and Pacheco (2013) who suggest that gamification, given its roots in motivation and experience design, plays a role in making e-learning enjoyable to students. It is such potential which needs to be explored.

1.4. Problem statement

Whilst e-learning may offer solutions to many of the challenges faced in classroom-based teaching, and in instances where classroom-based teaching is not possible, the issue of student engagement and drop-outs, if not resolved, also has the potential to negatively impact its success and sustainability (Karnad, 2014; Rostaminezhad, Mozayani, Norozi, and Iziy, 2013).

Many factors are cited as causing a lack of engagement and high rates of dropouts in e-learning and MOOC settings. These include noise (unrelated comments posted by other users) and information overload (due to the vast amount of content and communication in a collaborative online space) (Brinton, Chiang, Jain, Lam, Liu, and Wong, 2014). Additional factors relating to an individual's motivation include external pressures, a lack of consequences for non-participation or dropping out (Yang, Sinha, Adamson, and Rose, 2013), and a perception among some students that no real-world credit is obtained from completing courses online ("Measuring the MOOC," 2013). It should also be stated that in some cases, students enrolling in e-learning courses have no initial intention to complete a course (Kolowich, 2013).

However, within digital and online contexts, students dedicate many hours playing games and engaging on social media platforms, levelling up and unlocking new experiences. It is these same students who willingly devote their time to games and social media who often fail to show the same level of devotion to e-learning despite their studies providing longer-term benefit.

Thus, it becomes logical to interrogate technologies that positively influence students and aim to explore how such technologies, and their underlying constructs, may be applied in other contexts.

With this in mind, it is necessary to explore gamification, which harnesses the motivational elements within games, as a potential solution to the challenges faced in e-learning. The value of exploring gamification in learning is supported by Baker, Bujak, and DeMillo (2012) who describe gamification as a disruptive innovation which presents both opportunities and risks for education.

The core components of any game include clearly defined goals, a scoring mechanism, frequent feedback, personal choice of methods used to complete a task, and consistent coaching (Coonradt, 2007). When considering gamification coupled with the core components of games, it emerges that gamification presents an approach which seeks to harness the positive outcomes of those elements in games which sustain engagement. This suggests that gamification has strong potential to alleviate some of the e-learning challenges mentioned. Furthermore, gamification allows for rewards to be more tangible and tailored to participants motivators.

With this outlook towards gamification, the aim of the study, the research questions and the research objectives are discussed in the sections that follow.

1.5. Aim of the study

The aim of this study is to investigate the influence of gamification of e-learning on students' motivation.

1.6. Research questions

In order to achieve the aim of the study, the primary research questions which underpin this study are:

RQ1.   What are students' expectations of a gamified e-learning course?

As discussed, challenges associated with e-learning relate predominantly to motivation. Additionally, Then and Amaria (2013) acknowledge that the success of a technology-based implementation, in terms of adoption or rejection, is influenced by existing user-perceptions. Additionally, Bharuthram and Kies (2013) found that prior exposure to ICT impacted students ability to complete online tasks. In the specific context of e-learning, Tagoe (2012) found that users may face challenges with e-learning as a result of technology ownership, prior experiences and perceptions of e-learning.

Considering these factors collectively, it becomes crucial to understand prior experiences, expectations and motivators that may affect students' participation in a gamified e-learning course.

It is anticipated that this research question will allow the researcher to understand students' perceptions towards both e-learning and gamification. Factors to be investigated included

expectations around e-learning and gamification, perceptions towards different types of game elements, gaming habits, and expectations in terms of the criteria used for allocation of rewards.

RQ2.   What factors influence students' experiences of participating in a gamified e-learning course?

O'Donovan et al. (2013) found that applying gamification in a university course had a positive influence with some game elements being more motivational than others. On the other hand, Berkling and Thomas (2013) discovered that many students in their study were not adequately prepared to embark on a gamified course. In these and other studies, it emerges that success is not guaranteed in all applications and instances of gamification.

It is intended that this research question will enable the researcher to determine how gamification influences different types of players and how various elements contribute to their experience. Additional factors to be explored include levels of engagement, discovery and awareness, onboarding and introduction, and accessibility. Furthermore, this question will explore the role of factors like game design and various game elements in motivating students.

RQ3.   How does gamification of e-learning influence students' motivation in a gamified e-learning course?

Having considered the value of exploring factors influencing students' experiences in a gamified e-learning course, this research question aims to understand how gamification of e-learning influences student motivation. This research question transcends beyond simply whether gamification works or not since Nacke and Deterding (2016) indicate that gamification has been determined to motivate in prior research. Therefore, it is appropriate to extend the discussion and investigate how gamification motivates students.

In order to achieve this, the researcher will turn to Self-Determination Theory (SDT) where Deci and Ryan (2000) identify three key areas of basic human needs as autonomy, relatedness and competence. Furthermore, they acknowledge that motivation exists on a continuum ranging from intrinsic motivation through to extrinsic motivation and amotivation (a lack of motivation). They postulate that if the three basic human needs are satisfied, an individual may be considered as self-determined or intrinsically motivated.

Additional constructs which will be explored are informed by the Intrinsic Motivation Inventory (IMI) which is a framework with its roots in SDT. In addition to considering autonomy, relatedness and competence, IMI enables measurement and representation of motivation through dimensions like interest/enjoyment, value/usefulness, effort/investment and tension/pressure.

Since gamification seeks to motivate people, it is anticipated that this research question will allow the researcher to gain an in-depth, theoretically-driven understanding of how gamification of e-learning influences students' motivation.

Furthermore, it is also necessary to consider the fact that individuals are motivated differently. Supporting this notion, Nacke and Deterding (2016) argue that further research is warranted into the manner in which different types of individuals are influenced by different game elements. As a result, gamer profiles are considered across all three research questions. Further insight into gamer profiles is discussed in the literature review.

1.7. Objectives of the study

The objectives of this study are:

i. To determine students' expectations of a gamified e-learning course.

This objective will be accomplished through analysis of responses provided by participants in the initial questionnaire and supported by the researcher's observations relating to expectations.

ii. To understand the factors that influence students' experiences of participating in a gamified e-learning course

This objective will be attained through analysis of responses provided by participants in the end-of-course questionnaire and in face-to-face interviews. Findings will be reinforced by the observations of the researcher and insights generated by the e-learning platform.

iii. To investigate how gamification of e-learning influences students' motivation in a gamified e-learning course.

This objective will be realised through analysis of responses provided by participants in the end-of-course questionnaire, during face-to-face interviews and through observations of the researcher relating to SDT and IMI.

1.8. Unique contribution of the study

In order to overcome the obstacles confronting e-learning, whilst enhancing its sustainability, this study aims to contribute a possible narrative towards utilising gamification to enable the realisation of the benefits of e-learning in a seamless and widely accessible manner. It is also envisioned that such a narrative will consider and reflect on the challenges faced by users of e-learning.

Since e-learning is widely applied, the outcomes and contribution of this study may be applicable across academic disciplines. It is anticipated that the findings and recommendations of this study

may inform practical implementations of gamification of e-learning across various disciplines. It is also anticipated that insights from this study will equip academics and institutions to motivate students by integrating gamification into their e-learning endeavours. The contributions of this study may also provide e-learning platform developers and service providers with practical insights to guide development and enhancement of gamification platforms.

Furthermore, an intended outcome of this study is to investigate beyond whether gamification works or not as this has been widely researched and determined (Nacke and Deterding, 2016). Rather, there is a need to explore the motivational role of various game elements and the influence of various types of gamer profiles on both students' experiences and motivation in a gamified course.

1.9. Experiences of the researcher

As this dissertation commences, it would be appropriate to share glimpses of the researcher's experiences with e-learning in higher education, both as a student and as an emerging academic. These experiences presented opportunities for the researcher to explore and understand the inner workings of e-learning whilst simultaneously suggesting areas within the e-learning domain that present exciting opportunities for research.

In terms of experience, the researcher was initially exposed to e-learning in 2008 as an undergraduate student. This experience with e-learning was characterised by the utilisation of a now-retired e-learning platform called Online Learning System (OLS) (Figure 1-1) which was used primarily for the dissemination of course notes. Within OLS, lecturers were able to create folder structures and upload various types of files which students could download.

Figure 1-1: OLS Login Page (as at 30 April 2008)

Source: Wayback Machine at web.archive.org

The researcher's experience with e-learning evolved when the institution adopted multiple instances of the Moodle Learning Management System (LMS) across various departments (Figure 1-2). Whilst Moodle was primarily utilised for the dissemination of content, there were an increasing number of

instances where students could complete quizzes and submit some formative assignments online. This was also accompanied by instances of students engaging with peers using collaborative tools. Moodle was later streamlined by an institutional rollout of a single instance of Moodle a few years later.

Figure 1-2: Moodle Homepage (as at 02 April 2011)
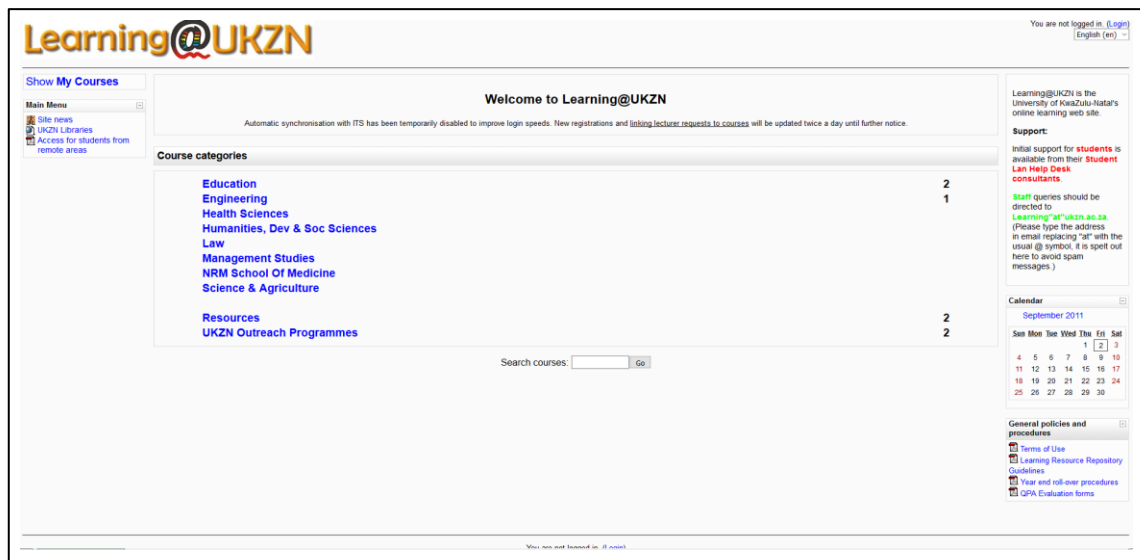
Source: Wayback Machine at web.archive.org

Perhaps the point where the researcher's experience with e-learning faced a turning point was early in 2011 when the researcher enrolled in a Computer Mediated Communication course in the Information Systems & Technology Honours programme. This full-time course was delivered as primarily through e-learning and was offered through Facebook (Figure 1-3).

The course was unique as it differed from the other lecture-based courses in the programme. Critical to the experience was the constructivist organic approach (Blewett and Quilling, 2012) which sought to encourage self-directed learning and collaboration. Owing to this approach, learning using social media became academically rewarding as the platform served as a place to share content, engage peers, run polls, post, comment, like and share. Furthermore, the activities in the course encouraged students to use this social space to learn. However, the integration with one's personal social media felt cumbersome at times.

Nonetheless, this course exposed the researcher to the potential of e-learning beyond simply dissemination of content and facilitation of assessments, towards constructivist and connectivist learning using technology.

Figure 1-3: Fab Space course page (as at 18 June 2017)

Source: www.facebook.com

Furthermore, this course also exposed the researcher to the concept of virtual worlds for e-learning in the form of Second Life (Figure 1-4). In this virtual space, students were exposed to the notion that learning is not two-dimensional and only restricted to reading, memorising and writing. Learning in this online space encouraged students to engage with three-dimensional objects in Second Life to assemble virtual spaces where learning could take place in a manner that transgressed the boundaries of the traditional classroom.

Figure 1-4: UKZN Virtual Campus in Second Life (as at 18 June 2017)

Source: Second Life Viewer

Later in 2012, as the researcher enrolled in another course in the programme, exposure extended to another platform, namely Edmodo (Figure 1-5). This platform presented students with a Facebook-type interface in a more closed-off setting which felt like a dedicated learning space. Edmodo provided the opportunity to use a social platform and harness the benefits of social and collaborative learning without the awkwardness associated with invading students' personal space. Like Facebook, Edmodo also provided a web interface and a native mobile application. However, this space was separate from the researcher's personal social media accounts.

Figure 1-5: Edmodo course page (as at 18 June 2017)
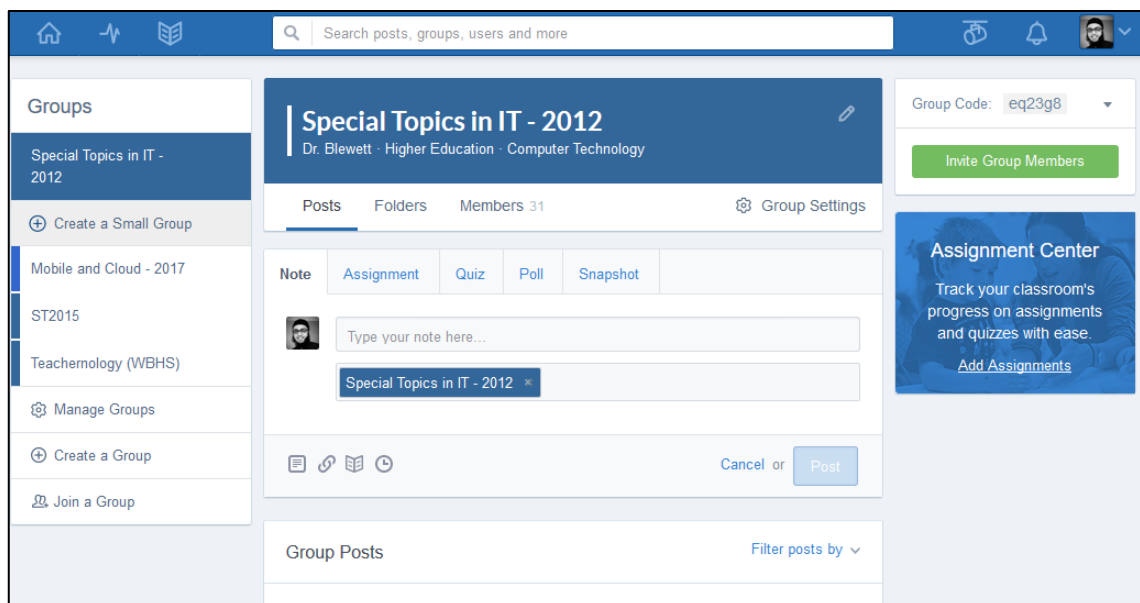
Source: www.edmodo.com

In 2014, the researcher began lecturing Information Systems & Technology at a first-year level. Within this role, it was an institutional requirement that Moodle be used to engage with students. Whilst the mandate was primarily associated with dissemination of course material, there were instances where tools like the forum and discussion boards were used.

As the researcher lectured on additional courses and programmes, exposure increased to teaching using Facebook, Edmodo and, more recently, Blackboard. Additionally, the researcher used other tools like Kahoot!, web chat, video conferencing tools and web-based audience response systems. Exposure to each of these technologies provided practical insights into the opportunities and obstacles confronting e-learning, both as a student and as an emerging academic.

On the gamification front, the researcher joined the corporate world for a short stint in 2013. During this time, the researcher was part of a two-person project tasked with exploring gamifying technology sales. This project served as the researcher's initial introduction to gamification. The project culminated in a Prezi presentation which explained gamification and provided recommendations for the sales executives and support teams. The presentation itself was gamified in that it was presented

in the context of a video game storyline (Figure 1-6) which saw the audience journey through obstacles to reach a treasure. Whilst this experience utilised a simple storyline to explain gamification, it resulted in tangible business outcomes and allowed the researcher to gain familiarity with gamification, its key principles and its outcomes.

Figure 1-6: Prezi Video Game theme used (as of 16 April 2017)
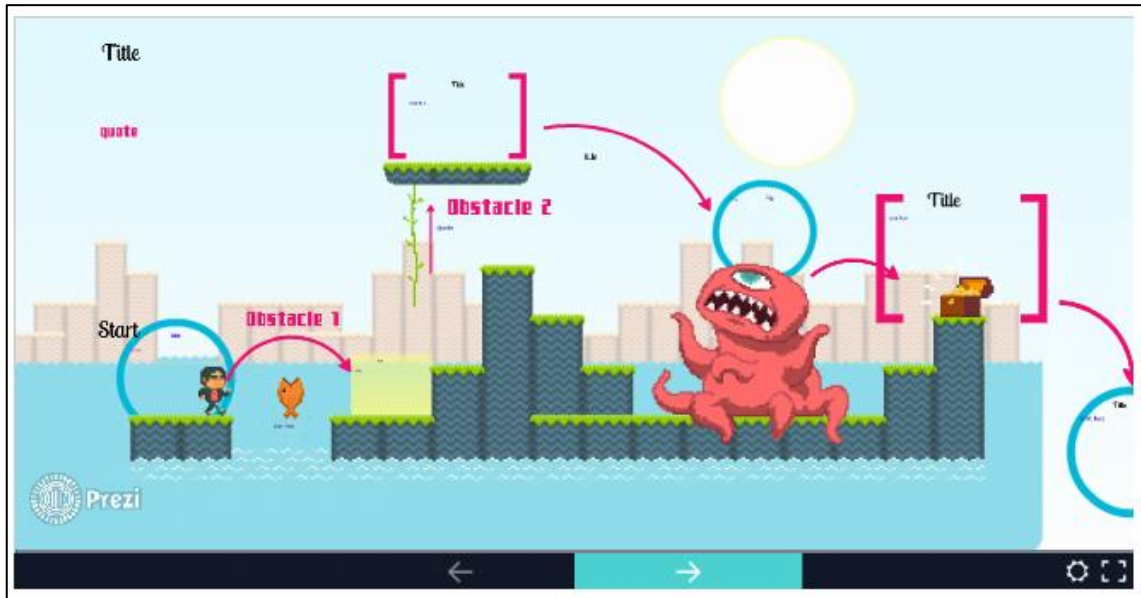
Source: www.prezi.com

The research undertaken in this dissertation may be viewed as a culmination of some of the experiences of the researcher, both as an emerging academic and as a technologist.

1.10. Outline of the dissertation

After introducing the phenomenon under investigation and defining the research questions and objectives, this dissertation provides a review of existing literature around motivation, e-learning and gamification, with a focus on its application in e-learning in higher education. Thereafter, the dissertation elaborates on the research design adopted for this study. Central to the study was the gamification project from which the study emerged. Hence, the process undertaken in the gamification project is explained in detail. Subsequently, results and analysis of results are presented. The dissertation concludes with discussions and recommendations.

1.11. Conclusion

In order to keep students motivated within the context of higher education, particularly with the pervasiveness of e-learning, it is increasingly crucial to overcome the prevalent challenges. Whilst the shift to student-centric teaching may be possible through e-learning, the fact that e-learning is confronted by challenges introduces complexities. In the endeavour to enhance the student experience and drive motivation, it is necessary to explore solutions which can serve to enhance e-learning. In this light, this study aims to investigate the influence of gamification of e-learning on student motivation.

2. CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

Mouton (2001) argues that it is crucial to commence a research project with an in-depth review of the existing literature. An in-depth literature review ensures that duplication is avoided; recognises recent and authoritative works related to the phenomenon under investigation; suggests new perspectives and approaches; provides an understanding of key concepts; uncovers widely accepted findings; and identifies suitable instruments and alternative data sources that have been previously used, among other benefits (Leedy and Ormrod, 2005; Mouton, 2001). In essence, the literature review allows the researcher to identify gaps in the body of knowledge.

This chapter commences by outlining the process adopted to obtaining literature. Then, the chapter explores motivation, various types of motivation, and elaborates on existing motivation theories. Against the backdrop of motivation, e-learning and its evolution is discussed. Thereafter, the chapter proposes a conceptualisation of gamification and elaborates on gamification elements, misconceptions, gamer profiles, and opportunities and challenges associated with applying gamification. This review then reflects on the nexus of e-learning and gamification by situating gamification in education and discussing past studies where gamification has been applied in classroom-based learning and e-learning. This is done to establish an understanding of the practical considerations of applying gamification in higher education. This chapter concludes with a discussion of the theoretical frameworks suited to gamification studies as well as the frameworks applied in this study.

2.2. Obtaining literature

The process of obtaining literature is strategic and requires researchers to consult various resources (Leedy and Ormrod, 2005). The resources utilised to obtain literature for this study included journal articles, books, conference proceedings and presentations, online databases and websites. The availability of various resources warrants the adoption of a structured approach towards obtaining literature.

For the purposes of this study, the researcher identified keywords which were used when searching for literature in online databases. These included: games; gamification; e-learning; gamification of e-learning; gamification in higher education; game elements; motivation and motivation theory. Databases which were utilised included ERIC, Elsevier, IEEExplore, ScienceDirect, Springer, and Taylor & Francis Online, among others.

Furthermore, to ensure the literature obtained remained current, the researcher subscribed to a Google Scholar Alert using the alert query: "gamification education e-learning". This alert provided the researcher with a frequent email digest of relevant academic works, as they became available.

The researcher also followed the approach of backward chaining which involves traversing the body of literature based on other works cited in known academic papers (Talja, Vakkari, Fry, and Wouters, 2007). This approach guided the researcher to additional journal articles, book chapters and conference proceedings contributing to comprehensive insight into the literature available.

Whilst peer-reviewed academic publications were the preferred type of literature, due to the emerging nature of gamification, some non-academic texts are also cited.

2.3. Literature review

This literature review commences with a discussion on motivation followed by a discussion on e-learning. Thereafter, literature pertaining to gamification is discussed. The nexus of e-learning and gamification is also discussed. The review concludes with a discussion on motivation, e-learning and gamification in higher education.

2.3.1. Motivation

Since the definition of gamification cited in the previous chapter cites gamification as a technique to motivate behaviour, it is necessary to explore existing literature in the domain of motivation. In examining literature, this section conceptualises motivation. Then, the different types of motivation are discussed. Thereafter, the section concludes with a discussion on the theories of motivation.

2.3.1.1. Conceptualising motivation

Motivation is a multidimensional construct used to explain reasons for and quality of an individual's actions, desires and needs (Buckley and Doyle, 2016; Elliot and Covington, 2001). These reasons, or motives, prompts individuals' to behave or incline to behave towards a specific direction (Pardee, 1990).

The behaviour of human beings may be classified as being engaged and proactive or, alternatively, alienated, disconnected and passive with such behaviour driven by an individual's context or social situation (Ryan and Deci, 2000b). Ryan and Deci (2000a) describe being motivated as being moved to complete an activity. They further describe motivation as a feeling of impetus, energy, activation and inspiration to act towards an end (Ryan and Deci, 2000a).

Motivation varies within an individual and may be categorised as being amotivation, extrinsic or intrinsic (Ryan and Deci, 2000a). These categorisations may be positioned on a continuum ranging from a sense of self-determination through to non-self-determination (Figure 2-1).

Figure 2-1: Taxonomy of human motivation or continuum of self-determination

	Nonself-determined					Self-determined
Type of Motivation	**Amotivation**	**Extrinsic Motivation**				**Intrinsic**
Type of Regulation	Non-regulation	External Regulation	Introjected Regulation	Identified Regulation	Integrated Regulation	Intrinsic Regulation
Locus of Causality	Impersonal	External	Somewhat External	Somewhat Internal	Internal	Internal

Adapted from Deci and Ryan (2000)

At the left of the continuum lies amotivation which may be explained as a state of lacking intention or drive to act (Deci and Ryan, 2000). It emanates as a result of non-regulation and no sense of personal causation, where individuals do not feel in control of a situation. In addition, such an individual may not experience capability or competence when completing an activity, nor do they experience a sense of autonomy or relatedness (Deci and Ryan, 2000).

As the continuum is traversed, extrinsic motivation lies towards the centre. This may be conceptualised as the performance or completion of an activity to attain a separable outcome, i.e. external to oneself (Ryan and Deci, 2000b). Extrinsic motivation comprises four categories which Ryan and Deci (2000b) classify based on degrees of autonomy. The first category, with the least degree of perceived autonomy, is external regulation where one's behaviour serves to satisfy an external need or demand (Deci and Ryan, 2000). The second category is introjected regulation where an individual's behaviour is marginally more intrinsic and is regulated by a sense of pressure or the need to maintain one's self-esteem (Deci and Ryan, 2000). The third category is identified regulation where one identifies the importance of an action and accepts the regulation associated with the action (Deci and Ryan, 2000). The fourth category is integrated regulation where one internalises reasons for completing activities and assimilates them to oneself (Deci and Ryan, 2000). Whilst this form of motivation is a more autonomous form of extrinsic motivation which closely resembles intrinsic motivation, it does not enter the domain of intrinsic motivation since behaviour is motivated by some outcome or influence external to oneself (Deci and Ryan, 2000).

At the right end of the continuum lies intrinsic motivation which refers to an individual engaging in an activity due to the inherent satisfaction associated with completing the activity itself (Ryan and Deci, 2000b), as opposed to completing the activity for some separable consequence or outcome (Ryan and Deci, 2000a).

The researcher cites an example to explain the difference between extrinsic and intrinsic motivation. Within the context of education, motivation tends to be extrinsic with focus placed on completing tasks, achieving grades and obtaining employment rather than intrinsic motivation which focuses on achieving satisfaction or pleasure from completing a learning activity (Banfield and Wilkerson,

2014). Intrinsically motivated students are more likely to engage a task willingly and work to improve their skills and capabilities whilst extrinsically motivated students are more likely to derive motivation from competitions, rewards, and recognition (Fotaris, Mastoras, Leinfellner, and Rosunally, 2016).

2.3.1.2.   Theories of motivation

Whilst study of motivation has been undertaken across various disciplines, there are three broad types of theories which may explain motivation in games. These theories seek to explain motivation from the perspective of needs, social influence and rewards (Vassileva, 2012). These theories may also be represented based on a continuum ranging from extrinsic to intrinsic motivation (Figure 2-2). However, at the centre of this continuum lies the concept of social motivation. Each of these type of theories is discussed. Thereafter, a comprehensive theory of motivation is discussed followed by examination of a motivational theory founded in the field of gamification.

Figure 2-2: Motivation Theories in Games

Extrinsic Motivation	Social Motivation	Intrinsic Motivation
Rewards-based Theories	Social-based Theories	Needs-based Theories
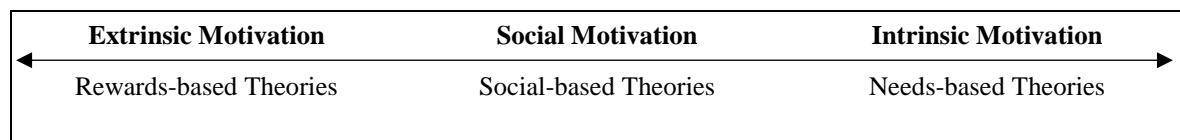
Adapted from Vassileva (2012)

2.3.1.2.1   Rewards-based theories

Grounded in extrinsic motivation, rewards-based theories include Expectancy Value Theory and Skinner's Reinforcement Theory.

Expectancy Value Theory attaches significance to the degree of motivation to pursue a certain goal, to expectations to achieve the goal, and to the incentive associated with that specific goal (Vansteenkiste, Lens, Witte, and Feather, 2005). This theory argues that values and expectations influence choice, tenacity, effort invested and performance (Eccles and Wigfield, 2002; Wigfield and Eccles, 2000). Furthermore, this theory seeks to acknowledge the role of perceived capability, perceived level of difficulty, individual goals or aspirations, past experience and social influence performance (Eccles and Wigfield, 2002; Wigfield and Eccles, 2000).

Skinner's Reinforcement Theory is based on the premise that continuous reinforcement encourages desired behaviours faster than partial reinforcement (Lilienfeld, Lynn, Namy, Woolf, Jamieson, Marks, and Slaughter, 2014; Skinner, 1957). However, when continuous reinforcement is removed, the desired behaviours diminish. Therefore, this theory argues that partial reinforcement results in greater persistence (Lilienfeld et al., 2014; Skinner, 1957).

Within the context of gamification, motivation in these theories may be harnessed by giving participants a sense of control and the ability to customise their experience either in terms of themes, user interfaces or game progression. Additionally, points provide a clear connection between effort and reward. Furthermore, the utilisation of a combination of scoring mechanisms will encourage motivation (Richter, Raban, and Rafaeli, 2015).

2.3.1.2.2   Social-based theories

With its foundations in social motivation, social-based theories include Social Comparison Theory and Personal Investment Theory.

Social Comparison Theory is based upon the notion that a vital source of knowledge is that which an individual gathers from others. Festinger (1954) posits that individuals evaluate their beliefs, capabilities and reactions through comparisons with others who have similar traits. Social Comparison Theory further posits that individuals seek continuous improvement (Wood, 1989). However, the unidirectionality of this theory is confronted by Kruglanski and Mayseless (1990) who recognise that social comparisons are influenced by the different levels of competitiveness within individuals in their context. They further claim that motivation may be as a result of either upward or downward comparison (Kruglanski and Mayseless, 1990).

Personal Investment Theory is based upon the integration of social influence with achievement motivation (Schilling and Hayashi, 2001). This theory argues that human behaviour is motivated by the meaning that they create through beliefs, perceptions, emotions, purposes and goals. The three fundamental motivators included in this theory are critical to determining personal investment in specific circumstances. These motivators are personal incentives, a sense of self, and perceived options (Granzin and Mason, 1999). These motivators reflect ego incentives, task incentives, social incentives and extrinsic rewards (Granzin and Mason, 1999; Schilling and Hayashi, 2001).

Within the context of gamification, these theories may be harnessed through points, leaderboards and displaying progress of participants in relation to others. Additionally, the utilisation of points, badges and reputation mechanisms also enable harnessing of motivational influence (Richter et al., 2015).

2.3.1.2.3   Needs-based theories

With its roots in intrinsic motivation, needs-based theories include Maslow's Hierarchy of Needs, Need Achievement Theory, Goal Setting Theory and Self-Efficacy Theory.

Figure 2-3: Maslow's Hierarchy of Needs
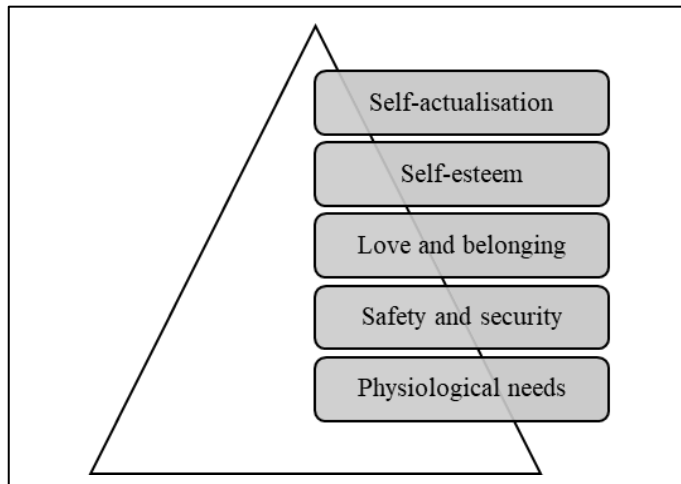
Adapted from Maslow (1943)

Among the earlier theories of motivation, Maslow's Hierarchy of Needs (Figure 2-3), is based on the premise that human beings have basic needs which may be represented in five layers ranging from physiological needs through to self-actualisation (Maslow, 1943). As depicted in Figure 2-3, at the base human of needs are physiological needs which support life and encompass an necessities like breathing, food, water, shelter, clothing and rest (Maslow, 1943). The next layer represents the next basic human need for safety and security, which includes factors like health, employment, property, family and social stability (Maslow, 1943). Once these basic needs are fulfilled, the next two layers which represent psychological needs are sought. The need for love and belonging includes intimate friendships, intimacy and a sense of connection whilst the need for self-esteem refers to confidence, achievement, respects and uniqueness (Maslow, 1943). At the pinnacle of human needs and motivation lies self-actualisation which relates to the need of self-fulfilment and comprises a sense of morality, creativity, acceptance, purpose, meaning and recognition of inner potential (Maslow, 1943).

This theory has been critiqued for its rigidity in representing human needs hierarchically (Denning, 2012), revised by the author to include transcendence (Maslow, 1969), and even extended to include self-actualisation sub-constructs like purpose, autonomy and mastery (Pink, 2011).

Within the context of gamification, Griffin (2015) reflects on the possibilities of implementing gamification in e-learning using Maslow's Hierarchy of Needs as the theoretical approach. Within this reflection, they suggest that there is alignment between the layers and game elements. Additionally, Siang and Rao (2003) propose a Hierarchy of Players' Needs which has its origins in Maslow's Hierarchy of Needs. This theory suggests that motivating participants in a gamified activity be achieved and enhanced through levels and increasing difficulty (Richter et al., 2015).

Need Achievement Theory is centred around human beings' need for success rather than failure. It acknowledges that human behaviour is directed at displaying, either to oneself or to others, a higher sense of ability (Atkinson and Litwin, 1960). Atkinson and Litwin (1960) state that achieving success and avoiding failure are two separate motives which influence individuals' choices in which activities to engage in. This theory is based on the premise that individuals who are highly motivated to succeed would incline towards engaging in moderately difficult tasks whilst individuals who are strongly motivated to avoid failure would incline to engaging in either very simple or very complex activities (Atkinson and Litwin, 1960). Within the context of gamification, the fulfilment of needs, achievement of goals and recognition of performance results in increased motivation (Richter et al., 2015).

Goal Setting Theory posits that complex, precise, context-specific and short-term goals play a stronger motivational role than longer term goals (Ling, Beenen, Ludford, Wang, Chang, Li, Cosley, Frankowski, Terveen, and Rashid, 2005). This is based on earlier literature by Locke, Shaw, Saari, and Latham (1981) who argue that goal-setting improves performance by focusing attention, driving effort, and enhancing persistence and confidence in one's capability to complete a task. Within the context of gamification, the concepts of gradually increasing difficulty and levelling up enables participants to experience short-term goals which enable progress to a larger objective (Richter et al., 2015).

Self-Efficacy Theory defines self-efficacy as referring to perceived performance ability for a specific task (Bandura, 1977). The inclusion of ability or capability in this theory resembles Expectancy-Value Theory (Wigfield and Eccles, 2000). This theory argues that an individual's perception of self-efficacy can enhance or impede motivation as it determines their choice of tasks, selection of difficult tasks, effort invested, persistence and ultimately task performance (Bandura, 1977). Furthermore, individuals with greater self-efficacy select more challenging tasks and invest greater effort and persist, even when facing failure (Schwarzer, Bäßler, Kwiatek, Schröder, and Zhang, 1997). Within the context of gamification, a sense of efficacy may be developed through various techniques including flow, incentives within games, dividing tasks in games, team play, immediate feedback, leaderboards, badges, socialising and communities (Richter et al., 2015).

2.3.1.2.4   A comprehensive theory of motivation, and a derivative

Whilst the theories discussed thus far consider motivation at various points on the continuum of self-determination (amotivation, extrinsic or intrinsic), it is arguably beneficial to explore a motivational theory which acknowledges the multidimensionality of motivation.

2.3.1.2.4.1 Self-Determination Theory

One such theory of motivation is Self-Determination Theory (SDT) (Ryan and Deci, 2000b). In a similar manner to some of the theories discussed, this theory places focus on the social-contextual conditions that facilitate or impede self-motivation (Ryan and Deci, 2000b). In doing so, SDT further seeks to examine factors that enhance and oppose intrinsic motivation, self-regulation and well-being (Ryan and Deci, 2000b). Within this context Deci and Ryan (2000) postulate that human beings have three innate needs namely autonomy, relatedness and competence (Figure 2-4). Fulfilment of these needs results in intrinsic motivation and optimal development.

Figure 2-4: Three innate needs within SDT resulting in intrinsic motivation
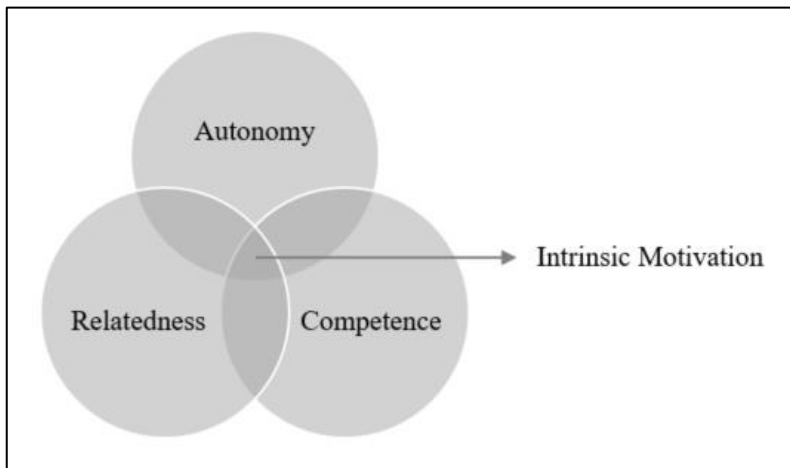
Adapted from Deci and Ryan (2000)

Autonomy may be defined as an individual's need to have control, choice and volition over ones' decisions (Deci and Ryan, 2000). In the context of learning, autonomy is achieved when students are provided with choice which is supported by academics, thus resulting in a student perceiving no challenging external pressure or constraints whilst being presented with the correct level of choice (van Roy and Zaman, 2017). Relatedness is defined as an individual's perception of support and likeness given to or received from interactions with peers engaging in particular tasks (Deci and Ryan, 2000). Experiencing a sense of relatedness and connectedness provides a sense of value and positively influences students (van Roy and Zaman, 2017). Additionally, in an educational context, students may form greater relationships due to common learning objectives and shared experiences (van Roy and Zaman, 2017). Competence refers to the perception that one has of their capability and effectiveness in a particular task (Deci and Ryan, 2000). This level of competence may be extended to considering oneself a master of a particular task (van Roy and Zaman, 2017). Furthermore, in terms of education, competence may be derived by providing students with constructive feedback which would result in resilient students who achieve academically (van Roy and Zaman, 2017).

In line with needs for human well-being and personal satisfaction, Pink (2011) identifies three key elements, which bear likeness to the basic needs identified in SDT: autonomy, mastery and purpose.

Autonomy relates to the human desire to be in control of their lives, mastery explores the desire to constantly improve and overcome challenges which are aligned to the capabilities of an individual, and purpose connects the intrinsic needs of individuals and facilitates personal fulfilment (Pink, 2011).

Furthermore, SDT acknowledges that human motivation falls on a continuum of intrinsic motivation (doing something because it is enjoyable, optimally challenging or aesthetically appealing), extrinsic motivation (doing since it results in some separable outcome), and amotivation (a state of lacking motivation). Deci and Ryan (2000) posit that if the three basic human needs are fulfilled, intrinsic motivation is attained and sustained. Furthermore, they also argue that extrinsic motivation may be internalised and integrated into an individual, particularly in contexts wherein the basic needs are fulfilled to a stronger degree (Ryan and Deci, 2000b).

Additionally, it is worth mentioning that SDT, through its acknowledgement of contextual support, realises that human beings are social and exist in various contexts which may influence autonomy, relatedness and competence (Ryan and Deci, 2000b). The influence on autonomy, relatedness and competence may be positive or negative based on factors in the environment like the level of competition between students and the nature of feedback students receive (van Roy and Zaman, 2017). Furthermore, SDT suggests that individual motivators must be considered (van Roy and Zaman, 2017).

In terms of its origins, SDT comprises six sub-theories which results in a comprehensive macro-theory which comprehensively addresses motivation and personality (Ryan and Deci, 2000b). These theories are expounded upon in Table 2-1.

Table 2-1: Sub-theories of SDT (Ryan and Deci, 2000b)

Sub-Theory	Contribution to SDT
Cognitive Evaluation Theory (CET)	CET contributes consideration of the varied nature of intrinsic motivation and gives cognisance to how rewards, social mechanisms and personal status influence intrinsic motivation. Furthermore, CET highlights the roles played by autonomy and competence in fostering intrinsic motivation.
Organismic Integration Theory (OIT)	OIT contributes to understanding extrinsic motivation and internalisation. Additionally, OIT also considers social contexts that enhance or hinder internalisation. Furthermore, OIT highlights that autonomy and relatedness as critical to internalisation.
Causality Orientations Theory (COT)	COT differentiates between three broad classes of behaviour: autonomous, control-determined and impersonal. It explains the differences in individuals' unique tendencies and motivational orientations to incline toward certain environments and resultant behaviour.
Basic Psychological Needs Theory (BPNT)	BPNT considers the psychological needs of human beings and their bearing on mental health and well-being. Furthermore, this theory posits that psychological

Sub-Theory	Contribution to SDT
	well-being and optimal functioning is based on autonomy, relatedness and competence.
Goal Contents Theory (GCT)	GCT draws distinctions between intrinsic and extrinsic goals and their relevant influence on motivation and wellness. Extrinsic goals may include appearance, financial health, and popularity whilst intrinsic goals may comprise personal growth, close bonds and a sense of community
Relationships Motivation Theory (RMT)	RMT informs relatedness and considers close personal and group relationships. Also, RMT acknowledges that positive interactions provide satisfaction of the human need of relatedness. This theory further postulates that a positive relationship exists between the satisfaction of the need for relatedness when analysed against autonomy and competence.

In terms of its contribution as a motivational theory, SDT is comprehensive since it is grounded in and gives cognisance to the continuum of motivation discussed earlier (Richter et al., 2015).

2.3.1.2.4.2 Intrinsic Motivation Inventory

With its foundations in SDT, Intrinsic Motivation Inventory (IMI) is a multidimensional tool which allows for measurement of participants' subjective experiences of an activity (Monteiro, Mata, and Peixoto, 2015). Variables of measurement are distributed across seven subscales, including interest/enjoyment, value/usefulness, effort/investment and tension/pressure. Further subscales in IMI which are directly present in SDT are perceived choice (autonomy), perceived competence (competence) and relatedness (Monteiro et al., 2015).

As an explicit measure of intrinsic motivation, the interest subscale aims to measure the inherent pleasure or satisfaction derived from completing a specific activity (Monteiro et al., 2015). The value subscale, which serves to measure internalisation, embraces the idea that individuals internalise and develop more self-regulatory activities when they consider an experience as useful and valuable (Monteiro et al., 2015). Effort considers different motivation-specific contexts of individuals and explores their capacity to invest effort into completing a specific task (Monteiro et al., 2015). This construct evaluates an individuals' investment in their capacities in what they are doing (Monteiro et al., 2015). Within the content of IMI, perceived choice and perceived competence are seen to be positive self-evaluation and behavioural predictors of motivation. Perceived choice evaluates the sentiments of participants when engaging in an activity voluntarily whilst perceived competence assesses the perceived level of effectiveness experienced by an individual when engaging in a task (Monteiro et al., 2015). Also within the context of IMI, relatedness is a newly added subscale which explores the degree of an individuals' connectedness to others, particularly in contexts where individuals interact with each other (Monteiro et al., 2015). Tension, developed as a negative measure of intrinsic motivation, explores whether individuals experience pressure to succeed at a given task (Monteiro et al., 2015).

For each of these subscales, the authors have provided a set of potential questionnaire questions with the inclusion of each question and underlying subscale at the discretion of the researcher based on the context, types of activities and characteristics of participants being investigated (Monteiro et al., 2015).

2.3.1.2.5 The Octalysis Framework

Whilst theories and frameworks exploring motivation discussed thus far are more general in their domains of application, it is also beneficial to explore a motivational theory with its core specifically in gamification. One such theory is the Octalysis Framework.

Chou (2015) argues that many systems, including gamified systems, are function-focused as opposed to being human-focused. Function-focused design places greater priority on getting the job done whilst human-focused design acknowledges that human beings experience emotions, insecurities, and reasons as to why they do, or do not, engage in certain activities (Chou, 2015). He posits that approaching gamification from the perspective of human-focused design places motivation at the core, thereby yielding an effectively motivating experience. In this line, actions that human beings engage in may be defined by one of the eight core drives identified in the Octalysis Framework depicted in Figure 2-5 (Chou, 2015).

Figure 2-5: Octalysis Framework
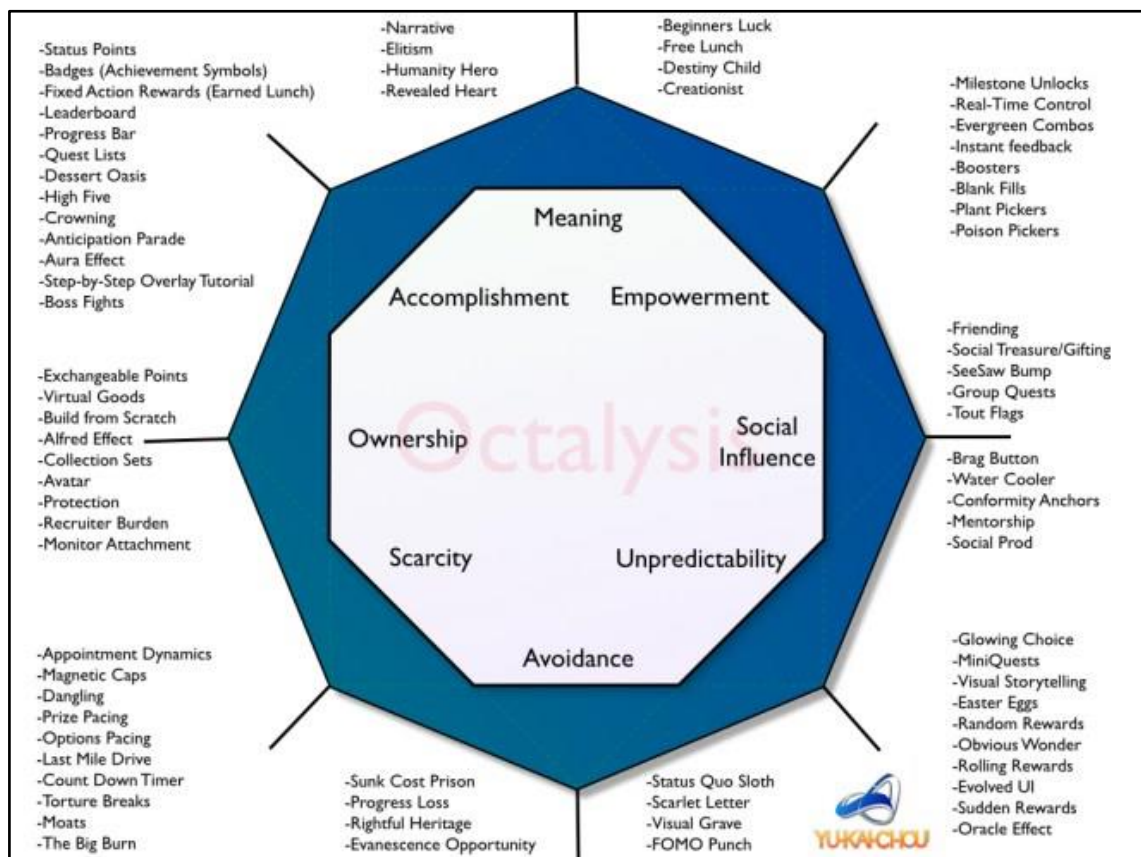
Source: Chou (2015)

Chou (2015) elaborates on each of these core drives as depicted in Table 2-2.

Table 2-2: Octalysis Core Drives

Core Drive	Name	Explanation
1	Epic Meaning & Calling	This core drive harnesses the human need to engage in an important endeavour which has a greater purpose than oneself.
2	Development & Accomplishment	This core drive involves motivating and influencing growth, progress and skills-development towards a goal and eventual accomplishment.
3	Empowerment of Creativity & Feedback	This core drive incorporates the motivational influence felt when users are consistently involved and engaged in creative processes, each requiring a varied approach.
4	Ownership & Possession	This core drive harnesses the motivating effects that are present when a user assumes ownership of an activity or task and seeks ways to enhance the task and how it is completed.
5	Social Influence & Relatedness	This core drive incorporates the social elements that may motivate people such as collaboration, competition and mentoring
6	Scarcity & Impatience	This core drives involves the human drive to want something that one cannot not easily have or by introducing a sense of urgency
7	Unpredictability & Curiosity	This core drive involves the motivational influence of wanting to find out what might happen next
8	Loss & Avoidance	This core drive is based on the human need to avoid something negative

Like SDT, the Octalysis Framework also acknowledges the continuum of self-determination. As such, Chou (2015) classifies these core drives in terms of intrinsic and extrinsic motivational tendency, and positive and negative motivations experienced.

In terms of intrinsic and extrinsic motivation, Chou identifies right brain or intrinsic drives, and left brain or extrinsic drives. Right brain drives include CD3, CD5 and CD7 whilst left brain drives include CD2, CD4 and CD6 (Chou, 2015). Right brain drives appeal to creativity, social dynamics and self-expression whilst left brain drives appeal to analytical thought, logic and ownership (Chou, 2015). Chou (2015) explains that this classification does not refer to the right-brain and left-brain domains already defined in anatomy and neurology but rather represent the location of these core drives in the Octalysis Framework illustrated in Figure 2-5.

When considering emotions and motivation, Chou identifies white hat drives, which elicit positive motivations, and black hat drives, which elicit negative motivations. White hat drives include CD1, CD2 and CD3 whilst black hat drives include CD6, CD7 and CD8 (Chou, 2015). White hat drives elicit and inspire positive emotions associated with power, fulfilment and satisfaction whilst black hat drives elicit and inspire negative emotions associated with obsession, anxiety and addiction (Chou, 2015). Upon encountering this literature, the researcher noted from their experience, that whilst negative emotions are being elicited and inspired, the aim would be to utilise these negative

emotions in a manner that results in a positive and motivating outcome. Chou agrees through this statement "I want to clarify here, that just because something is called 'Black Hat Gamification' doesn't mean it's necessarily bad or unethical." (Chou, 2015).

The researcher argues that a comprehensive and balanced gamification endeavour to a diverse group of participants should comprise elements of left and right brain, and white hat and black hat gamification techniques. Failure to approach gamification from these perspectives could lead to achieving only extrinsic motivation resulting in disengagement over time.

2.3.2. E-Learning

Since this study aimed to understand the influence of gamification of e-learning on motivation, it is also necessary to explore existing literature pertaining to e-learning and its evolution.

2.3.2.1. Conceptualising e-learning

As discussed, e-learning has the potential to alleviate some of the challenges associated with classroom-based learning. These challenges include the fact that traditional learning is instructor-centred, constrained by time and location whilst also being more resource intensive to deliver (Zhang et al., 2004).

E-learning may be defined as a type of learning, supported by ICT via the Internet or another network, aimed at improving the quality of teaching and learning (OECD, 2005; Tagoe, 2012). Selim (2007) adds to this by describing the purpose of e-learning as facilitating the achievement of learning objectives. This conceptualisation of e-learning as a type of learning is further explained by Urdan and Weggen (2000) who define e-learning as the delivery of course content using various forms of electronic media and communication technologies.

Aside from these definitions, e-learning may be further categorised into four types ranging from web-supplemented and web-dependent courses through to mixed mode courses and fully online courses (OECD, 2005). In instances of web-supplemented courses, the focus is placed on classroom teaching whilst some materials like outlines and lectures notes are disseminated via email or through web links (OECD, 2005). Web-dependent courses witness a shift in focus towards utilising the Internet to deliver key elements of a course whilst also adopting features like online discussions, assessments and collaborative tools (OECD, 2005). However, in such instances, there is not a significant reduction in classroom teaching time (OECD, 2005). In mixed mode courses, a greater shift is observed where e-learning starts replacing classroom teaching and online interaction dominates, although campus attendance is still required (OECD, 2005). In fully online courses, the entire course offering and opportunities to interact are provided online unhampered by geographical or time-based restrictions (OECD, 2005). These categories are displayed in the Figure 2-6.

Figure 2-6: Categories of e-Learning

Web-supplemented	Web-dependent	Mixed mode	Fully online

Classroom teaching   e-Learning

Dissemination of some materials   Independent of geography and time
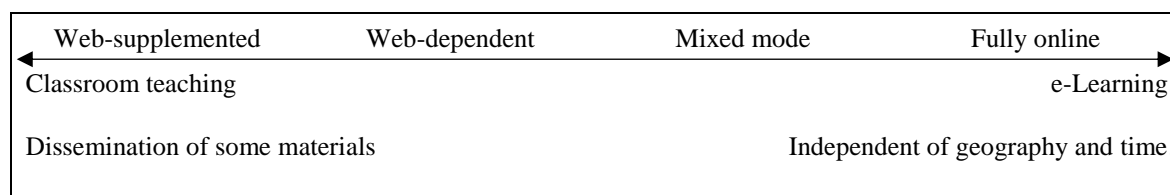
Adapted from OECD (2005)

From among the benefits of e-learning explained by Zhang et al. (2004) is the shift to student-centeredness, self-paced learning not constrained by time or location. Additionally, e-learning has the potential to extend access to knowledge beyond geographical borders whilst facilitating knowledge preservation, reutilisation and sharing (Zhang et al., 2004).

Notwithstanding its benefits, e-learning is not without challenges. The most widely debated challenges surrounding e-learning technologies include a lack of student engagement and high dropout rates (Karnad, 2014; Lee and Hammer, 2011; Zhang et al., 2004). An explanation for this is offered in that e-learning demands greater maturity and self-discipline than is demanded in classroom-based learning (Zhang et al., 2004). Additionally, challenges include a deficiency in immediate feedback in asynchronous e-learning, increased time commitments for academics, a sense of discomfort among some users as there exists potential for anxiety, confusion and frustration (Zhang et al., 2004). Furthermore, some context-specific challenges may include aging technical infrastructure, technical glitches, a lack of computer or digital literacy skills and poor Internet connectivity (Bharuthram and Kies, 2013).

The origins of e-learning may be traced in the work of Gonella, Pantò, and Dep (2008) who suggest that after the advent of web-based learning, e-learning gained momentum. This was short-lived due to the entry of online learning and ultimately e-Learning 2.0 (Gonella et al., 2008).

2.3.2.2.   Evolution to e-Learning 2.0

Whilst literature acknowledges the benefits and cautions about the challenges of e-learning, it also offers potential enhancements. Ehlers (2009) argues that e-Learning 2.0 is an innovative step up from e-learning since it harnesses elements of Web 2.0, as coined by O'Reilly (2005), and connectivism, as defined by Siemens (2014). Connectivism is a learning theory which acknowledges that learning is not necessarily an individualistic and internal activity but rather takes place in a complex, chaotic, self-organised, informal, networked and electronically-supported manner with implications for management of learning, design of learning spaces, and traversing of the knowledge networks that exist (Ehlers, 2009; Siemens, 2014). This argument is supported by Kumar (2009).

The theoretical and practical shift from e-learning to e-Learning 2.0 is characterised by immersive, informal and connected learning which harnesses mobile technologies (Downes, 2007; Ehlers, 2009).

Additionally, aspects like personalised learning and game-based learning also enter the discourse (Downes, 2007).

E-Learning 2.0 is not itself a new technology or paradigm. Rather, it refers to perspectives, developments and trends which demand a fresh outlook towards e-learning (Ehlers, 2009). When contrasted with e-learning, e-Learning 2.0 recognises that learning is ubiquitous and takes place in various contexts (Ehlers, 2009). Furthermore, the locus of control is handed to students who adopt the role of organisers in a lifelong, informal process where learning takes place in communities of practice (Ehlers, 2009). E-Learning 2.0 entrenches the student-centeredness of e-learning whilst harnessing the potential of student-centeredness and collaboration (Kumar, 2009).

Within this context of student-centeredness, students assess quality within a personalised learning environment populated with content which they deem to be relevant (Ehlers, 2009). Connectivism is established in e-Learning 2.0 through participation, interaction and communication using tools like e-portfolios, learning diaries and social media (Ehlers, 2009). A further distinguishable feature of e-Learning 2.0 is the paradigm shift towards positioning students as creators of content rather than consumers whilst facilitating platforms for such content to be dynamically published (Kumar, 2009).

Despite this approach underpinned by collaboration and connectivism, e-Learning 2.0, like e-Learning, also faces challenges. These include a lack of familiarity among students of Web 2.0 tools, a lack of responsibility and accountability, a lack of interaction and collaboration between students on the platforms, a lack of access and resources, and differences in learning cultures (Kumar, 2009).

2.3.2.3. Journey to Massive Open Online Courses (MOOCs)

Whilst e-Learning and e-Learning 2.0 sought to scale the boundaries of the traditional classroom, the concept of Massive Open Online Courses (MOOCs) is increasingly cementing itself in the discourses of technology and learning, whilst also introducing additional dimensions into the debate.

Debates range from MOOCs fostering innovation in higher education through to the potential of MOOCs to disrupt the current models of higher education which are prevalent today (Karnad, 2014; Vardi, 2012). On the other hand, Siemens (2012) posits that MOOCs are a platform or tool which presents opportunities for higher education but argues that its potential to be transformative and disruptive is questionable. Nevertheless, there is consensus that MOOCs will have an impact and contribute dramatically to awareness of online learning.

The term MOOC was coined in Canada by Dave Cormier and Bryan Alexander (Daniel, 2012) when describing the first open online course, *Connectivism and Connective Knowledge*, which was designed and offered by Stephen Downes and George Siemens in 2008 (Daniel, 2012; Liyanagunawardena, Adams, and Williams, 2013). In reflecting on this MOOC, Downes (2012)

acknowledges that in many respects, this course utilised many existing ideas, practices and technologies.

A differentiating factor between e-learning and MOOCs which emerges is the distributed nature of the course, which gave rise to the term "massive". Distribution in this sense is the adoption and aggregation of various platforms which were widely accessible to a large number of simultaneous participants (Downes, 2012). This argument is supported and extended by Liyanagunawardena et al. (2013) who hold the view that MOOCs may be facilitated through multiple platforms and by using various technologies, including social media, to deliver a course.

Like many emerging technologies and paradigms, the definition of MOOCs has evolved. Initially, MOOCs were viewed as a platform for the distribution of course materials through a large openly accessible online course which connected geographically distributed academics and students (Daniel, 2012). When considering open-access courses provided under the flag of e-learning, it did not seem to offer anything new. Later on, the understanding of MOOCs evolved to an approach centred on participation in a variety of online courses provided by traditional universities (Daniel, 2012).

MOOCs can be classified into two distinct categories, cMOOCs and xMOOCs. cMOOCs are grounded in connectivism and promote creativity and collaborative learning with connected like-minded individuals (Karnad, 2014; Siemens, 2012). Pedagogical focus is placed on knowledge creation and generation (Daniel, 2012; Siemens, 2012). However, as the uptake of MOOCs increased, xMOOCs gained prevalence, particularly due to uptake by traditional universities (Daniel, 2012). xMOOCs, unlike cMOOCs place focus on content and are linear in nature, especially considering when one considers that the pedagogical approaches found in xMOOCs closely resemble those found in traditional higher education (Karnad, 2014). A benefit of xMOOCs is that traditional boundaries are broken, funding pools are larger, courses can be scaled rapidly, and quality learning materials are accessible to audience who might not otherwise have access (Siemens, 2012).

Whilst a move towards cMOOCs arguably has the potential to alleviate the challenges presented by e-learning whilst shifting beyond the traditional LMS-type approaches of e-learning (Liyanagunawardena et al., 2013), the widespread adoption of xMOOCs internationally warrants further exploration of xMOOCs whilst also signifying the need for deeper exploration of cMOOCs.

In this light, Sharples, de Roock, Ferguson, Gaved, Herodotou, Koh, Kukulska-Hulme, Looi, McAndrew, and Rienties (2016) and, as stated, Liyanagunawardena et al. (2013) argue that MOOCs are evolving through the adoption of pedagogical approaches that bring in collaboration by integrating with technologies like social media. However, the researcher contends that this signifies the urgency for and resurgence of cMOOCs. Whilst this approach to MOOCs is not mainstream, it is crucial if one were to truly harness the potential of MOOCs.

Other than pedagogical approaches, Hill (2012) identifies other factors which influence the sustainability of both cMOOCs (referred in Figure 2-7 as the Connectivist branch MOOC) and xMOOCs (referred to in Figure 2-7 as the Stanford branch of MOOCS and MIT OpenCourseWare). The key challenge presented to cMOOCs is revenue generation whilst xMOOCs face challenges associated with accreditation, completion rates and authentication (Hill, 2012).

Figure 2-7: Potential Problems associated with MOOCs
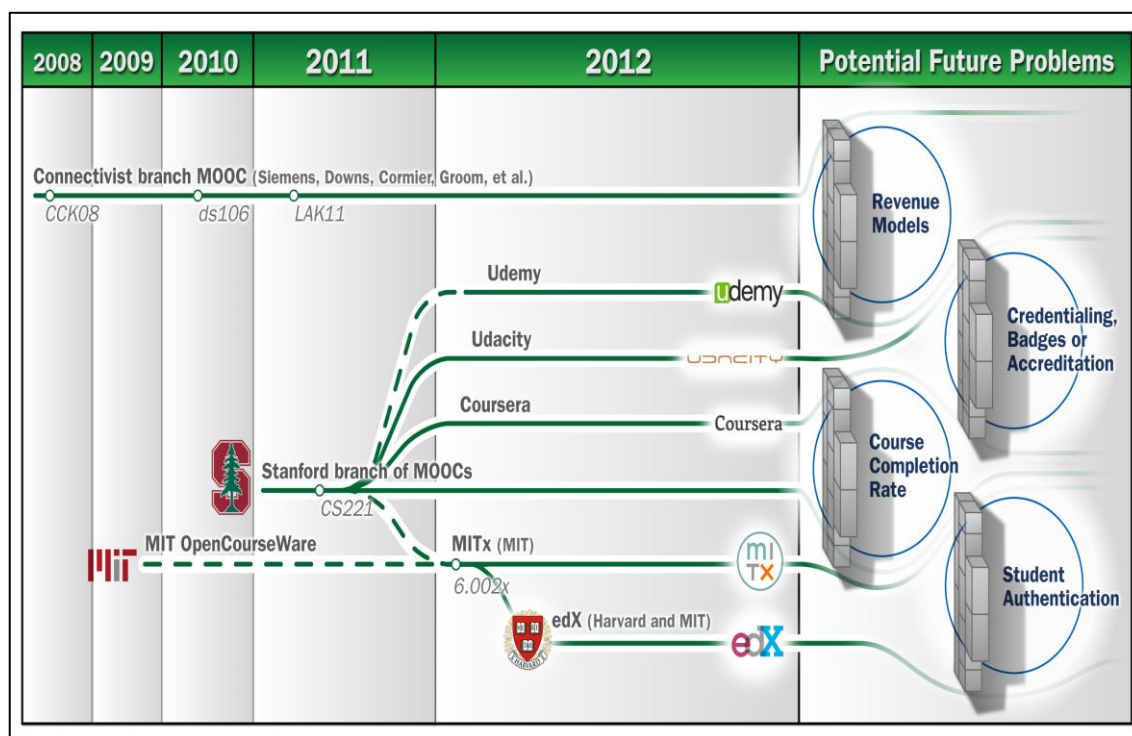
Source: Hill (2012)

From the perspective of students, MOOCs do not present traditional barriers to entry like fees, pre-requisites, formal accreditation or a required level of participation (Liyanagunawardena et al., 2013). At the same time, challenges associated with MOOCs include lack of incentive, a lack of focus due to the large number of participants, insufficient prior knowledge, ambiguity, a sense of little available support and distractions outside the course (Hew and Cheung, 2014). Whilst measurement of success has been defined in the e-learning approaches discussed thus far, success in cMOOCs bear no single metric and is dependent on the intentions of a student when enrolling in a course (Downes, 2012). As is also observed in Figure 2-7, focus is placed on metrics like completion rates to measure the success of xMOOCs.

The challenges associated with MOOCs discussed above, when viewed alongside the flexible measurement of success of cMOOCs and the rigidity of measurement of success of xMOOCs, necessitate exploration of interventions to address the challenges whilst acknowledging the measurements of success. It may also be argued that interventions are required to address the

challenges which may be faced by students enrolled in MOOCs whilst enabling attainment of success, no matter how success may be measured.

The course used in this study was offered entirely through e-learning. However, the rapid emergence of MOOCs rendered it crucial to consider evolution of e-learning over time. Furthermore, this was necessary to discuss since MOOCs extend the scope and reach of online (or e-learning) courses to equip institutions to freely provide high quality teaching to millions of Internet uses, thereby gaining widespread publicity and visibility (Chang and Wei, 2016).

Additionally, when exploring of the challenges of MOOCs, the motivation-related challenges which confront e-learning continue to emerge and confront MOOCs. Therefore, it is likely that endeavours to positively influence motivation through of gamification of e-learning could also play a role towards enhancing motivation in MOOCs.

Furthermore, since the pedagogical approach used in the course is grounded in connectivism, it was also necessary to explore the various types of MOOCs, and the associated literature with the intention of gaining a view of the MOOC landscape, which considers connectivism.

2.3.3. Gamification

Gamification, like e-learning and MOOCs, has undergone many definitions and descriptions. What constitutes gamification has been an intensely contested discourse with contributions from various industries including human-computer interaction (Deterding, Khaled, Nacke, and Dixon, 2011), marketing and video games (Deterding et al., 2011).

2.3.3.1. Conceptualising gamification

The notion of gamification is not entirely new. In fact, playfulness, games and game-design occupy central roles in human motivation and engagement throughout history (Nacke and Deterding, 2016).

The term gamification was coined by Neil Pelling in 2002 and gained widespread popularity in 2010 (Marczewski, 2013a). In order to understand the origins of the term, Chou (2015) explains that given the considerable experience of the game industry in motivation and engagement, the industry provides deep insights into human motivation. As a result, the term gamification has been derived from and is grounded in gaming (Chou, 2015).

In its simplest form, gamification may be defined as "the use of game design elements in non-game contexts." (Deterding et al., 2011, p. 2). A more descriptive definition is offered by Wu (2011, p. 3) who defines gamification as "the use of game attributes to drive game-like player behaviour in a non-game context." In this definition, the attributes include both game design and game mechanics. Additionally, the inclusion of the phenomenon of player behaviour is significant in that the participant (or player) is being recognised as part of gamification. Nicholson (2012, p. 1) supports

this definition by explaining meaningful gamification as the "integration of user-centred game design elements into non-game contexts." The concept of user-centeredness is further substantiated by the work of Chou (2015) who explains gamification as human-focused design rather than function-focused design. This outlook gives considerations to human emotions, insecurities, motivators and demotivators (Chou, 2015).

Burke (2014, p. 6) proposes that gamification is "the use of game mechanics and experience design to digitally engage and motivate people to achieve their goals." In this definition, significant additions include the realisation that experience is crucial, the utilisation of a digital platform upon which to deliver gamification is necessary and that gamification serves as a form of motivation. Perhaps the most critical consideration when designing a gamified learning platform is to ensure that users are placed at the centre. However, this conceptualisation was challenged by (Marczewski, 2014a) who presented an argument that there is an insinuation that gamification is only accessible on a digital platform.

Central to this argument is that gamification is a tool or methodology to motivate behaviour as opposed to being a technology (Marczewski, 2014a). This argument is further supported in literature (Deterding et al., 2011). The researcher supports this argument whilst identifying similarities between e-learning, MOOCs and gamification. These concepts are supported and enhanced by technology and technological platforms and are not necessarily technologies per se. Marczewski (2014c, p. 4) subsequently conceptualised gamification as, "the use of game design metaphors to create more game-like and engaging experiences." Furthermore, the notion that gamification is an approach or methodology as opposed to a technology may further be supported through analysis of gamification through the Gartner in their Hype Cycles.

The Garner Hype Cycle is a graphical tool (Figure 2-8) which depicts the maturity and adoption of technologies, in addition to providing insight into their anticipated evolution towards mainstream adoption ("Gartner hype cycle," 2017). Insights from Hype Cycles allow organisations to manage deployment of emerging technologies.

Figure 2-8: Gartner Hype Cycle
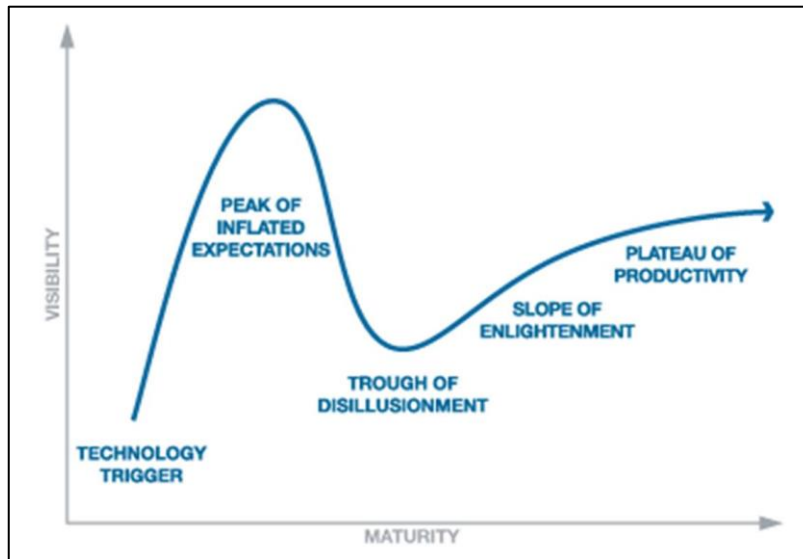
Source: "Gartner hype cycle" (2017)

Each of the technologies placed on the Hype Cycle is selected based on industry research and is allocated a prediction in terms of time for mainstream adoption. As illustrated in Figure 2-8, the Hype Cycle explores expectations versus time whilst classifying technologies into five categories, as explained by Gartner:

- Innovation Trigger represents the phase when a breakthrough gets the ball rolling and generates publicity and possibilities of what concepts may emerge. At this point, no commercially viable product may exist.
- Peak of Inflated Expectations is reached once early publicity generates some successful case studies alongside a multitude of failures. At this point, many organisations do not react.
- Trough of Disillusionment is slid into as failures in implementations set in resulting in waning of interest in a technology. At this point, developers either succeed or fail and further progress only occurs if developers improve on their product or service.
- Slope of Enlightenment is climbed as tangible benefits of a technology starts to emerge. At the same time, development of products and services have undergone multiple iterations and funding for further development is more readily available.
- Plateau of Productivity is entered once mainstream adoption take place. This is driven by certainty and confidence in the market of the potential of the technology.

In 2011 and 2012, gamification was placed on the Gartner Hype Cycle for Emerging Technologies nearing the Peak of Inflated Expectations, reaching the peak in 2013 (Simões, 2014). In 2014, it slid towards the Trough of Disillusionment with entrance into the Plateau of Productivity in two to five years (Simões, 2014). In 2015, gamification was removed from the Hype Cycle for Emerging

Technologies thus suggesting that the hype around gamification has passed, as is argued by Marczewski (2015b).

However, gamification remained on Gartner's radar. Since 2012 and up until 2015, gamification appeared in the Hype Cycle for Digital Marketing (McGuire, 2015), most recently sliding into the Trough of Disillusionment. The removal of gamification from the broader Hype Cycle for Emerging Technologies to the more specific Hype Cycle for Digital Marketing suggests that gamification is no longer viewed as a "game changer" or emerging technology on its own but rather as a digital marketing tool. However, the researcher argues that this placement on a hype cycle dealing with one industry or domain represents a constricted outlook towards gamification since it may be applied in various domains.

In 2016, gamification was removed from Hype Cycle for Digital Marketing and Advertising altogether. This suggests, like in the case of emerging technologies, that the hype around gamification in digital marketing has passed. These removals might also signal that Gartner concedes that gamification is not a technology. Despite this, the researcher suggests that as gamification gains momentum towards mainstream adoption, it continues to generate hype. Further discussions around gamification in education will substantiate this line of reasoning.

Since there are varying definitions of gamification with each giving consideration to different aspects, the researcher reasons that it is necessary to propose a comprehensive definition of what constitutes gamification which includes the various aspects outlined in the literature. At the same time, it is also necessary to acknowledge debates that have emerged. Thus, the researcher proposes that gamification is an objective-driven user-centred technique which integrates game mechanics, dynamics and game aesthetics into real-world contexts to motivate behaviour. This conceptualisation is utilised in this study.

2.3.3.2. Gamification elements

This section aims to provide a deeper conceptualisation of gamification. Sailer, Hense, Mandl, and Klevers (2013) argue one of the core components in conceptualising gamification is game elements. Game elements may be classified in a variety of ways. The MDA (mechanics, dynamics and aesthetics) model is an approach which, whilst giving consideration to the perspectives of both the designer and participants, deconstructs a player's process of consumption into three parts, namely rules (mechanics), system (dynamics) and fun (aesthetics) (Kim, 2015).

Game mechanics (rules) define how a game operates (Iosup and Epema, 2014). Furthermore, mechanics may be defined as a distinct set of rules that govern the outcome of a game (Kim, 2015; Marczewski, 2013a). Mechanics also include the various actions, behaviours and control mechanisms afforded to players in their engagement with a game (Kim, 2015). Examples of game

mechanics tools include: points, badges, levels, storylines, statuses, quests leaderboards and other rules and rewards (Iosup and Epema, 2014; Kim, 2015).

Game dynamics (system) guide how players interact with the game mechanics of a game (Iosup and Epema, 2014). This definition is supported by Marczewski (2013a) who explains game dynamics as a player's response to a game mechanic being applied. Game dynamics includes elements that are primarily concerned with the interaction between game mechanics and the players in the game at a more abstract level (Kim, 2015). Examples of dynamics include actual earning of badges, being onboarded, social engagement and the unlocking of new levels or content (Iosup and Epema, 2014). Further examples include appointment, behavioural momentum, feedback, progress, time limitations and development of avatars within a game (Kim, 2015).

Game aesthetics (fun) comprises harnessing the different goals of games which may result in users experiencing a desired experience or emotional state through playing games (Kim, 2015). These components include sensation, fantasy, narrative, achievement, challenge, fellowship, epic meaning, discovery, expression and submission (Kim, 2015). The concept of game aesthetics bears resemblance to the 8 core motivational drives discussed by Chou (2015) in the Octalysis Framework.

As discussed, whilst there is clear distinction between game mechanics, dynamics and aesthetics, they are broadly explained as game elements. Hence, this necessitates a discussion on the various game elements. Sailer et al. (2013) reflects on various game elements and their motivational effects as outlined in Table 2-3.

Table 2-3: Explanation of game elements and motivational effects – Adapted from Sailer et al. (2013), Nah, Zeng, Telaprolu, Ayyappa, and Eschenbrenner (2014), and Seaborn and Fels (2015).

Game Element	Explanation and Motivational Effects
Badges	Badges are visual representations of game achievements which may adopt varying levels of complexity. They have the potential to fulfil a player's need for success, serve as a virtual status symbol, function as a form of group identification, enable goal setting, and fosters feelings of competence. Badges are useful to engage and motivate students to achieve goals and objectives.
Leaderboard	Leaderboards provide details of a player's rank or success in a game. Rank or success may be provided at an individual level and for teams. They may play a motivational role to those players who are higher up but could equally serve a demotivational role to those players who are lower down on the leaderboard. Leaderboards foster competition, showcase achievement, assign power, imbibe feelings of competence, foster team collaboration and relatedness.
Meaningful Stories or Storylines	Storylines refer to the narratives or stories applied to a game. They play a role in delivering activities to pique player's interests, offer variety, encourage relatedness and autonomy, and foster positive emotions. Furthermore, storylines may also serve to provide context, illustrate real-life applications or sustain interest throughout the gamification endeavour or learning process.
Points	Points are the simplest form of game elements which serve as a measure of success or achievement. They numerically indicate progress and provide positive reinforcement. Points

Game Element	Explanation and Motivational Effects
	may be conceived as virtual rewards or a currency which may be utilised to purchase objects/items to further progress or to increase status. They may also be an indicator of academic achievement.
Progress Bars	Progress bars provide insight into individual progress of a player within a game. They serve to provide feedback, track progression, establish clear goals and milestones, compare current performance to previous and expected performance, and foster mastery.

Additional elements which may be applied to a game include avatars (visual identities created and adopted by participants), quests or challenges (little tasks), clear goals, frequent or immediate feedback, prizes or rewards (multiple evenly-distributed smaller tokens of recognition), progress (milestones), levels (increasingly difficult environments to indicate progression) and roles (role-playing elements of character) (Hamari, Koivisto, and Sarsa, 2014; Nah et al., 2014; Sailer et al., 2013; Seaborn and Fels, 2015). Dicheva, Dichev, Agre, and Angelova (2015), through systematic review of 34 studies, concluded that game elements varied in their use in existing empirical research. Points were most preferred, followed by badges, leaderboards, levels, virtual goods and avatars.

Aside from elements, game techniques are another critical component in conceptualising gamification exists in literature. Game techniques are explored in the literature with the most prevalent being visible status, social engagement, freedom of choice, freedom to fail, rapid feedback, and goals or challenges (Dicheva et al., 2015).

At this point, it seems like game elements and game techniques are synonymous or interchangeable terms. This further supported by Seaborn and Fels (2015) in their analysis of game elements in 31 gamification studies. They found the most employed game elements and techniques included points, badges, rewards, leaderboards, challenges, status, progression, achievements, avatars, mini-games, roles, narratives, time pressure and feedback.

Whilst the term "elements" is used widely in this study, the researcher believes that it is necessary to draw a distinction between game elements and game techniques.

In this light, the researcher proposes that game techniques include clear goals and objectives, freedom of choice, freedom to fail, progression or levels, rapid feedback, time pressure, social engagement, storylines and visible status. Game techniques cannot be won or obtained by participants in a gamification setting and participants cannot choose to include or remove techniques from the setting. However, they can still choose to ignore their presence.

Game elements, on the other hand, can be won or obtained by participants in a gamification setting. Whilst participants cannot choose to include or remove elements from a game, they can choose whether or not to pursue, consider or utilise specific elements. Game elements include avatars,

badges, a spot on a leaderboard, points, role-play and virtual goods. Furthermore, elements also include quests or challenges

Essentially, game techniques relate to the outcomes and design principles being applied and offer less autonomy to participants whilst game elements serve as the medium through which these outcomes and design principles are delivered and offer participants more autonomy.

2.3.3.3.   Misconceptions surrounding gamification

Whilst the underlying principles behind gamification may be derived from game principles (Deterding, 2010), there is debate on the differences between games, serious games and gamification. There is also rigorous debate on what does and does not constitute gamification (Seaborn and Fels, 2015).

Both gamification and serious games have their foundations in games and game play (Kapp, 2012; Richter et al., 2015). A game may be defined as "a system in which players engage in an abstract challenge, defined by rules, interactivity and feedback, that results in a quantifiable outcome often eliciting an emotional reaction." (Koster, 2013). In acknowledging the quantifiable nature of games, Deterding (2010) posits that well-designed games are specific, measurable, achievable, realistic and time-bound (SMART). Furthermore, games motivate by offering autonomy and relatedness whilst also allowing for meaningful real-time feedback to be provided (Deterding, 2011; Deterding et al., 2011). Additionally, as players progress through levels in games, they are required to develop or display increased levels of competence which may be acknowledged through techniques which incorporate social comparison (Deterding, 2010, 2011).

The notion that a difference exists between gamification and serious games is challenged by Kapp (2014) who broadly expresses gamification as the application of game thinking to solving challenges and motivating using appropriate elements of games. Furthermore, Kapp (2012) further explains that serious games broadly represent an experience designed using game mechanics and game thinking to influence individuals in a specific domain. Within the context of these definitions, Kapp argues that serious games and gamification are interrelated to the extent that serious games represent a specific subset of the meta-concept of gamification, more so since both concepts harness the benefits of games and share common objectives (Kapp, 2012).

Richter et al. (2015) holds a similar view though they acknowledge that a distinction exists between gamification and serious games. They posit that the universal applicability of games enables their functions to be appropriated in our daily lives. In instances where games are appropriated in various aspects of daily life other than solely for fun and entertainment, these games represent serious games (Richter et al., 2015). They argue that the similarity exists since gamification is the application of game elements for a purpose other than the expected use of entertainment (Richter et al., 2015). They

argue that similarity exists since the objective of both is beyond simple playfulness and because both approaches require creativity (Richter et al., 2015).

Whilst the similarities are highlighted, the distinction between serious games and gamification acknowledged above may be substantiated through the lens of the widely acceptance definition of gamification as the application of game elements in non-game contexts (Deterding et al., 2011; Fischer, Heinz, Schlenker, and Follert, 2016). This hint at distinction is explored by McGonigal (2011) who suggests that the use of the term game elements and not games itself signifies that an entire game is not being applied, rather specific traits found in games are being adapted. This theory is supported by Sailer et al. (2013) who situates the difference between gamification and serious games in the fact that gamification comprises elements of games whilst serious games comprise the utilisation of entire games for purposes other than entertainment. This view is supported by Deterding et al. (2011) who cite a distinct difference between serious games and gamification as illustrated in Figure 2-9.

Figure 2-9: Differentiation between serious games and gamification
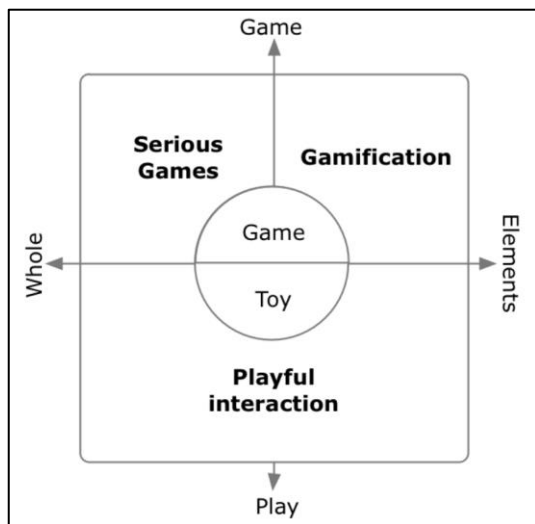
Source: Deterding et al. (2011)

Marczewski (2013b) offers further distinctions between gamification and serious games, particularly from the perspective of a designer. As illustrated in Figure 2-10, a game utilises a combination of game thinking, game elements and game play with the sole purpose of fun. Once the sole purpose of integrating game elements is not fun, the result is a serious game or simulation. When a game designer utilises only game thinking and game mechanics outside of the context of actual game play, gamification ensues. Within this context, it should be acknowledged that fun is still experienced from the perspective of the user.

Figure 2-10: Comparison of games, serious games and gamification

Adapted from Marczewski (2013b)

Lastly, Fitz-Walter (2015) outlined qualities which differentiate gamification from other aspects like games, serious games and game-based learning. These qualities include that gamification is applied when an endeavour is more gameful than playful; when an endeavour is not a complete game; when an endeavour is both a game and a tool; when the primary objective of an endeavour is not entertainment; and when an endeavour is not a pervasive game.

2.3.3.4. Gamer profiles

Whilst it is necessary to address the misconceptions around gamification, it is also necessary to acknowledge that not all game players are identical. Gamer classes or player profiles are also essential in gamification as they allow gamified environments to accommodate different types of individuals, each with varying motivators (Schönen, 2014).

An initial player typology in the literature is offered by Bartle (1996) who defined four types of players in the context of early online worlds: achievers, explorers, socialisers and killers. Achievers are players who actively seek values and treasures provided by the game (Bartle, 1996). They are motivated by the collection of points and rewards which serves as a primary motivation (Bartle, 1996). Players in the explorer player type derive motivation from engaging in discovery and exploration of the game environment. These players seek to understand the workings of a game, are likely to study and tweak game mechanics, possibly trying to uncover exploits. Unlike Explorers who seek to explore the game environment and mechanics, socialisers are motivated by and more interested in the social interactions and engagement facilitated by the game. They seek to understand other players and forge relationships. On the other hand, Killers are motivated by intense competition to the extent that might impose themselves onto others. Additionally, players may be driven to pursue the misery of others as a result of their own behaviour.

In extending Bartle's player types with a focus on gamification and gamified systems, Marczewski (2015a) identifies six types of players in the Gamification User Hypes Hexad Framework: Socialisers, Free spirits, Achievers, Players, Philanthropists and Disruptors. Socialisers are similar to those classes defined by Bartle. They are motivated by relatedness and seek and encourage social interaction. Free-spirits are motivated by autonomy and self-expression. They seek to create, explore, experiment and find ways to push the boundaries of any process. However, they may be demotivated when such boundaries are met. They bear resemblance to Explorers identified by Bartle. Achievers, like those identified by Bartle, are looking to learn new things and improve themselves. They are motivated by mastery, overcoming challenges and resulting rewards. Philanthropists are distinct from Bartle's classifications and are motivated by purpose. Their altruistic nature drives them to want to share and enrich the others in a game with no expectations. Whilst Philanthropists seek to enrich others within a game, Players will go to lengths to earn rewards from a system. They engage for their benefit and seek to learn in order to manipulate a game. Players bear resemblance to Killers identified by Bartle. Unlike Players, the reach of Disruptors extends beyond themselves. They seek to disrupt the nature of a game, either directly or indirectly. Thus, they can represent a constructive or destructive force within a game.

More recently, Tondello, Wehbe, Diamond, Busch, Marczewski, and Nacke (2016) extend the six Hexad user types identified by Marczewski (2015a) with the aim of creating and empirically validating a tool to determine an individual's player type whilst also aiming to verify the relationships between user types and game elements (Tondello et al., 2016).

Yee (2006) critiques Bartle's Player Types since it views types as distinct whilst they might overlap. Furthermore, Bartle's Player Types may prove challenging to practically apply unless empirically grounded and validated. Against this backdrop, Yee (2006) propose five user motivations for playing games: Achievement, Relationship, Immersion, Escapism and Manipulation. Achievement, similar to Bartle's type Achiever, seeks to measure the desire for power in a virtual environment by achieving goals and collecting in-game items with power. Relationship, much like Bartle's type Socialiser, seeks to quantify the desire of users to interact and engage along with understanding their willingness to form meaningful relationships. Immersion gauges the extent to which players enjoy experiencing a fantasy world whilst role-playing in the context of the associated the narrative. Escapism seeks to measure how users are using a game to avoid real-life obligations. Manipulation, similar to Bartle's type Killer, quantifies the extent to which a player wants to objectify other users and manipulate them for personal gain and satisfaction.

Yee (2008) provides an additional classification of player motivation comprising three main components and 10 subcomponents. These comprise Achievement (including Advancement, Mechanics and Competition), Social (including Socialising, Relationship and Teamwork) and Immersion (including Discovery, Role-playing, Customization and Escapism).

The BrainHex typology is an extension to the Bartle model and defines seven player profiles: Seeker, Survivor, Daredevil, Mastermind, Conqueror, Socialiser and Achiever whilst acknowledging any concepts that players may not enjoy (Nacke, Bateman, and Mandryk, 2011). Seekers are motivated by interest and curiosity in a game world and enjoy moments of wonder whilst Masterminds are motivated by solving difficult puzzles or problems that require players to devise a strategy, with efficiency being a strong motivator. Survivors are motivated by their experience of something intense and potentially terrifying. In a similar manner, Daredevils are motivated by playing on the edge, the thrill of a chase, and the excitement of a risky activity. Conquerors are challenge-oriented players who are motivated by struggling against adversity, triumphing in the face of difficulty and defeating other players in a game. In doing so, Conquerors behave forcefully directing any sense of anger towards their effort. Unlike Conquerors, Achievers are goal-oriented and motivated by long-term achievements. Achievers display preferences for completing activities that contribute to attainment of goals. Socialisers are trusting players who are motivated by conversation, rendering assistance and engaging interactively, provided that trust exists. In the absence of trust, they experience anger.

Whilst the BrainHex typology identifies different type of game players, it has its inherent limitations. The researcher contends that an attempt to provide a quantitative value based on human nature is inherently prone to inaccuracies. Additionally, the research sample that informed the BrainHex profiles was skewed in terms of gender with 87% male representation (Nacke et al., 2011). This may render BrainHex as not being widely applicable. Furthermore, whilst BrainHex does aim to classify individuals based on their gaming profiles, these profiles are based on various motivational factors which affect gamers and non-gamers. The fact that 66% of respondents in the BrainHex survey sample may be considered a limitation. Moreover, the sample comprised mostly English-speaking participants from regions including North America (49.8%), Western Europe and the UK (27.9%). Since the sample lacked a diversity in terms of languages and responses from developing regions, it may be argued that BrainHex fails to cater for the specific factors influencing participants in this study. Furthermore, the potential for player profiles to evolve as an individual matures or encounters experiences is not considered.

Despite these limitations, it is still essential to consider player profiles. Nacke and Deterding (2016) contend that further research is warranted into the influence of different game elements in relation to motivation and gamer profiles. Within the context of this study, the research maintains that the BrainHex typology be utilised to understand participants gamer profiles. This is due to the fact that it considers already-known gamer profiles whilst also providing a means of determining a player profiles using an easily accessible online tool (Nacke et al., 2011). Furthermore, utilisation of BrainHex typology in this study may yield insight into player profiles in a developing context. Based on these profiles, this study will then explore the influence of various game elements on participants' experiences as well as how gamification influences their motivation.

BrainHex profiles have been used in prior gamification studies to understand whether gamification improves students' motivation to engage coursework (O'Donovan et al., 2013), towards developing a player model for adaptive gamification (Monterrat, Desmarais, Lavoué, and George, 2015) and towards developing personalised gamification (Lankes, Hochleitner, Rammer, Busch, Mattheiss, and Tscheligi, 2015; Orji, Mandryk, Vassileva, and Gerling, 2013).

2.3.3.5. Existing research into gamification

Whilst gamification presents many opportunities, it demands management of the associated risks. This is necessary since gamification research has witnessed mixed results over the past few years. This includes further shifts on the Gartner Hype Cycle and varying results in empirical academic research.

As discussed, in 2014, Gartner placed gamification in the Trough of Disillusionment on the Hype Cycle for Emerging Technologies. Against the backdrop of gamification shifting into the Trough of Disillusionment, Broer (2014) conducted an analysis of 15 papers cited by Hamari et al. (2014) as is illustrated in Figure 2-11. It was found that only one study received a purely positive outcome, three studies received partially positive outcomes, three studies received mixed reviews, 1 study received rejected outcomes, seven studies yielded non-pertinent (non-relevant) results. Whilst they were unable to draw conclusions on whether gamification works or not, they concluded that gamification entered the into Trough of Disillusionment due to high expectations not being met.

Figure 2-11: Broer's (2014) revised rating of paper results
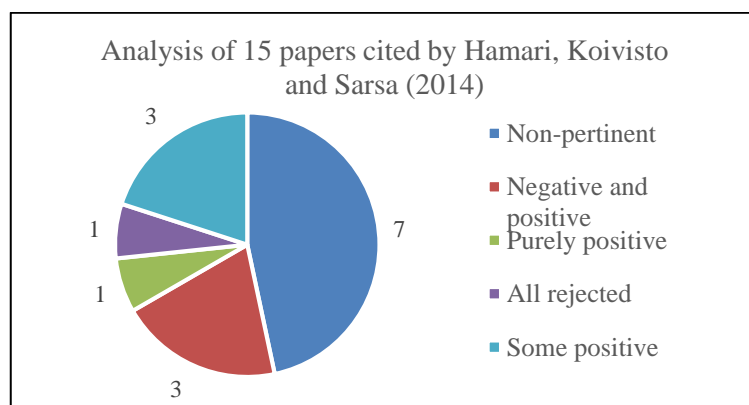
Adapted from Broer (2014)

Additionally, Broer (2014) stressed the need for further empirical research which focuses on the target audience, adopts a variety of game elements, and considers various types of individuals. Furthermore, the need to factor in motivation and understanding of the reasons why individuals are influenced by certain motivational drivers over others is stressed (Broer, 2014).

Since then, research has sprawled and spanned across many disciplines (Nacke and Deterding, 2016). Literature includes but is not limited to the following disciplines:

- Education (de-Marcos, Domínguez, Saenz-de-Navarrete, and Pagés, 2014; Fischer et al., 2016; Katsigiannakis and Karagiannidis, 2017; Souza-Concilio and Pacheco, 2013);
- Fitness and wellness (Hamari and Koivisto, 2013; Lister, West, Cannon, Sax, and Brodegard, 2014; Zhao, Etemad, and Arya, 2016);
- Healthcare (King, Greaves, Exeter, and Darzi, 2013; Miller, Cafazzo, and Seto, 2016; Pereira, Duarte, Rebelo, and Noriega, 2014);
- Government services (Bista, Nepal, Paris, and Colineau, 2014);
- Marketing and advertising (Lucassen and Jansen, 2014);
- Crowdsourcing (Morschheuser, Hamari, and Koivisto, 2016);
- Finance (Morschheuser, Henzi, and Alt, 2015; Rodrigues, Costa, and Oliveira, 2013); and,
- Information systems & technology (Suh, Wagner, and Liu, 2016).

Nacke and Deterding (2016) observe that gamification research is evolving from a novel domain into a field for multidisciplinary study. They classify gamification research into three categories: theory-driven empirical studies (understanding), design methods and application areas (or contexts).

In terms of theory-driven empirical studies, research has placed greater focus on how individual game elements motivate. However, scope has been limited to certain game elements. Furthermore, whilst theoretical frameworks require further exploration, there is also a need for the development of new theories (Nacke and Deterding, 2016).

When considering research exploring gamification design, there is broader focus beyond simply points, badges and leaderboards with aspects like participation, inclusion and motivation being examined (Nacke and Deterding, 2016).

Insofar as research into application areas, there has been recognition of different player types with early understanding of the suitability of elements to specific contexts emerging. However, further research is warranted into the actual effects of player types and situational effects (Nacke and Deterding, 2016).

In essence, whilst Broer (2014) explains that earlier gamification research presents questions which warrant further research, Nacke and Deterding (2016) suggest that gamification research is maturing, particularly in terms of questions posed by earlier studies. Notwithstanding, there is consensus that current gamification research still encounters many unanswered questions and presents unexplored avenues. These gaps relate to design, target audience, player types, motivational drivers and situational affordances (Nacke and Deterding, 2016).

2.3.4. Nexus of e-learning and gamification

Having commenced this review with a discussion on motivation, and progressing to e-learning and gamification, it is opportune to explore the nexus of e-learning and gamification.

2.3.4.1. Situating of gamification in education

As discussed, education is one of the disciplines where gamification can be applied. Furthermore, education is also a domain where considerable gamification research has been conducted, when compared to others like finance, healthcare, fitness and wellness and technology (Hamari et al., 2014).

When exploring gamification against industry analysis, gamification first appeared on the Gartner Hype Cycle for Education in 2011 (Lowendahl, 2011). Unlike its presence in the Hype Cycles for Emerging Technologies and Digital Marketing, its presence on the Hype Cycle for Education has been consistent. Gamification was placed at the Peak of Inflated Expectations in 2011-2013. In 2014-2015, gamification slid down to the Trough of Disillusionment. In 2016, gamification is closer to the Slope of Enlightenment (Figure 2-12) with outlook to reach mainstream adoption in two to five years (Fardinpour, 2016). The inclusion on the Hype Cycle for Education has been the most consistent inclusion of gamification in any Hype Cycle. Furthermore, the 2016 Hype Cycle for Education illustrates the closest placement of gamification to mainstream adoption.

Figure 2-12: Gartner's Hyper Cycle for Education 2016
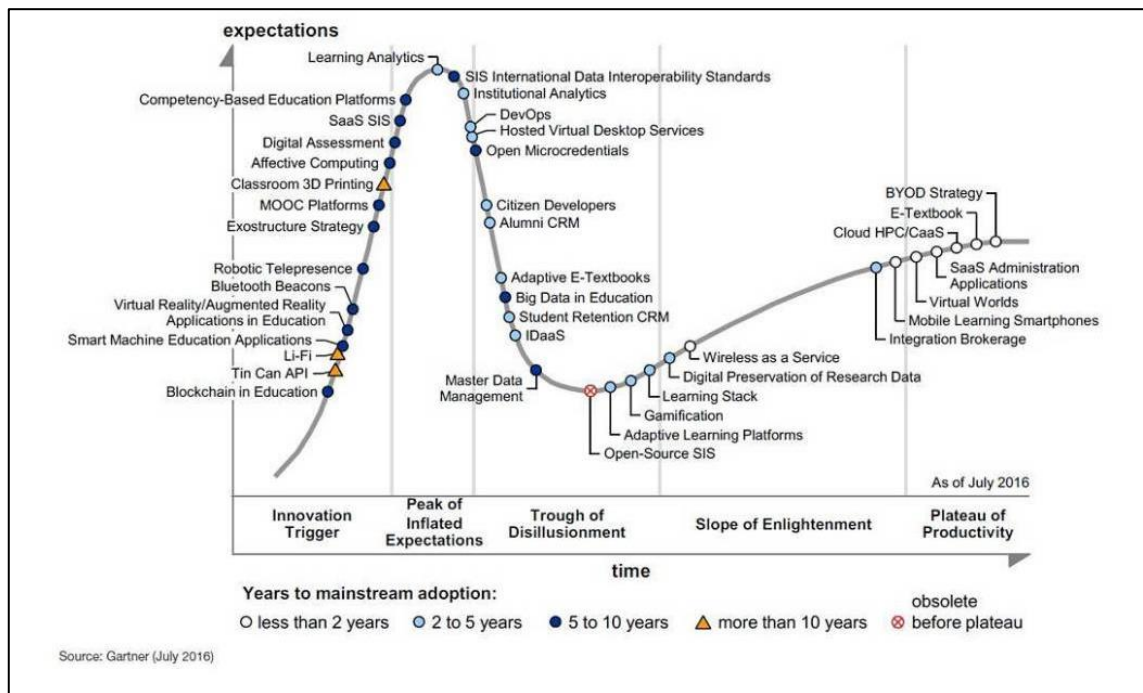
Source: Fardinpour (2016)

Another dimension which further positions gamification in education is introduced by Kapp (2012, p. 10). Their definition of gamification as "game-based mechanics, aesthetics, and game thinking to engage people, motivate actions, promote learning, and solve problem," specifically includes promotion of learning.

2.3.4.2. Opportunities and risks presented by gamification

Every technology, particularly when considered to be a hype, is viewed with a degree of scepticism. Thus, it is necessary to explore opportunities that may be harnessed alongside the associated risks.

Gamification offers benefits like enhancing motivation, fostering innovation, promoting participation, encouraging persistence and achievements (Richter et al., 2015). Within its applications in education, gamification techniques have been found to foster participation and collaboration, encourage self-directed learning, motivate completion of homework, make completion assessments easier, integrate exploratory approaches, strengthen student creativity, and instil motivation in students (Caponetto, Earp, and Ott, 2014; Lee and Hammer, 2011). Literature also argues that gamification has the potential to encourage engagement, serve as a motivator, increase participation, whilst at the same time providing students with a greater level of content understanding and analytical skills (O'Donovan et al., 2013; Seaborn and Fels, 2015). In addition, gamification also allows students to collaborate smoothly in a virtual environment whilst learning to self-manage problems and learn through virtual experience (Karnad, 2014). Furthermore, literature suggests that experiencing gamification can serve to develop skills required by 21st century graduates, can make learning joyful, and can transcend the boundaries between formal and informal learning (Lee and Hammer, 2011). However, there is not wide consensus or clarity on the direct influence of gamification on academic performance (Seaborn and Fels, 2015).

Despite opportunities, there are risks which threaten the success of gamification. One of the most intense debates raised regarding gamification is that gamification is essentially "pointsification" as it utilises external rewards like points, badges and leaderboards in often fails to motivate users (Richter et al., 2015; Seaborn and Fels, 2015). This debate is commonly raised in the discipline of game design but represents a narrow view of literature, particularly since gamification has grown into a multidisciplinary area of research (Seaborn and Fels, 2015).

Similarly, whilst gamification may bring about these benefits in education, certain practical challenges may emerge. There may be significant financial and time-related costs associated with applying gamification to learning (Lee and Hammer, 2011; O'Donovan et al., 2013). Students may not be entirely prepared to learn in a gamified environment either due to disinterest in gaming or inability to adapt the autonomy and mastery required when engaging a gamified course (Berkling and Thomas, 2013). Challenges may also exist with onboarding and obtaining institutional support (Iosup and Epema, 2014).

As emerges in literature, gamification does not represent a universal panacea or silver lining (Lee and Hammer, 2011). In order to respond to these challenges associated with gamification and harness opportunities, literature suggests that greater focus must be placed on adherence to design practices, theory-driven research, user-centricity and motivational drivers (Chou, 2015; Lee and Hammer, 2011; Nicholson, 2012).

2.3.4.3.   Existing research in gamification and education

Research into gamification and e-learning continue to develop. Thus, a necessary step in exploring gamification and e-learning is to explore existing research into gamification and education.

Whilst gamification has been applied in various domains and environments, it has also been applied to various disciplines in education with the aim of supporting learning and professional development (Caponetto et al., 2014). Furthermore, there is consensus that the most prevalent level at which gamification is applied is higher education (Caponetto et al., 2014).

Whilst initial research was focused on programming courses, presumably due to gamification being previously viewed as an innovative technology, there is a growing shift towards gamifying courses across other disciplines (Dicheva and Dichev, 2015). Gamification research in education has been applied in academic subjects including science, mathematics, languages, culture, health, computer science, software engineering, business, logistics, human use of technology, use of Photoshop, multimedia content production, psychology and research methods (Caponetto et al., 2014; Dicheva and Dichev, 2015).

Research into gamification in education has yielded mixed results. As indicated in Figure 2-13 (Dicheva and Dichev, 2015), whilst there have been positive results in earlier years, there has been a trend of inconclusive results emerging.

Figure 2-13: Outcomes of published papers (2010-07/2015)
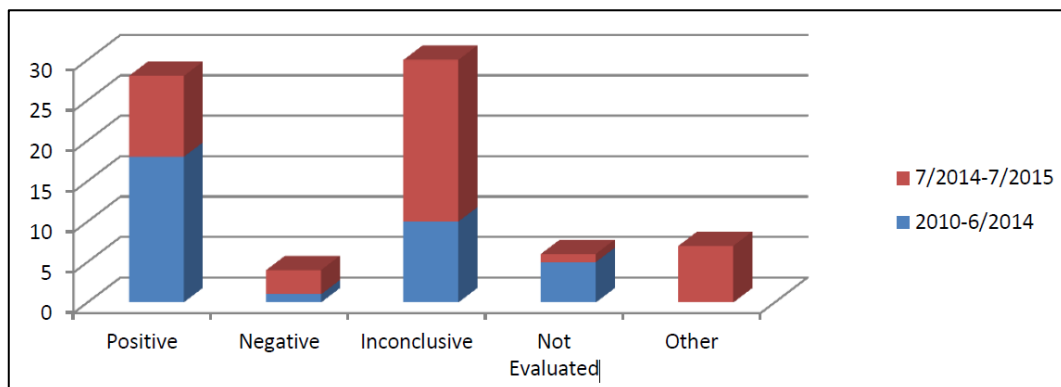
Source: Dicheva and Dichev (2015)

Despite this trend, gamification seems to be increasingly applied in education over the past few years, with many examples of success. Iosup and Epema (2014) utilised gamification in technical higher

education and found it necessary to have automated management of rewards for larger courses. Badges were found to be the most popular form of reward and constant feedback from students served as a useful analytical tool. O'Donovan et al. (2013) applied gamification in a classroom-based games development course and found that gamification improved understanding, engagement and performance. However, students were uncertain regarding the value of a storyline. Students were most motivated by leaderboards whilst badges, end-of-course prizes and progress bars were least motivating. However, the study only rewarded students for interaction in-class. Gamification has also been applied successfully by Akpolat and Slany (2014) and Bellotti, Berta, De Gloria, Lavagnino, Dagnino, Antonaci, and Ott (2013).

Whilst the abovementioned implementations were considered successful, there have been implementations that have failed. When Berkling and Thomas (2013) gamified a software engineering course, they found that many students were not gamers and were significantly motivated by relevancy. They suggest that students used in the study might not have been adequately prepared to embark on a gamified course which offered them autonomy and required students to take control of the mastery of course content (Berkling and Thomas, 2013). A longitudinal study by Hanus and Fox (2015) critiques gamification. They also argued that gamification, despite alignment to learning objectives, impedes motivation as commonly adopted elements were found to demotivate students and harm educational outcomes over time. They attributed this to a sense of decreased autonomy, decreased competence and a sense of tension and fatigue associated with gamification over time.

In terms of a possible trajectory to successful gamification in education, literature suggests that it is crucial to acknowledge the value of proper planning and design (Caponetto et al., 2014). Furthermore, there is increasing research around how students respond to various gamification elements and classifying students in gamified environments, particularly since practical implementations of gamification for learning exceed research (Dicheva and Dichev, 2015).

In terms of educational environments where gamification is applied, the most common context is blended learning, followed by unsupported online courses, MOOCs, supported online courses, e-learning sites and gamification support platforms (Dicheva et al., 2015). Further reviews indicate that there has been a significant increase in development of dedicated gamification applications (Dicheva and Dichev, 2015).

2.3.4.4. Existing research in gamification and e-learning

In addition to gamification research in education, there is an increasing body of research where gamification is applied in e-learning, in various formats. These include blended learning courses, full e-learning courses and even MOOCs.

In terms of blended learning, gamification has been applied with varying levels of success. Fotaris et al. (2016) explored gamification in a computer programming class. In their study, they divided students into two groups, of which one was exposed to online gamification-based tools like Kahoot! and CodeAcademy. Within the gamified group, they reported enhanced academic performance, increased attendance, and greater online engagement with course material. Furthermore, they reported an increase in motivation among students in the control group and the academic team.

On the other hand, Olsson, Mozelius, and Collin (2015) studied gamification in a traditional classroom programming course with a gamified Moodle component. In their study, they explored the influence of digital badges and found that whilst they had a motivational role, academic performance (grades) served as a stronger motivator. Research placing focus on a particular game element was also conducted by Buckley and Doyle (2016) in their study on virtual currencies. They applied an online gamified learning intervention among 100 undergraduate students to support a traditional accounting course. In terms of results, they found that gamification positively influenced learning, particularly in terms of knowledge gain and self-directed learning. However, they noted that results were dependent on students' centre of motivation: intrinsic or extrinsic. These studies signal that, whilst intrinsic motivation is preferred, it might be necessary to understand the levels of motivation of students engaging in a gamified course. Similarly, these findings suggest that whilst gamification can motivate, gamification is a tool to support learning and remains as a tool, even in the view of students.

Research into gamification in blended learning courses is not restricted to higher education. Within the South African secondary education, Adukaite and Cantoni (2016) explored the implementation of gamification in a secondary school tourism course which was delivered using a blended learning approach and supported by a web platform, classroom teaching and social media. In terms of students' prior experience, 39% reported never using computers prior to the course. Despite this, they reported that gamification piqued their interest with most motivation being derived from game elements like competition, challenges, scoring, immediacy of feedback and visual aesthetics. Academics in this study found that gamification has the potential to increase students' interest in subject, plays a role in developing a more conducive context for learning, and provides a more engaging way to assess learning. However, they reported experiencing shortages of time, inadequate technological resources, and a low level of computer literacy among teachers.

In terms of applying gamification to courses delivered entirely online, research indicates that gamification has been applied with largely positive results. Domínguez, Saenz-de-Navarrete, de-Marcos, Fernández-Sanz, Pagés, and Martínez-Herráiz (2013) explored gamification by means of developing a Blackboard plugin. In their study, they utilised two groups of students, one which was exposed to gamification and one which was not. They explored various game elements including trophies/medals (badges), progress bars and simulations. In terms of findings, students exposed to

gamification were motivated early in the course, but this motivation seemingly dwindled. Furthermore, they achieved better practical assessment scores, but lower written assessment scores.

de-Marcos et al. (2014) extended the results of this study to include a comparison between e-learning in isolation, e-learning supported by gamification, and e-learning supported by social media. They found that e-learning supported by both gamification and social media provided similar results in that they resulted in increased academic achievement and practical assessment. However, in terms of assessing deeper knowledge, students who were exposed to e-learning without gamification and social media performed better. Furthermore, beside positive attitudes towards social media and gamification, participation was not positively influenced. These findings may imply that interest in and as a result of gamification fluctuates. Furthermore, they also seem to support the earlier discussion that gamification is not a panacea. Whilst there are definitely positive outcomes, gamification may not yield desired results in every instance. It could be possible that the nature of the game design in these studies might have resulted in these findings. In that light, it supports the argument that game design must cater to a wider audience.

Furthermore, there exists a trend of exploring multiple game elements in full e-learning courses. Strmečki D., Bernik A., and D. (2015) explored applying gamification into an online informatics course. In their study, they also used two groups of students, one which was exposed to non-gamified e-learning and one which was exposed to gamified e-learning in Moodle. They explored various game elements including points, badges, levels and quests. Upon conclusion of the gamified course, they found that students reported experiencing greater learning success.

Research into gamification has also explored effects of adding and removing gamification from online courses. Amriani, Aji, Utomo, and Junus (2013) explored the effects of adding and removing gamification on two groups of 38 secondary school students in an online Moodle course. In the case of one group, they introduced gamification after one week of traditional e-learning, with no significant impact on interaction, whilst in the case of the other group, they removed gamification after one week and found a negative impact on interaction among students. In both cases, they also found that the role of the facilitator or academic in guiding students in gamification is crucial. These findings suggest that guidance and support play a significant role in gamification. Furthermore, findings also offer caution that gamification must be applied with planning and due diligence since backtracking on the intervention could have damaging consequences.

In the context of MOOCs, Chang and Wei (2016) applied gamification with the aim to understand how gamification engages learners. They commenced their study with a focus group with 25 frequent users of MOOCs and identified 40 game elements. Based on the focus group, they administered a survey among 5020 students and derived the ten most engaging game elements including virtual

goods, redeemable points, team leaderboards, Where's Wally game, trophies and badges, peer grading, peer emoticons, feedback, memory-game interactions, check points and skill points.

As may be gleaned from the literature, some trends prevail in gamification research around e-learning. These include utilising control groups and integrating gamification into existing learning management systems.

2.4. Theoretical frameworks underpinning this study

Whilst gamification research into e-learning has traversed across various types of e-learning, literature acknowledges that gamifying education is a complex process which demands that applying gamification is an informed process guided by theory. In this light, the theoretical frameworks underpinning this study are discussed.

Since the aim of the study is to investigate the influence of gamification on student motivation, it is necessary to ensure that motivation is distinctly prevalent in any theoretical framework used. Furthermore, since gamification at its most beneficial form (deep level gamification) aims to encourage particular behaviour, it was crucial to ensure that motivation is a significant construct in the theoretical framework.

This section discusses the theoretical frameworks adopted in this study.

2.4.1. Self-Determination Theory (SDT)

2.4.1.1. Unpacking SDT

There have been various theories and frameworks applied to gamification research. Amongst these are Self-Determination Theory (SDT), Intrinsic and Extrinsic Motivation, Situational Relevance, Situated Motivational Affordance, Universal Design for Learning, User-Centred Design, and the Transtheoretical Model of Behaviour Change (Nicholson, 2012; Seaborn and Fels, 2015).

However, of these theories and frameworks, SDT places strongest focus on intrinsic motivation whilst also acknowledging that human motivation exists on a continuum from amotivation (a lack of motivation) to intrinsic motivation. Since a core focus of SDT is motivation, it aligns closely with the concept of gamification which seeks to motivate behaviour, thus identifying it as a suitable theory in respect to gamification research (Nicholson, 2012). Central to this theory is acknowledgement that humans are active and progressive organisms (Deci and Ryan, 2000). Furthermore, SDT places focus on factors that drive individual choices whilst aiming to explain human needs, motivation and well-being within a social context (Deci and Ryan, 2000).

As can be gleaned from earlier discussions, SDT is comprehensively explores motivation from multiple dimensions. Evidence of its suitability in gamification studies, aside from motivation being

central, is that SDT is among the most established theoretical frameworks underpinning gamification research as argued by Seaborn and Fels (2015).

2.4.1.2.   Existing SDT research

The application of SDT in the field of e-learning itself is not a new concept. An SDT-based model was utilised by Chen and Jang (2010) in a study which explored attrition in online courses. In testing SDT, they found a link between contextual support and self-determination. However, they provide critique that self-determination does not adequately enable prediction of learning outcomes (Chen and Jang, 2010)

Furthermore, combining SDT with other theories is also demonstrated in literature. For instance, Sørebø, Halvari, Gulli, and Kristiansen (2009) conducted a study of e-learning wherein SDT was combined with the Technology Acceptance Model (Venkatesh and Davis, 2000). Despite this combination, SDT has also been used as a standalone theory. For example, Roca and Gagné (2008) used SDT to assess the adoption of gamification in a work environment.

Aparicio, Vela, Sénchez, and Montes (2012) goes further to specify how various game elements may be applied, in the context of SDT, to foster motivation. Firstly, to encourage autonomy, they propose adopting avatars, alternative activities, customisable interfaces, privacy settings, notification settings and macros (Aparicio et al., 2012). Secondly, in order to drive relatedness, they suggest utilisation of messaging, group collaboration, blogs, social media and online chat (Aparicio et al., 2012). Lastly, in order to inspire competence, they advocate for use of challenge, positive feedback, information of progress, points, leaderboards, levels and intuitive controls (Aparicio et al., 2012).

In terms of engaging users, Suh et al. (2016) utilised SDT to explore how user engagement is enhanced through gamification. In their study, they found that enjoyment positively influences engagement in a gamified information system whilst autonomy, relatedness and competence positively influences enjoyment (Suh et al., 2016). Within this, they found that autonomy is enhanced by providing rewards and opportunities for self-expression, competence is enhanced by rewards and competition, and relatedness is enhanced by competition and altruism (Suh et al., 2016).

As discussed, there have been failures in integrating gamification into e-learning. In this light, van Roy and Zaman (2017), using SDT as a foundation, propose nine heuristics (Table 2-4) to design successful gamification in education, though these heuristics may be applied to gamification outside the domain of education.

Table 2-4: Nine gamification heuristics based on SDT

Heuristic	Relation to SDT
1. "#Avoid obligatory uses"	Autonomy
2. "#Provide a moderate amount of meaningful options"	
3. "#Set challenging, but manageable goals"	Competence
4. "#Provide positive, competence-related feedback"	
5. "#Facilitate social interaction"	Relatedness
6. "#When supporting a particular psychological need, (I am) wary to not thwart the other needs"	Nexus of psychological needs
7. "#Align gamification with the goal of the activity in question"	Contextual support for activity
8. "#Create a need-supporting context"	Contextual support for environment
9. "#Make the system flexible"	User motivators

Each of these heuristics has implications for designing effective and successful gamification which harnesses intrinsic autonomous motivation (van Roy and Zaman, 2017). The researcher believes that proposing heuristics signifies the value of careful planning and design of gamification.

2.4.2. Intrinsic Motivation Inventory (IMI)

2.4.2.1. Unpacking IMI

As can be gleaned from earlier discussions, IMI has a likeness to SDT in that three of its seven subscales overlap with SDT. This will enable easier integration with a study utilising SDT. Since IMI has been developed to enable measurement of motivation, this results in IMI being identified as a suitable theory to complement SDT in this study.

2.4.2.2. Existing IMI research

Whilst research using IMI is not as extensive as SDT-based research, there has been research using IMI across a variety of disciplines including fitness, reading, technology, problem and puzzle solving, and education (Monteiro et al., 2015).

In the context of applying IMI into e-learning research, Redling (2013) explored the influence of intrinsic motivation of employees on e-learning courses in a work setting. Whilst they found no significant interest between intrinsic motivation and performance, they did ascertain significant relationships between the various components of IMI. However, a key finding in their study was that pressure negatively influenced employees' interest and resulted in a lower degree of perceived choice (Redling, 2013). This finding supports the need to design gamification based on heuristics, particularly in relation to autonomy and competence.

2.4.3. Technology Acceptance Model (TAM)

Since this study aims to understand the influence of gamification of e-learning on students' motivation, students are required to utilise e-learning and experience gamification.

In order to understand participants' acceptance and willingness to use e-learning, the Technology Acceptance Model (TAM) (Venkatesh and Davis, 2000) will be adopted. This model is based on the premise that when a user encounters a technology, perceived usefulness and perceived ease-of-use influence their decisions about how and when to use a technology. Whilst TAM has been widely used, its reliability and practicality has been critiqued, thus resulting in revisions (Venkatesh and Bala, 2008).

Bearing in mind this critique, the role of TAM in this study is not extensive or central. TAM provides a basis upon which to understand participants' willingness to use e-learning and gamification. This will in turn provide insight into participants' expectations of e-learning and gamification.

2.4.4. Role of the theoretical frameworks in this study

Since various frameworks contributed to this study, this section describes the role of the frameworks used in this study.

Self-Determination Theory was used to understand how gamification motivates participants from the perspectives of autonomy, relatedness and competence (RQ3). Similarly, Intrinsic Motivation Inventory was incorporated into this study to understand the extent to which gamification motivated participants on the continuum from amotivation to extrinsic motivation through to intrinsic motivation (RQ3). Furthermore, these frameworks played a partial role towards providing an understanding of participants experiences (RQ2). Lastly, the Technology Acceptance Model was used to understand participants prior experiences and expectations of both e-learning and gamification (RQ1).

Other frameworks, whilst not necessarily adopted as theoretical frameworks in this study, also played a role in answering the research questions. These included Octalysis (RQ2) and BrainHex which served as a primary means of classifying and profiling participants across all research questions.

2.5. Conclusion

In this chapter, the researcher aimed to explore existing literature relating to motivation, e-learning and gamification. Motivation and associated theories were explored as the review commenced. It emerged from the literature that whilst frameworks and theories exist in relation to motivation, focus on the comprehensiveness of motivation is crucial.

Thereafter, literature on e-learning was explored and reviewed in the context of its progress since its inception. Whilst its progress has been driven by obstacles encountered, its most recent iteration, MOOCs, presents similar challenges to earlier iterations.

When gamification was examined, it emerged that gamification is an emerging and constantly evolving domain of research, with much room for further inquiry. Gamification in education, particularly in e-learning, despite the presence of existing research, remains a research domain requiring deeper investigation.

3. CHAPTER THREE: RESEARCH DESIGN & METHODOLOGY

3.1. Introduction

Leedy and Ormrod (2005) describe research as a structured practice of gathering, scrutinising and interpreting information to derive greater understanding about a phenomenon. To ensure that any research undertaking fits this description, it is necessary to define the research design and research methodology.

This chapter commences by reiterating the aim of this study and the research questions. Thereafter, the research paradigm, design, research methodology and data collection techniques used in the study are discussed. The data analysis approach is then outlined. The chapter then concludes by reflecting on the ethical considerations pertaining to the study.

3.2. Aim & research questions

The aim of this study is to investigate the influence of gamification of e-learning on students' motivation.

In order to achieve the aim of the study, the research questions underpinning this study are:

RQ1. What are students' expectations of a gamified e-learning course?

RQ2. What factors influence students' experiences of participating in a gamified e-learning course?

RQ3. How does gamification of e-learning influence students' motivation in a gamified e-learning course?

This study seeks to obtain insights from students who were registered for the Special Topics in IS&T (ISTN731) course at the University of KwaZulu-Natal, Westville Campus. These insights include their perceptions and factors influencing experiences with the gamified e-learning course.

3.3. Research paradigm

It is prudent to commence with an outline of the overall research paradigm as it influences the research design, methodology, data collection and analysis. Guba and Lincoln (1994) define a paradigm as a set of beliefs which essentially represent a worldview that defines, from the perspective of a researcher, the nature of the world or reality, the researcher's position in it, and the possible relationships to the world or parts thereof. To extend this further, Rossman and Rallis (2011) offer a conceptualisation of a paradigm as a shared understanding of the world.

Paradigms are based on three fundamental considerations: ontology, epistemology and methodology (Guba and Lincoln, 1994). Ontology relates to the form and nature of reality and what can be known about it, epistemology considers the nature of relationship between the researcher, participants and

the research, and methodology considers how a researcher may go about conducting research (Guba and Lincoln, 1994).

Guba and Lincoln (1994) identify the existence of a multitude of paradigms ranging from positivism through to postpositivism, critical theories and constructivism. The aim of the positivist and postpositivist paradigms are primarily explanation whilst critical theory aims to provide critique and transformation, and constructivism seeks to provide understanding and reconstruction in the area of inquiry (Guba and Lincoln, 1994). These paradigms have been critiqued and extended to include the participatory paradigm (Heron and Reason, 1997) which places emphasis on the researcher as an individual living among research participants, whilst also emphasising the integration of action with knowledge.

Positivists hold a belief that a single reality exists and can be measured and understood through quantitative techniques whilst constructivists believe that a single reality doesn't exist (Lincoln, Lynham, and Guba, 2011). Rather, constructivists hold a view that the reality of the world is relative and constructed through the multiple realities. Therefore, they believe that these multiple realities must be interpreted through qualitative methods (Lincoln et al., 2011).

Whilst positivist research dominates in the field of information systems and technology research, Chen and Hirschheim (2004) contend that interpretivism is the next widely observed paradigm in information systems and technology research. They argued that positivist research is grounded in the formulation of hypothesis, models or causal relationships, make use of predominantly quantitative methods to test hypotheses, and that researchers appreciate and practice objectiveness and interpretation independent of their values (Chen and Hirschheim, 2004). On the other hand, they argue that interpretivist research is observed through evidence from a non-deterministic free-will perspective, researchers' engagement in the specific social and cultural context and interpretation based on participants' subjective viewpoints (Chen and Hirschheim, 2004).

In the context of this study, a constructivist or interpretivist paradigm is adopted. This may be explained by the fact that this study aims to understand a multitude of perspectives in a study which presents an arguable sense of uncertainty in a complex content with a variety of participants. Furthermore, the inclusion of research questions as opposed to hypothesis implies that interpretation of the meaning of events and activities in this study was the objective. Additionally, the researcher holds a constructivist outlook towards research and teaching practice.

The adoption of the constructivist paradigm presented implications or suggestions for this study. Aside from suggesting incorporation of a qualitative or mixed methods approach, there is also suggestion that a case study design be incorporated (Patel, 2015). Furthermore, methodologies that may be adopted include observation, interviews and focus groups whilst not ruling out quantitative methodologies like questionnaires (Patel, 2015).

The sections which follow in this chapter elaborate on the decisions related to the research design, approach and methodologies, whilst providing justification for the decisions.

3.4. Research design

Mouton (2001) describes the research design as the blueprint which outlines how a researcher plans to conduct research. Since research is underpinned by research questions and objectives, it is crucial to adopt a research design that allows the researcher to adequately answer the research questions and meet the research objectives (Mouton, 2001). The research design comprises the nature of the study, research approach, data sources and the overall research design.

3.4.1. Nature of the study

In order to classify the nature of a study, it is necessary to understand what the study aimed to achieve. A non-empirical study utilises research questions that are philosophical or theoretical in nature with data derived from philosophical analysis, conceptual analysis or existing literature (Mouton, 2001). Conversely, an empirical study employs the use of exploratory, descriptive or evaluative research questions (Mouton, 2001).

Since the research questions and objectives of this study are evaluative and exploratory in nature, this study may be classified as empirical.

3.4.2. Research approach

Three predominant types of research approaches may be applied to a study. Data may be collected and analysed using a qualitative, quantitative, or a mixed methods research approach (Leedy and Ormrod, 2005).

A qualitative research approach focuses on discovering and understanding experiences, perspectives, phenomena or qualities that occur in natural settings and involve capturing and analysing complexity of such phenomena (Harwell, 2011; Leedy and Ormrod, 2005). In contrast, a quantitative research approach attempts to generalise findings obtained from numerical analysis and objective measurements of data (Babbie, 2010). A mixed methods research approach integrates the practices from both qualitative and quantitative research approaches into a single study (Harwell, 2011).

Existing research into gamification has been predominantly quantitative in nature (Hamari et al., 2014). For example, quantitative approaches have been adopted to understand the broader concept of gamification by O'Donovan et al. (2013) to assess the impacts of gamification on higher education. Aside from this study, analysis of approaches in existing literature by Hamari et al. (2014) indicate a high prevalence of quantitative gamification studies. This signifies a gap in literature and suggests that in-depth research is warranted.

Since the objective of this study is not to generalise findings, but rather to deeply investigate the influence of gamification of e-learning on students' motivation, the researcher considered adopting a qualitative research approach. Whilst a qualitative approach allows a researcher to deeply investigate a phenomenon, it has been critiqued as being non-replicable or generalisable whilst also susceptible to being influenced by the researcher's experiences, perceptions and bias (Harwell, 2011).

This prompted the researcher to explore a mixed methods approach which employs a combination of both quantitative and qualitative approaches (Harwell, 2011). Johnson, Onwuegbuzie, and Turner (2007) explain that the central principle of a mixed methods approach is that multiple kinds of data be collected and analysed with different strategies and methods. It allows researchers to harness the strengths of both approaches and overcome any weaknesses that may emerge when using only a single approach (Johnson and Onwuegbuzie, 2004).

Leedy and Ormrod (2005) highlight four types of mixed-methods research designs: convergent, embedded, exploratory and explanatory. Convergent design involves parallel collection of both qualitative and quantitative data with the aim of triangulation whilst embedded design involves collection of both qualitative and quantitative data within a similar general time frame, with one approach dominating (Leedy and Ormrod, 2005). The aim of embedded design is to explore different but related research questions.

Exploratory and explanatory design both involve two phases. In exploratory design, qualitative data is collected and analysed followed by collection and analysis of quantitative data, informed by qualitative the results (Leedy and Ormrod, 2005). In explanatory design, quantitative data is collected and analysed followed by collection and analysis of qualitative data, informed by the quantitative results (Leedy and Ormrod, 2005).

Since this study comprised multiple research questions, with both qualitative and quantitative data being collected over a general time-frame, the researcher adopted an embedded mixed methods research approach. Furthermore, it should be noted whilst quantitative data was collected at the commencement and end of the course and qualitative data was be collected during the course, the intention was to explore gamification of e-learning from multiple dimensions. In this study, the qualitative and quantitative data fulfilled complementary roles.

The embedded mixed methods approach applied in this study bears resemblance to the concurrent mixed methods strategies outlined by Creswell (2013). In particular, it aligns with the concurrent transformative strategy as this study was guided by a theoretical framework with data collected concurrently, or over a general timeframe and given equal weighting (Creswell, 2013). It should be noted that when adopting a concurrent transformative strategy, a researcher may utilise triangulation

techniques to understand the nature of similarities and differences between qualitative and quantitative results (Creswell, 2013).

The use of a mixed methods approach has been previously been adopted by Sanmugam, Zaid, Abdullah, Aris, Mohamed, and Meijden (2016) to investigate the impact of infusing game elements and gamification into a study where classroom learning was supported by e-learning.

3.4.3. Primary vs. secondary data

In an empirical study, data may be sourced from either primary or secondary sources (Mouton, 2001). Primary data refers to data collected directly from a source or respondent whilst secondary data refers to data collected from existing data or literature sources (Leedy and Ormrod, 2005; Mouton, 2001; Sekaran and Bougie, 2013).

Since there has been a limited number of studies investigating the influence of gamification of e-learning on student motivation, particularly within this context, it is imperative to collect and analyse primary data.

3.4.4. Overall research design

As the research design is outlined, Johnson and Onwuegbuzie (2004) argue that a mixed methods research approach is an extension to quantitative and qualitative approaches, as opposed to serving as a replacement. In this light, there exist several research designs that may be adopted in a qualitative study. These include case studies, ethnographies, phenomenological studies, grounded theory and content analysis (Leedy and Ormrod, 2005). Similarly, there exist several research designs that may be adopted in a quantitative study. These include descriptive, experimental and comparative (Leedy and Ormrod, 2005).

In harnessing the benefits of a mixed methods approach combined with the aim to deeply investigate the influence of gamification of e-learning on student motivation, the researcher considered the utilisation of a case study design. By its nature, case study design integrates well into a mixed methods research approach due to the possibilities presented to obtain richer data collection, deeper analysis and comprehensive understanding (Kitchenham, 2010). Therefore, a case study design was adopted.

A case study is defined as an empirical research design where in-depth data is gathered from multiple sources regarding a contemporary phenomenon (a case) with the aim of obtaining an in-depth and real-world understanding of a situation (Leedy and Ormrod, 2005; Mouton, 2001; Sekaran and Bougie, 2013; Yin, 2013). Furthermore, in a case study, the boundary between the phenomenon and the context may not be apparent (Yin, 2013).

Leedy and Ormrod (2005) argue that a case study research design is suited to studies that involve a particular group of individuals (a class of students); over a period of time (one semester) in order to assess the outcome of an intervention that has been applied (gamification of a course). In a case study, the case may be an individual, a group, an event or the situation that the researcher is investigating (Sekaran and Bougie, 2013).

When utilising a case study research design, a researcher may elect to adopt a particular type of case study. Yin (2013) define three types of case studies: explanatory, exploratory and descriptive. An explanatory case study may be used where the researcher seeks to understand the causal links in an intervention that may not be adequately explained by surveys or experiments (Yin, 2013). An exploratory case study may be used when a researcher seeks to explore a situation where an intervention has no clear or single set of outcomes (Yin, 2013). A descriptive case study may be applied by a researcher to describe an intervention and the context in which it occurred (Yin, 2013).

Since this study sought to investigate the influence of gamification of e-learning on student motivation within the context of a closed-access e-learning platform, it may be argued that the broad context within which the gamification being applied is defined and established. Furthermore, whilst there are research questions underpinning this study, the outcomes of the application of gamification to the e-learning course were not clearly defined. Therefore, an exploratory case study research design was adopted with the case being defined as the application of the gamification to the Special Topics in Information Systems & Technology (ISTN731) course.

The use of a case study research design for gamification research is supported by a similar design being used in prior studies investigating gamification in the context of higher education. O'Donovan et al. (2013) adopted a case study design to understand the effects of applying gamification principles in a university-level course, with positive results. Gehringer and Peddycord (2013) adopted a similar research design in a study of gamification being applied to an Ethics in Computers university course. Furthermore, a case study design was adopted by Akpolat and Slany (2014) when exploring gamification of a Software Engineering course.

Additional details pertaining to the case, context of this study, including the aims of the ISTN731 course, objectives, available resources, gamification design, and other relevant details are expanded upon in Chapter Four.

3.5. Research methodology

Research methodology is a systematic approach to solve the research problems (Kothari, 2004). It focuses on the research process and tools which might be used to achieve the objectives of the study and execute the research design (Mouton, 2001).

3.5.1. Population

The population refers to the group of individuals who may be of interest to the researcher in their investigation (Sekaran and Bougie, 2013). The population for this study comprised all students registered for the ISTN731 honours-level semester-long course offered by the Discipline of Information Systems & Technology in the School of Management, IT and Governance at the University of KwaZulu-Natal, Westville Campus.

Sekaran and Bougie (2013) suggest that population for a study be defined in terms of elements, geographical location and size.

3.5.1.1. Elements

The ISTN731 course is offered on an annual basis with all learning activities taking place almost entirely on an e-learning platform. Since the phenomenon under investigation is the influence of gamification of e-learning on student motivation, students registered for the course were identified as suitable elements for the study.

3.5.1.2. Study site

The site of the study was the University of KwaZulu-Natal Westville Campus which is situated in the suburb of Westville in Durban, South Africa. However, it should be stated that since the ISTN731 course will be offered using a web-based e-learning platform accessed via the Internet, participants may not necessarily be situated on-campus at every instance of data collection.

3.5.1.3. Population size

In 2014, the number of students registered for the ISTN731 course at the Westville Campus is 37 ("Real Time Module Enrolments," 2014).

3.5.2. Sample

A research sample is a representation of the population from which a sample is drawn (Sekaran and Bougie, 2013).

3.5.2.1.   Sampling approach

3.5.2.1.1   Overall sampling approach

A researcher may elect to utilise various types of sampling when conducting research. These types of sampling include probability sampling, non-probability sampling or census sampling.

Probability sampling is a sample design where every element within the population has equal potential to be represented in the sample (Leedy and Ormrod, 2005; Sekaran and Bougie, 2013). Probability sampling is typically used where representativeness and generalisability are crucial (Sekaran and Bougie, 2013).

Non-probability sampling, on the other hand, is a sample design where the researcher is unable to predict that each element of the population will be represented within the sample (Leedy and Ormrod, 2005). Non-probability sampling is better suited when generalisability is not crucial and when constraints exist (Sekaran and Bougie, 2013).

A census is a sampling approach used when all elements within a population are considered part of the sample (Sekaran and Bougie, 2013). Whilst undertaking a census may require greater resources, the data yielded is more representative of the population (McLennan, 1999).

In case study research, a researcher is required to utilise multiple sources and methods of collecting data to gain a comprehensive understanding of the phenomenon under investigation (Leedy and Ormrod, 2005). Therefore, adopting a combination of sampling approaches for qualitative and quantitative data collection enabled the researcher to understand both the depth and breadth of the phenomenon under investigation.

3.5.2.1.2   Sampling approach for qualitative data collection

As discussed, it is necessary for the researcher to apply multiple methods of data collection in a case study. Since generalisability is not crucial, non-probability sampling was applied as a sampling approach to gather qualitative data.

Leedy and Ormrod (2005) identify three forms of non-probability sampling:

i.   Convenience sampling, where the researcher does not aim to identify a representative subset of a population and utilises elements that are readily available and easily accessible.

ii.   Quota sampling, where the researcher selects elements based on the same proportions/categories that may be found in the overall population.

iii.   Purposive sampling where the researcher selects elements based on a set of predefined traits or characteristics.

Purposive sampling is best applied when a researcher seeks to obtain information from specific elements within a sample who meet some predefined criteria (Sekaran and Bougie, 2013). Furthermore, this approach has strong potential to yield robust and reliable data (Tongco, 2007). Additionally, Yazan (2015) cites that case study research methodology requires that purposive sampling be applied.

Therefore, in order to deeply investigate the influence of gamification of e-learning on student motivation, the researcher purposively sampled participants for qualitative data collection based on specific criteria.

In this study, it is expected that participants may engage and perform at different levels within the gamified e-learning course. In order to deeply understand the influence of gamification of e-learning on student motivation within this case, it is imperative that the researcher studies the phenomenon from various perspectives. Maximum-variation sampling is a purposive sampling approach where a researcher purposively samples a population in a manner that allows a wider range of perspectives based on behaviour or attributes ranging from typical to more varied in nature (Lund and Lund, 2010). As a result of the above, maximum-variation purposive sampling is employed as the sampling approach for selecting interviewees from the population.

3.5.2.1.3 Sampling approach for quantitative data collection

Within the context of this study, the researcher will aim to explore prior expectations and factors influencing experiences of participants when exposed to a gamified course. In order to achieve these aims, it is necessary to obtain insight from as many elements in the study as possible.

Whilst a case study research design will be followed in this study, the size of the population is not large. Hence, the researcher will utilise census sampling for quantitative data collection. This will allow the researcher to understand overarching motivators, perceptions, expectations and experiences of the sample in relation to a gamified e-learning course. However, it should be reiterated that generalisability outside the population of this study is not the objective.

3.5.2.2. Sample size

Since the case under investigation in this study is the application of the gamification to the Special Topics in IS&T course, the researcher endeavoured to accomplish a census.

Since gamification was be applied to the course, all students, including any students who did not consent to participation in the research project, experienced gamification. Non-participation in the research project meant that such students did not complete questionnaires or participate in interviews. However, non-participation had no negative impact in academic or game-related progress or performance. All consenting students represented participants in this study.

3.5.3. Data collection

In a case study, both qualitative and quantitative data may be collected and analysed to provide an in-depth understanding of the phenomenon under investigation (Sekaran and Bougie, 2013). Data may be collected using instruments may broadly be categorised as observation, self-reporting or documentary sources (Mouton, 2001). Qualitative data may be collected by means of interviews, focus group discussions and observations whilst quantitative data may be collected using questionnaires and document analysis (Sekaran and Bougie, 2013).

In alignment with the mixed methods approach, the research instruments that were utilised in this study include two sets of questionnaires, twelve interviews based on a single interview schedule, and observation of interactions on the gamified e-learning platform. The overall approach towards data collection bore some resemblance to the approach utilised by O'Donovan et al. (2013), Todor and Pitica (2013) and Siemon and Eckardt (2017).

3.5.3.1. Interviews

Interviews are a data collection tool that allows a researcher to obtain responses verbally from participants (Sekaran and Bougie, 2013).

3.5.3.1.1 Interview design

As discussed, interviews were conducted to understand participants' experiences and their motivation derived from gamification. Interviews were guided by literature relating to motivation, e-learning and gamification and explored participants' experiences thus far in terms of their game performance, engagement in the course and motivation. This was further unpacked to understand how participants were motivated or demotivated by gamification in this study. As part of this, they were asked regarding the influence of game elements on their motivation. Participants were also asked regarding whether gamification influenced their learning, workload, and anticipated academic performance. Furthermore, in order to contextualise these findings, participants were asked regarding their understanding of the game and any challenges they encountered. These included challenges around gamification, game elements and their environment.

In terms of theoretical frameworks, the interviews were designed in alignment with the Technology Acceptance Model to understand participants outlook towards gamification and e-learning, and Self-Determination Theory and Intrinsic Motivation Inventory to understand the influence of various factors influencing motivation.

Interviews may be unstructured or structured in nature. Unstructured interviews involve an approach where the researcher does not enter the interview with a planned set of questions which may allow the researcher to uncover areas for further study (Sekaran and Bougie, 2013). On the other end of the spectrum, structured interviews involve an approach where the researcher knows at the outset the

information that is needed and enters the interview with a list of predetermined questions (Sekaran and Bougie, 2013). A blended approach of adopting semi-structured interviews may also be utilised.

Interviews that were conducted in this study are semi-structured in nature. In semi-structured interviews, whilst a researcher enters the interview with a schedule of predefined points for discussion, interviewees are provided with opportunities to share further insights which might not have been queried (Leedy and Ormrod, 2005). This approach allowed the researcher to ensure that responses from the interviews follow a similar flow to enable answering the research questions, whilst also enabling discovery of additional areas of focus.

Interviews may be conducted face-to-face or telephonically. Whilst face-to-face interviews may present geographical restrictions, they allow a researcher to adapt questions, clarify doubts immediately and gauge body language (Sekaran and Bougie, 2013). Despite the fact that telephonic and online interviews allow a researcher to gain insights from participants irrespective of location, these approaches may result in interviewees feeling less inclined to share personal information or unforeseen termination of calls (Sekaran and Bougie, 2013).

In this study, the concrete nature of face-to-face interviews, especially in their suitability to case studies, coupled with the fact that participants were geographically accessible led to face-to-face interviews being conducted.

3.5.3.1.2   Interview logistics

During the progress of the course, twelve interviews were conducted with participants. The Special Topics in IS&T course was divided into three broad topics and interviews were held at the end of each topic. This approach allowed the researcher to understand participants' experiences as the course progresses. Each interview was scheduled for 45 minutes but actual times fluctuated based on the level of engagement in each interview, with additional time catered for, when required.

3.5.3.1.3   Interviewee selection

As discussed, maximum-variation purposive sampling was employed as a sampling approach for interviews. This approach allowed the researcher to obtain insights from specific participants based on their engagement or performance.

Leedy and Ormrod (2005) recommends that an interview sample includes both typical and non-typical interviewees. Furthermore, Leedy and Ormrod (2005) recommend selecting interviewees from a community that are involved and influential at different levels whilst also recommending that the interview sample also include participants who might potentially discredit emerging hypothesis.

As a result, participants were purposively sampled based on their performance on the game leaderboard as well as their engagement in the gamified course, in relation to their peers.

Additionally, participants were also placed into bands based on views shared on the online platforms which implied that they held a positive, negative or neutral outlook towards gamification. Based on these criteria, interviewees were categorised into three types as indicated in Table 3-1.

Table 3-1: Criteria for interviewee selection

Interviewee Types	Position	Observed Level of Engagement
Engaged	Position 1-10 on the game leaderboard at time of interview	Observed to be engaging strongly with the gamified e-learning course
Partially-Engaged	Position 11-20 on the game leaderboard at time of interview	Observed to be engaging moderately with the gamified e-learning course
Disengaged	Position 20+ on the game leaderboard at time of interview	Observed to be engaging poorly with the gamified e-learning course

Interviewee types ranged from Engaged participants who were found to be performing and engaging strongly in the gamified course through to Disengaged participants who were found not to be performing and engaging in the gamified course. Whilst these interviewee types defined as the study commenced, specific interviewees were selected based on them fitting a particular type at the time of the interview.

Potential interviewees were invited to participate in interviews via email. In the case where purposively sampled participants are unable to participate, the researcher sought to obtain the next closest interviewee in terms of interviewee type. To encourage a diversity of views, no participant was interviewed more than once. Each interviewee was asked to provide their student number during interviews to allow for comparative analysis with quantitative data.

Whilst the researcher aimed to interview participants in order to gain representation of the three types of interviewees, the researcher was cognisant of reaching saturation point. It is necessary to ensure that data saturation is reached as it impacts the quality and validity of the research endeavour (Fusch and Ness, 2015). Saturation point may be defined as the point when the ability to obtain new information has been reached, enough information is obtained to replicate the study, and when further coding is deemed to be no longer feasible (Fusch and Ness, 2015)..

In this study, the researcher based the interviews on the theoretical frameworks whilst offering flexibility for additional themes to emerge. As the researcher reached the last phase of interviews, it was deemed that saturation point was reached since no new themes emerged and it became apparent that enough data had been collected to adequately answer the research questions.

3.5.3.1.4   Credibility and trustworthiness

Leedy and Ormrod (2005) highlight the need to ensure credibility and trustworthiness of qualitative instruments. Validity refers to the extent which an instrument measures what it is intended to measure whilst reliability refers to the extent an instrument yields consistent results when a characteristic being measured has not changed (repeatability) (Leedy and Ormrod, 2005).

To ensure validity and reliability, the researcher identified key aspects to be discussed in interviews. These aspects are weighted and included in the interview schedule based on their weighting. This approach allowed the researcher to ensure that the constructs being investigated are given adequate coverage in the interview schedule based on their relevance to the study.

A draft interview schedule was reviewed by the researcher's peers with experience in designing research instruments and prior exposure to e-learning. Recommended changes were incorporated into the final interview schedule.

Furthermore, the researcher employed member-checking where independent feedback was obtained from interviewees during and after data collection. Adopting this technique aided in avoiding any misunderstandings on the part of the researcher.

3.5.3.2.   Questionnaires

Questionnaires are research instruments designed to collect data where respondents provide answers to a set of predefined questions using closely defined alternatives (Sekaran and Bougie, 2013).

3.5.3.2.1   Questionnaire design

At the commencement of the course, an initial questionnaire was distributed to all participants. This questionnaire aimed to establish the gamer profiles of participants and understand their prior experiences with e-learning and gamification. Furthermore, it was anticipated that the questionnaire will shed insight into their expectations of participation in a gamified course and their perceptions towards gamification. In terms of theoretical frameworks, the initial questionnaire was designed in alignment with the Technology Acceptance Model to understand participants outlook towards and expectations of gamification and e-learning.

Questions pertaining to prior experience with e-learning and prior expectations of e-learning were adapted based on questions utilised by Tagoe (2012). These questions were further adapted to explore participants' expectations of e-learning. Gamification and game-related questions in the initial questionnaire were designed based on components of the questionnaire designed by O'Donovan et al. (2013). Adaptations of these questions served to probe experiences and expectations from e-learning and gamification. Additionally, questions on gaming habits, game preferences and gamer profiles were included in the survey. Gamer profiles were based on results obtained by students upon

completion of the BrainHex survey (Bateman, 2009). This approach to obtaining BrainHex profile resembled the approach used by O'Donovan et al. (2013) where participants completed the BrainHex survey online and shared their results with the researcher.

On conclusion of the course, an end-of-course questionnaire was distributed to all participants. This questionnaire sought to understand the experience of students in the gamified course in terms of motivating factors, their experience with the gamified course and in relation to the theoretical frameworks. The end-of-course questionnaire was designed in alignment with Self-Determination Theory (Deci and Ryan, 2000), Intrinsic Motivation Inventory (Monteiro et al., 2015) and theoretical aspects found to be relevant in existing literature. Self-Determination Theory and Intrinsic Motivation Inventory questions were adapted from the questionnaires provided online at selfdeterminationtheory.org (Deci and Ryan, 2011). The purpose of integrating these frameworks into the design of questionnaires was to understand the influence of gamification on participants' motivation from the perspective of the various constructs.

Relevance in terms of literature was determined by the ability of the theoretical aspects emerging in the literature to contribute to answering the research questions. Participants were also asked regarding their experiences of the platform, storyline, scoring and rewards. Furthermore, they were asked about their ranking of specific game elements.

In order to enable participants to share additional experiences and dimensions that might not have been explored, both questionnaires also included open-ended questions.

Utilisation of two questionnaires resembled a gamification study by Buckley and Doyle (2016) where they utilised pre-intervention and post-intervention questionnaires.

In questionnaire design, measurement is defined as constraining data to allow for interpretation and comparisons (Leedy and Ormrod, 2005). Both questionnaires employed a five-point Likert scale measurement to understand expectations and experiences of participants.

Table 3-2: Likert scale employed in this study

Likert scale statements	Value associated with each statement to be used in analysis
Strongly disagree	1
Disagree	2
Neutral	3
Agree	4
Strongly agree	5

Students were asked to provide their student numbers in both questionnaires for the purposes of comparative analysis, where necessary.

3.5.3.2.2 Dissemination of questionnaires

Questionnaires were distributed to students as paper-based questionnaires, except in the instance where participants were not on-campus at the time of data collection. In such instances, electronic copies of the questionnaire were distributed to participants to complete and return.

The researcher opted to use paper-based questionnaires instead of online questionnaires as this allowed the researcher and participants to meet in person, thus resulting in the forming of some relationship between the study and the participant. As discussed, applying census sampling was necessary to understand the overarching as well as individual motivators, perceptions, expectations and experiences of the sample in relation to a gamified e-learning course.

The initial questionnaire was facilitated at an introductory face-to-face session with the entire group. In this session, students were introduced to the course by the lecturers and introduced to the gamification of the course by the researcher. Thereafter, the initial questionnaire was distributed among students. Students who indicated willingness to participate in the research were then required to complete a declaration of informed consent and then the initial questionnaire. Once the questionnaires were completed and returned, all students were provided with details to access to the e-learning platform.

The end-of-course questionnaire was also facilitated during a face-to-face session where the questionnaire was distributed to participants. Thereafter, the researcher shared the results of the gamified experience (the winners of various known and unknown rewards). Sharing of results of the research was due to follow at a later stage.

3.5.3.2.3 Validity and reliability

Mouton (2001) emphasises the need to ensure validity and reliability of questionnaires. As previously stated, validity refers to the extent which an instrument measures what it is intended to measure whilst reliability refers to the extent an instrument yields consistent results when a characteristic being measured has not changed (repeatability) (Leedy and Ormrod, 2005).

In ensuring validity and reliability, draft questionnaires were also reviewed by the researcher's peers with experience in designing research instruments and who have prior exposure to e-learning. Any changes recommended by these peers were incorporated into the final questionnaires.

Additionally, the researcher also undertook a pilot study with students who completed the same programme in the previous year. This ensured that participants of the pilot study resembled the intended participants in the main study in that they held similar traits, pursued similar academic goals,

and held similar career aspirations. In the pilot study, participants were asked to provide feedback on formatting, layout, length and sequence, any ambiguity, double-barrelled questions, leading questions and loaded questions (Mouton, 2001; Sekaran and Bougie, 2013). Care was also taken to ensure that questions were not offensive or threatening to any respondent. Feedback from the pilot study was integrated into the respective questionnaires.

3.5.3.3. Observation

An additional technique which was utilised in this study is observation. During observation, the researcher may represent an external or internal participant whose observations are intentionally free-flowing and unstructured with the aim of shifting focus as significant events are observed (Leedy and Ormrod, 2005). Whilst this data collection approach offers flexibility, potential researcher considerations include changing focus with the correct lenses and remaining impartial during observation (Leedy and Ormrod, 2005).

In this study, the researcher observed and recorded students' interactions on the e-learning platforms which were used in the course. In ensuring that objectivity is maintained, the research questions governed observation and researcher involvement on the gamification platform took place only when interaction was required to drive the game forward. Such interactions included placing notices related to the tasks, driving the storyline, rewards and extensions. Additionally, the researcher responded to queries on the platform that related to the gamification.

Data collection included ongoing observation of specific student interactions alongside transcripts of discussions on the platforms used. These interactions were stored in a journal and in document form, where required.

3.6. Data analysis

Data analysis is defined as the process of dissecting data with the aim of discovering findings, themes, trends or relationships (Mouton, 2001). Thereafter, data is interpreted, and conclusions drawn.

3.6.1. Qualitative analysis

Data gathered in semi-structured interviews was analysed through thematic content analysis. The process of thematic content analysis involves analysing transcripts, identifying themes in the data, and gathering and presenting examples from the data (Burnard, Gill, Stewart, Treasure, and Chadwick, 2008). A similar approach was adopted by O'Donovan et al. (2013) in their study on gamification of a software development class.

3.6.1.1. Alignment with research questions

The researcher categorises the responses to the interviews in terms of their alignment with the research questions, as indicated in Table 3-3.

Table 3-3: Alignment between interviews and research questions

Research Questions	Source
RQ1: What are students' expectations of a gamified e-learning course?	No data from interviews applicable
RQ2: What are students' experiences of participating in a gamified e-learning course?	12 interviews
RQ3: How does gamification of e-learning influence student motivation in a gamified e-learning course?	12 interviews

3.6.1.2. Capturing and coding interviews

At the commencement of each interview, interviewees were asked if they consent to their interview being recorded. If an interviewee agreed, the interview was recorded. These audio recordings were shared with a research assistant for transcription. Once the interviews were transcribed based on the exact words of participants, the researcher proceeded to import these transcripts into the NVivo software package. The researcher also included notes which were made during the interviews.

Another aspect confronted the researcher involved interviewees grammar and language. most participants in this study were students whose home language may not necessarily have been English. This is evidenced by the institution's 2006 language policy which stated that, at the time, students with isiZulu as their home language represented a growing group in the University and that isiZulu was the most widely spoken language in KwaZulu-Natal ("Language Policy of the University of KwaZulu-Natal," 2006). In recognition order to preserve the message being shared by interviewees, the researcher used transcriptions which were an exact representation of the words shared in interviews. In areas where further clarity was required, the researcher provided this during analysis. Furthermore, if words were added by the researcher for clarity, these were placed in brackets.

There is a difference of opinion on the depth at which researchers transcribe interviews in relation to vocabulary, grammar and body language (Poland, 1995). Whilst interview transcripts may be edited for clarity of language and ideas, there is a risk of altering the data and losing the message (Poland, 1995). To this end, the researcher sought to ensure that vocabulary and grammar were transcribed verbatim whilst body language was included in the researcher's notes and incorporated into analysis if applicable.

3.6.1.3.   Analysing interviews

Burnard et al. (2008) identify an approach to analysing interviews. This approach is listed below and is followed by a summary of how the researcher fulfilled these steps.

These steps include:

1. Read the transcripts and make notes in the margins of words, theories and phrases that encapsulate the essence of the text (open coding).
2. Consolidate the words, theories and phrases, and remove any duplications.
3. Identify overlapping and similar categories and develop groups (codes).
4. Code the data, based on these categories and groups, in the interview text.
5. Organise the data, based on the codes/themes, into an organised dataset.
6. Interpret and write up the research findings based on these codes/themes.

To complete these steps, the researcher read through the transcripts and interview notes and made observations and additional notes, where applicable. Through this process, the researcher aimed identify which statements which were relevant to the study and which statements are unrelated. This also provided an opportunity to include and consider body-language and other contextual information as ideas were discussed. The researcher developed categories (or codes) when designing the interview schedule. At this point, the researcher imported the transcripts into NVivo and included the developed codes (Nodes) into the software package. The interviews were then then coded, and the data organised using NVivo. These findings and related discussions are presented in the subsequent chapters.

In terms of thematic codes (nodes), the constructs of the theoretical frameworks provided a basis for several codes. SDT provided codes relating to autonomy, relatedness and competence whilst IMI provided codes relating to interest/enjoyment, value/usefulness, effort/investment and tension pressure. TAM provided codes relating to perceived and experienced effectiveness for learning.

Additional themes which were initially identified and subsequently adopted during qualitative analysis. These included themes relating to participants' experiences like access and usage habits, facilities, support provided, workload, introduction and onboarding, collaboration, game elements, game design, gamified platform, rewards structures and amotivation.

3.6.2. Quantitative analysis

Quantitative data collected through the initial and end-of-course questionnaires was analysed using the SPSS statistical package. This section elaborates on the process undertaken to complete quantitative analysis.

3.6.2.1. Alignment with research questions

For ease-of-reference and to maintain the focus of the study, the researcher categorises the responses to the questionnaires in terms of their alignment with the research questions. These questions formed the basis of the presentation of the results and are indicated in Table 3-4.

Table 3-4: Alignment between questionnaires and research questions

Research Question	Source
RQ1: What are the prior motivators for participation in a gamified e-learning course?	Initial questionnaire: B1, B2, B3, C1, C2, C3, C4, C5, C6, D1, D2, E, F
RQ2: What are students' experiences of participating in a gamified e-learning course?	End-of-course questionnaire: D1, D2, E1, E2
RQ3: How does gamification of e-learning influence student motivation?	End-of-course questionnaire: B, C, E1, E2

3.6.2.2. Capturing and coding questionnaire responses

Data collected through the paper-based questionnaires was captured into the Microsoft Excel software package. During data capturing, each participant was given a unique identifier to ensure anonymity, whilst allowing for comparative analysis between the two questionnaires and interviews, if applicable. Data was cleaned up and coded in Microsoft Excel and thereafter, exported into the SPSS software package to carry out statistical tests. The data was then coded in SPSS according to nominal and ordinal scales. Likert-scale and ordered data was coded as ordinal whilst data with no particular order will be coded as nominal.

The researcher expected that there will emerge instances where participants did not answer every question in a questionnaire. However, their responses were considered usable, provided that only a limited number of questions were omitted, and their omission did not significantly hinder efforts to answer the research questions.

3.6.2.3. Reliability

Statistical reliability allows a researcher to ensure validity and correctness of measurement scales, and thus, of resulting statistical analysis (Leedy and Ormrod, 2005). Statistical tests were conducted on Likert-scale data to determine reliability.

Cronbach's Alpha is a measure of internal consistency and reliability of a given test or scale, and is represented as a number between 0 and 1 (Tavakol and Dennick, 2011). Cronbach's Alpha aims to ascertain the extent to which items in a test measure a construct thus giving insight into the interconnectedness of each item (Tavakol and Dennick, 2011). Whilst Cronbach's Alpha may yield insight into the reliability of a test comprising multiple items, Cronbach's Alpha tests should also be conducted at an item level (Cohen, Swerdlik, and Phillips, 1996).

In this study, the research conducted Cronbach's Alpha tests on individual items (specific questions) and the constructs (like autonomy, relatedness and competence). However, the researcher elected to report reliability at a construct level rather than an item level since this approach still provided insight into reliability of constructs coupled with the fact that all included individual items were deemed to be statistically reliable on their own.

A Cronbach's Alpha value ranging from 0.7 to 0.95 would be deemed acceptable whilst factors like too few items and poor interconnectedness may yield a lower value (Tavakol and Dennick, 2011). Therefore, any Cronbach's Alpha internal reliability test which resulted in a reliability coefficient within the range of 0.7 and 0.95 for a test of a specific construct resulted in such a result being deemed to be reliable. Any factors which negatively influenced the reliability of results were removed from the analysis.

3.6.2.4. Parametric vs non-parametric tests

When analysing quantitative data, it is critical to ensure that the correct statistical tests are carried out. There are two types of statistical tests which are possible: parametric and non-parametric. Parametric tests assume that data being analysed is normally distributed and represented using interval or ratio scales (Leedy and Ormrod, 2005). Non-parametric tests, on the other hand, are used when distribution of the data is not normal and where data is ordinal in nature (Leedy and Ormrod, 2005).

In this study, the data being analysed was of an ordinal in nature and the sample was non-homogenous. Whilst these factors contributed to the determination that non-parametric tests would be adopted, it was also necessary to determine the distribution of the data.

In order to determine the distribution of the data, two common tests of normality may be conducted: the Kolmogorov-Smirnov and Shapiro-Wilk tests ("Testing for Normality using SPSS Statistics," 2013). The researcher utilised the Shapiro-Wilk test which was more suitable for smaller sample size ($n<50$) ("Testing for Normality using SPSS Statistics," 2013). If a sig. value < 0.05 is obtained when a Shapiro-Wilk test is conducted, data is deemed to not follow a normal distribution, which will indicate that non-parametric tests will be utilised. If a sig. value < 0.05 is not obtained, data may be deemed to follow a normal distribution, which will result in parametric tests being adopted.

3.6.2.5.   Descriptive statistics

Leedy and Ormrod (2005) describe categories of descriptive tests to describe data: measures of central tendency, variability and association (correlation).

Measures of central tendency refer to the techniques used to find the point around which data revolve. These techniques include determining the mean (the arithmetic average which represents the single point at which two sides of a distribution balance), median (the numerical centre of a set of data) or mode (the score that occurs most frequently). Leedy and Ormrod (2005) indicate that when working with ordinal data, reporting of means and modes may not yield accurate results. Therefore, the researcher determined central tendency by testing for the median.

It is also important to determine the measures of variability which allows a researcher to understand the dispersion and deviation of the data from the central point. These techniques include the range, standard deviation and variance. If the data recedes further from the central point (higher measures of variability), the data increasingly loses the qualities that make it average/central. In line with testing ordinal data for the median, the researcher determined variability by testing for variance.

Measures of central tendency and variability involve a single variable. However, at times, the researcher might also seek to determine the nature of the association between two or more variables (correlation). A correlation has two distinct qualities: direction and strength. The result of a correlation test, the correlation co-efficient ranges for -1 to +1 and provides details of the direction and strength of a correlation. A positive result indicates a direct correlation between two variables whilst a negative result indicates an inverse correlation between two variables. Additionally, the closer value of the correlation co-efficient is closer to -1 or +1, the stronger the correlation whilst the closer the value of the correlation co-efficient to 0, the weaker the correlation.

Leedy and Ormrod (2005) identify four non-parametric correlation tests: Spearman's rank correlation (suitable for rank-ordered, ordinal data), Kendall coefficient of concordance (suitable for ordinal, rankings made by multiple rankers), Contingency coefficient (suitable for nominal data) and Kendall's Tau correlation (suitable for ordinal data, useful for small sample sizes where n<30). When considering the nature of the data coupled with the possible sample size in this study n>30, the researcher tested for association using Spearman's rank correlation.

In this study, the researcher anticipated running correlation analysis on various quantitative data. However, upon completion of data collection, the researcher only elected to perform correlation analysis on the composite variable which explored expected value/usefulness against experienced value/usefulness of gamification. The researcher elected to dedicate energies towards exploring associations identified in qualitative results. Furthermore, the nature of the initial and end-of-course

questionnaires did not provide further quantitative data upon which direct correlation analysis could be run as the objectives of each instrument was inherently different.

Themes which were initially identified and subsequently adopted during quantitative analysis included prior expectations of e-learning and gamification, prior experience with e-learning and gamification, usage and access habits, support provided, anticipated and experienced preferences of game elements. Furthermore, themes like experience of game design, the gamified platform, rewards structures and amotivation. Lastly, themes relating to the theoretical frameworks were also adopted.

3.6.3.   Analysing qualitative and quantitative data in tandem

As discussed, a mixed method research approach allows a researcher to realise the complementary nature of quantitative and qualitative approaches (Johnson and Onwuegbuzie, 2004).

When analysing data in a mixed methods study, a researcher may elect to give priority to either qualitative or quantitative data (Leedy and Ormrod, 2005). Alternatively, a researcher may assign an equal weighting to both qualitative or quantitative data (Leedy and Ormrod, 2005). As discussed, in this study, equal weighting was given to qualitative and quantitative data.

Furthermore, a researcher must consider how to effectively integrate qualitative and quantitative findings when interpreting data in a mixed method study (Leedy and Ormrod, 2005). A researcher may elect to analyse the frequency at which themes emerge in both the qualitative and qualitative results and discuss these (Leedy and Ormrod, 2005). Another approach includes comparing qualitative and quantitative results to understand similarities and differences which emerge (Leedy and Ormrod, 2005).

During the analysis, the researcher examined both qualitative and quantitative results using the constructs of the theoretical frameworks as a basis. When interpreting the results, the qualitative and quantitative analysis were then compared to each other to understand similarities and differences. Results which complemented and contrasted each other were then explored and discussed further.

When utilising a mixed methods approach where qualitative and quantitative data are collected concurrently over a general timeframe, given equal weighting, and guided by a theoretical framework, Creswell (2013) indicates that data may be merged and connected during interpretation, reporting and discussion. This merging allows the researcher to integrate, compare and contrast qualitative and quantitative results into a single discussion (Creswell, 2013).

In this study, the researcher adopted this approach when interpreting, reporting and discussing the results. As discussed by Creswell (2013), this approach is commonly found in mixed methods studies as it has been shown to result in well-validated and credible findings.

3.7. Ethical clearance and necessary permissions

Whilst the underlying objective of research is to uncover new information that contributes to the larger body of knowledge, it is crucial that a researcher fulfils their ethical duty to the research participants, the discipline and society (Mouton, 2001).

In ensuring that the ethical duties are fulfilled correctly the objectives and intended outcomes of this study were communicated to participants, in writing, at the commencement of the research. Participation in the study was voluntary and informed consent was obtained from all participants. Participants were also afforded the opportunity to withdraw at any time, with no negative consequence in the course or their rank in the game. Furthermore, the researcher undertook to respect the rights of participants to remain anonymous by ensuring that the privacy and confidentiality of participants and their responses was upheld. Anonymity and confidentiality was further protected by ensuring that the names of participants are not revealed in the research output.

To ensure the integrity of the study, the researcher obtained approval from the course lecturers to undertake this study using the ISTN731 course (Obtained - see Appendix C). Furthermore, the researcher obtained gatekeeper's permission from the Office of the Registrar at the University of KwaZulu-Natal (Obtained – see Appendix D), and Ethical Clearance from the University of KwaZulu-Natal Human and Social Sciences Ethics Committee (Obtained – see Appendix E). Lastly, informed consent was obtained from all participants (Obtained – see Appendix F).

Data collection commenced once the required clearances, permissions and approvals were obtained.

3.8. Positionality of the researcher

Whilst ethical practices are critical to any research endeavour, it is also critical to consider other factors which may influence the research. Since this research project spanned an entire semester, with the researcher fulfilling a dual-role, it is also necessary to reflect on the researcher's positionality.

A researcher's positionality may be explained as a reflexive process undertaken by a researcher to maintain awareness of the complex relationship between the researcher, the research and participants (Bourke, 2014). In this study, the researcher was cognisant of the researcher's dual-role which was assumed and would be perceived by participants, i.e. the roles of both postgraduate researcher and the gamification master.

The role of the researcher included planning the research, facilitating questionnaires, conducting interviews, recording observations and maintain the ethical integrity of the study. Furthermore, the researcher was responsible for analysis and writing up the findings, though these functions were not

witnessed by participants. As the gamification master, the researcher was in control of the planning, design, scoring, management and other functions to ensure that the game progressed smoothly.

Whilst both these roles held common functions like managing the research and the game whilst addressing student queries, it was possible that tension would emerge as participants might feel compelled to positively participate in the research to achieve in the game or that progress (or non-progress) in the game might result in disconnection from the research.

Furthermore, there was a possibility that the researcher held a position of influence due to his personal circumstances. Factors contributing to personal circumstances include aspects like religion, culture or socioeconomic situation (Bourke, 2014). The researcher was a postgraduate candidate who was also employed as an ad-hoc lecturer. It was necessary to be aware that the circumstances prevailing in the lives of participants would be different. Furthermore, it was also necessary to maintain awareness that the researcher has easily-available access to technology both on and off-campus.

This introduced an additional dimension around the role of the researcher in relation to participants, which centres around being the same as or different from participants (Bourke, 2014). As explained above, the position of the researcher differed from participants. On the other hand, the position of the researcher was similar to participants in that both participants and the researcher were postgraduate students. As a result, it was possible that some participants might have been more or less inclined to participate in this study.

From the initial stages of both this study and the gamification through to completion, it was necessary to ensure that these roles were not perceived as the same. Therefore, the researcher adopted a practice of actively differentiating between research and gamification activities both online and in-person. In order to achieve this, the researcher specifically stipulated whether activities, interactions or queries related to the research and or the gamification. Furthermore, if students demonstrated any confusion between the research and the gamification, the researcher immediately intervened to provide clarity.

3.9.   Conclusion

As indicated in this chapter, this study may be classified through multiple dimensions in terms of its characteristics.

This study followed a constructivist or interpretive paradigm. In terms of research design, this study is an empirical exploratory study which adopted an embedded mixed methods approach. The study was carried out through analysis and interpretation of primary data whilst adopting a case study research design.

From the perspective of research methodology, the sample for this study comprised students enrolled for the ISTN731 – Special Topics in IS&T class in 2014 on the UKZN Westville Campus. Data was collected using an initial questionnaire, twelve interviews during the course and an end-of-course questionnaire. The role of these instruments in answering the research questions and the timing of each are summarised in Table 3-5.

Table 3-5: Summary of sequence of research activities, instruments and research questions.

	Pre-course	**In-course**	**Post-course**
Research Question	1	2 & 3	2 & 3
Instrument	Initial questionnaire	Interviews	Interviews and end-of-course questionnaire

Administering of questionnaires adopted a census sampling approach whilst selection of interviewees utilised a purposive sampling approach. Reliability and validity was established by adopting feedback from peers and undertaking a pilot study, among other techniques.

In terms of analysis, qualitative data was coded and prepared in Microsoft Excel, and analysed in the NVivo software package. Quantitative data was analysed using IBM SPSS 23.

Ethical clearance and other necessary permissions were obtained prior to data collection and the researcher endeavoured to preserve confidentiality of respondents and maintain the integrity of the research project.

4. CHAPTER FOUR: THE GAMIFICATION PROJECT

4.1. Introduction

As discussed in Chapter Three, the case defined in this study is the application of the gamification to the Special Topics in IS&T course. Apart from defining the research methodology, Baxter and Jack (2008) argue that it is necessary to elucidate on the case in such a manner that additional details are provided in order to establish context and validity.

Furthermore, since this case study comprises a semester-long gamification project, it is necessary to explain the decisions and processes that were followed in delivering the gamification project upon which this study was based. Additionally, the practice of explaining the process followed in integrating gamification is established in literature (Domínguez et al., 2013; Morschheuser, Hamari, Werder, and Abe, 2017; O'Donovan et al., 2013; Strmečki D. et al., 2015).

This chapter commences by providing context into the Special Topics in Information Systems & Technology (ISTN731) course which will be used for this research project. Thereafter, the platform selection and preparation are discussed. The gamification design process is outlined in detail and the game mechanics and dynamics to be used are also described. Within this, the flow and layout of the game is then discussed. Then, the chapter proceeds to discuss game delivery through the lens of the phases that players will experience in the game. Throughout these discussions, reference is made to gamification guidelines and how these will be implemented in the project.

4.2. The Special Topics in IS&T (ISTN731) course

The ISTN731 course is a semester-long course run annually at the University of KwaZulu-Natal (UKZN) as part of the Bachelor of Commerce Honours in Information Systems & Technology programme. Additionally, the same course also forms part of the Bachelor of Business Science programme at the same institution. In both programmes, this course is offered at a 4th year level and is offered in the second semester. Students from both programmes are combined into a single group.

There exists synergy between this study and the ISTN731 course. The nature of the synergy is such that gamification is an emerging research area whilst the course seeks to provide students with exposure to emerging technologies. This is evidenced by the module guide which states, "The purpose of this module is to explore some of the emerging trends within Information Systems and Technology and equip students with the tools and experience to critically engage and evaluate global IT trends." (Blewett and Quilling, 2012:3).

As discussed, this study seeks to investigate the influence of gamification of e-learning on student motivation. In conducting such an investigation, this course was deemed an ideal setting due its utilisation of e-learning as the primary means of delivery. "This course is delivered in a virtual manner … (where)… students are required to constantly engage with the course material… (and) …

spend a considerable amount of time in the various online environments used to present the material." (Blewett and Quilling, 2012:5).

Furthermore, the e-learning platform differs each year based on the suitability of the platforms available and the requirements of the course. In 2014, the year when this study was conducted, the course was lectured by two senior lecturers who have been lecturing the course for a number of years. They were willing to exploring new e-learning platforms and approaches if they could potentially enhance learning in some way.

The researcher attended the same course two years prior to the gamification project and was therefore well acquainted with the overall course layout and content. This allowed the researcher to immediately focus on the gamification rather than trying to get acquainted with the nature and structure of the course.

It should be stressed that the role of the researcher in this course did not involve any teaching. Rather, the researcher's role was contextualised by this study and involved integrating gamification into the existing course and conducting the research based on the gamification.

The course comprised three sub-topics, with various activities to be completed in each topic. Each week, an activity with multiple tasks was assigned to students for completion. Since the course adopted a scaffolded-learning approach, with each activity building upon the last, all activities ultimately contributed to the assessments.

Traditionally, students received feedback from lecturers at the end of each assessment and also received ad-hoc feedback from the lecturers by means of a blog post with general feedback for the entire class. Students could also raise individual queries with lecturers individually or rely on peers, if they wished.

4.3. Groundwork and preparation

4.3.1. Background

Preparation for the gamified course commenced one month prior to the commencement of the course. Preparation activities included platform selection, storyline development and integration of gamification into the existing course content.

4.3.2. Platform selection

In the past, the course was offered on platforms like Edmodo and Facebook. Since this iteration of the course used gamification, a platform with gamification capabilities was required.

Prior to the commencement of the game design, the researcher searched for a platform through Google, Internet reviews and leading gamification blogs. When a potential platform was identified,

the researcher signed up for a demo license to ascertain usability and suitability. A critical factor influencing the decision, aside from support for gamification, was the ability for users to interact on the platform in a social and collaborative manner, as was the practice in previous iterations of the course.

Support for gamification was determined by the support of a variety of game aesthetics, dynamics and mechanics available on the platform like a blend of automated and manual management of points, badges, leaderboards, unlocking of challenges and activities, social networking and collaboration, and white-labelling to support the storyline. Suitability was also determined by performance, reliability, design, customisation and security.

In Chapter One, the researcher stated that Moodle was implemented as the institutional learning management system at UKZN. As a result, Moodle was explored as one of the platforms to use in this project. Moodle offers a variety of gamification tools including avatars, progress visibility, quizzes, levels, feedback, conditional activities, badges and leaderboards (Kiryakova, Angelova, and Yordanova, 2014). However, some functionality required installation of plugins which was not possible on the instance of Moodle implemented at UKZN.

On completion of the research into various platforms (including Moodle, Blackboard and TalentLMS, among others), the researcher, in consultation with the course lecturers, selected the Docebo LMS platform. Docebo (www.docebo.com) is a subscription-driven cloud-based e-learning platform which offered gamification capabilities beyond other platforms (at the time of the project) and also provided a Facebook-style blog allowing users to post their own content as well as comment and like posts made by peers. Docebo was approached regarding their subscription fee and offered a discount due to the platform being used for a research project in a higher education institution.

The Docebo platform offered support for gamification and various gamification elements including badges (Figure 4-1) and badge management, points associated with badges, a leaderboard (Figure 4-2), locked activities (Figure 4-3), time-limits and completion indicators. Additionally, the platform also provided students with some analytics associated with their engagement and the ability to track time spent on the course and on social activities.

Figure 4-1: Screenshot of some badges created by the researcher on the gamified platform

Badges

ICON	NAME	POINTS	ASSIGN		
	Tweeter	10	25	☐	✕
	Trendsetter	10	32	☐	✕
	Tablet PC	30	8	☐	✕
	South African Golf Shirt	20	4	☐	✕
	Social Researcher	15	31	☐	✕
	Social Media Analyst	30	6	☐	✕
	Silk Tie & Cufflinks	25	8	☐	✕
	Resourceful	30	7	☐	✕
	Researcher of Note	15	22	☐	✕
	Professionalism	30	3	☐	✕
	Professional Golf Set	25	11	☐	✕
	Potential	15	27	☐	✕
	Pension Fund Contribution	20	5	☐	✕

Figure 4-2: Screenshot of the Top 10 leaderboard

Top 10

1	Aaqil Ismail 🏆	★ 440
2	Ripfumelo Maluleke 🏆	★ 350
3	Preshern Moodley 🏆	★ 305
4	Zuzile Nxumalo	★ 300
5	chumani gowana	★ 260
6	Solomon Omokehinde	★ 260
7	Deborah Oluwadele	★ 225
8	Sherwyn Dasari	★ 195
9	Eunice Ooreofe	★ 190
10	siphelele ncayiyana	★ 185

Figure 4-3: Screenshot of different types of activities available – open, locked and completed.
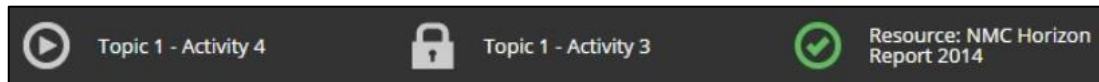
4.3.3. Platform configuration

Once the platform was selected, the next stage was configuring the platform. Activities in this stage included uploading of images, branding, aesthetic content and course content. Additionally, the researcher set up learning exercises in Docebo and prepared for the course activities which required the use of external platforms (including online chat rooms and Twitter).

4.4. Game design

When comparing preparation between previous iterations of this course and the iteration being offered in this project, the game design phase was the point where differentiation in preparation for the course commenced. Up until that point, many of the configuration activities would have to be followed, even in an iteration of the ISTN731 course without gamification.

Since gamification is a complex endeavour, game design must follow a structured approach. This section discusses the approach and process that was followed in developing the gamified course. Literature is expanded upon to describe the game design approaches and game design process.

4.4.1. Game design approach

In his book on gamification of learning and instruction, Kapp (2012) highlights predominant approaches to gamification design, particularly for gamification of learning. These approaches include a linear waterfall-type approach, namely (M)ADDIE, and an iterative approach, namely Scrum. Both these approaches are established and adopted in the domains of information systems projects and instructional design. A third approach discussed by Kapp is the hybrid approach between (M)ADDIE and Scrum.

The (M)ADDIE approach (Figure 4-4) follows discrete steps for creating gamification. These include Analysis, Design, Development, Implementation and Evaluation (Kapp, 2012). An optional initial step, Project Management (denoted by M), may also be included if the development follows a project-based approach with complexity in resources and comprises teams. Each step in this approach follows on from the previous step. The researcher is critical of the linear nature of this model since it is difficult to anticipate whether participants will respond positively to gamification and adaptations may be necessary.

Figure 4-4: (M)ADDIE approach
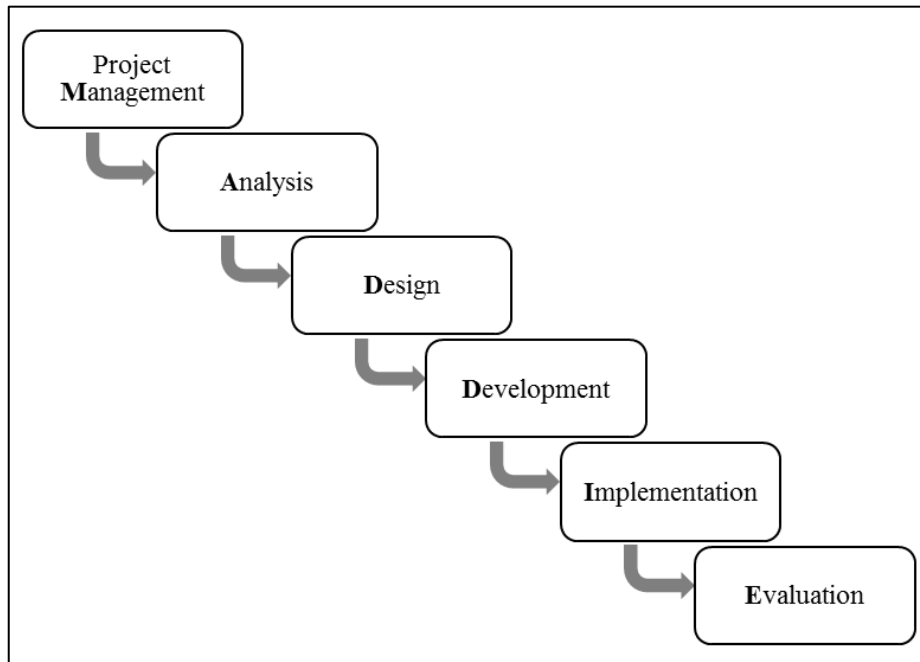
Source: Kapp (2012)

The Scrum approach supports this critique and acknowledges the complexities associated with gamification. It adopts agile development practices which are iterative in nature (Kapp, 2012). The term Scrum, derived from rugby, follows the practice where tasks are handed between different stakeholders who work together to achieve a common goal, whilst being cognisant of the fact that uncertainty exists, and adaptability is key. Consistent evaluations and improvements at each iteration make Scrum a beneficial approach.

The hybrid approach, which is often applied to gamification, provides game designers and developers with the structure needed to manage a gamification project whilst ensuring that a game remains adaptive and responsive to the needs of the players (Kapp, 2012). Kapp (2012) outlines the process which commences with realising outcomes and objectives. Thereafter, content to be taught is assembled. The process continues with a brainstorming session comprising stakeholders including game designers, instructional designers and subject-matter experts. Here, consideration will be given to the flow of the game, selection of content, and technical limitations. Once concluded, a paper-based mock-up of the game is created. This is refined into a gamified prototype deployed onto an e-learning system, which undergoes testing as various mechanics and dynamics are added. Lastly, the game is implemented, and feedback is obtained. Critical to the hybrid process is collaboration, iteration, consistent testing, feedback and development.

As discussed in Chapter Three, participants were asked in the initial questionnaire about their prior experience, expectations, gaming habits and game preferences. It was necessary to make changes to the initial game based on participants' feedback. Furthermore, feedback was also sought through the interview process and through observations of interactions on the Docebo platform. To accommodate

this need for adaptability and consistent feedback, a hybrid approach was followed. This ensured that the game was adequately planned whilst being flexible to evolve and adapt based on the needs of students.

Marczewski (2014b) suggests that gamification may be applied to varying degrees, depending on the context and outcomes. These comprise thin layer applications which introduce interface components like badges and points or at a deep level which drives problem solving and deeper engagement by designing the underlying platform to include gamification characteristics (Marczewski, 2014b). Both thin layer and deep level applications may be applied over a short or long term. Since this study sought to understand how gamification influences motivation, gamification was applied at both a shallow and deep level.

4.4.2. Game design process

In this project, the game design process was completed by the researcher. Existing literature offers practical guidelines to assist in the successful design of gamified courses. These include the utilisation of a theme or storyline (O'Donovan et al., 2013), adoption of a single e-learning platform that offers scaffolded learning (Thomas and Berkling, 2013), whilst ensuring that the environment does not create interpersonal conflicts (Todor and Pitica, 2013). Furthermore, providing tangible rewards to winners is also essential (Akpolat and Slany, 2014; O'Donovan et al., 2013).

Whilst these guidelines contribute meaningfully, studies have also sought to define an end-to-end process to be followed when gamifying. For instance, Aparicio et al. (2012) propose a four-step process to design effective gamification: identification of the main objective, identification of the transversal objective (objectives which people find motivational), selection of game mechanics support (in terms of autonomy, relatedness and competence) and conducting effectiveness analysis. Notably though, inclusion of the step related to analysing the effectiveness of gamification after its application acknowledges the value of evaluating the outcomes of a gamified endeavour and suggests that gamification may yield various results. Whilst this process considers motivation in terms of Self-Determination Theory, this process is generic and was not designed with education as the core domain of application.

A further approach, more tailored to gamifying learning is outlined by Kiryakova et al. (2014). They outline four steps which include determining students' characteristics, defining learning objectives, creation of educational content and activities for gamification, and adding game elements. They elaborate that creation of educational content and activities should be tailored to learning objectives whilst allowing multiple iterations to be attempted and multiple paths to be followed. Furthermore, activities should be achievable and increase in complexity as students are exposed to more activities Kiryakova et al. (2014). A case for multiple paths, and thus personalised gamification is also made by Iosup and Epema (2014).

A similar approach is proposed by Huang and Soman (2013) who describe five stages in their process. These include understanding the target audience and the context; define learning objectives, structure the experience, identify resources and apply gamification. These stages may be undertaken by the game designer in preparation for a gamified course. Each stage is described below with an explanation of its integration into this gamification project.

4.4.2.1.   Understanding the target audience and the context

The first stage is understanding the target audience and the context. This step is crucial in that it determines the success of any gamified course whilst providing the game designer with an opportunity to become acquainted with the demographics and objectives of those who will participate in the course. Furthermore, this step is arguably crucial towards delivering meaningful, and thus deeply engaging and motivating gamification (Nicholson, 2012).

In this course, participants were students who would likely be embarking on corporate careers the following year. Since it would be a first-job for most students, it was possible that they might not be familiar with how the corporate world functions and that they might be unaware of the prevalent organisational structures. This gave rise to the corporate company storyline used in the course.

As discussed in the literature review, a storyline enables progress-tracking whilst providing insight into a specific context. In keeping with game design principles, the corporate theme was consistently applied throughout the experience from the login screen (Figure 4-5) and home screen course banners (Figure 4-6) through to the language used when communicating with students (Figure 4-7).

Figure 4-5: Screenshot of themed login screen
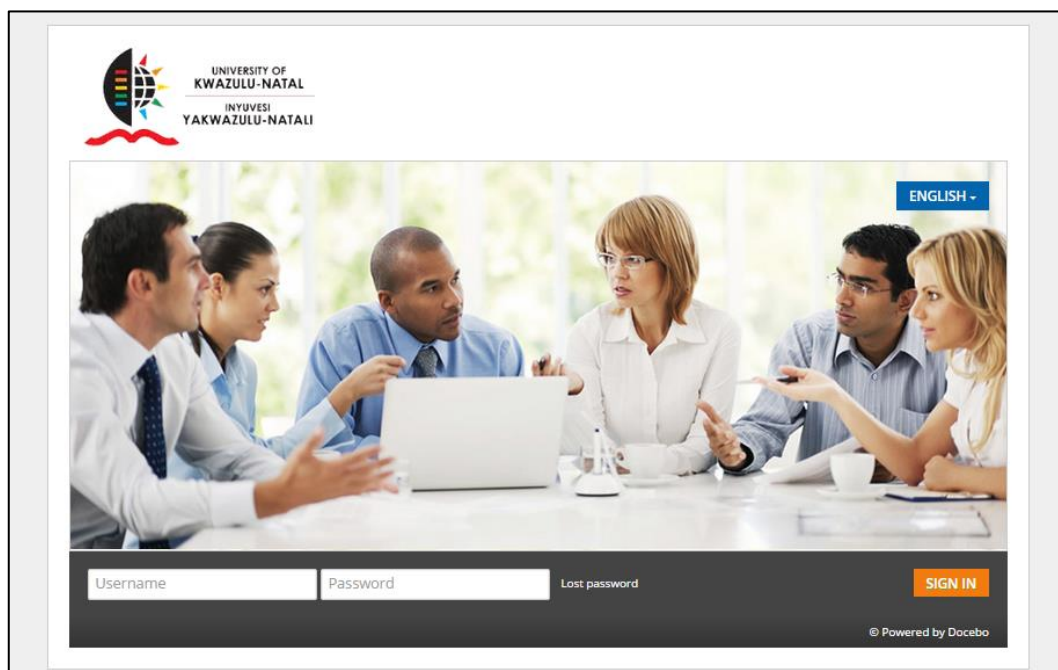
Figure 4-6: Screenshot of corporate-style banner

Figure 4-7: Screenshot of an example of communication incorporating corporate terminology

Due to participants being students with a technology major and their familiarity with Moodle, as a result of it being institutionalised, it was expected that students will be accustomed to e-learning. Also, it was expected that they will be willing to participate in a gamified course on an e-learning platform that may not have previously used.

Whilst the course would run for a semester, cognisance of the fact that students will need to attend to other commitments like other courses, research work and job interviews, it was expected that students will experience some strain from the increased workloads, which might have resulted in them dropping out of the game. However, since the course and the gamification were distinct, with the game being applied to the course, the course would govern the momentum and workload. Therefore, momentum and workload were not directly affected by the gamification. It would emerge in the analysis whether or not participants distinguished between the course and the gamification.

4.4.2.2. Defining the learning objectives

Equipped with an understanding of the target audience and context, the researcher shifted focus to defining the learning objectives involved the development of learning and behavioural goals.

Since the learning objectives and activities used in the course were already developed in prior years coupled with the fact that defining the learning objectives was not an objective of this study, this activity was not required. Rather, the researcher used the existing objectives to design behavioural goals for the gamified course.

4.4.2.3. Structuring the experience

Once the objectives are defined, the designer may focus on structuring the experience, which involves introducing milestones and stages which allow for benchmarking.

Since the gamification would follow the structure of an existing course, this stage was not intensive. Due to the nature of the course being offered in three topics, it was possible to use these topics to derive three stages, or levels, for the game. These levels served as a platform for introducing tweaks in scoring mechanisms and for the introduction of alternative forms of rewards. Also, at each level, the nature of the rewards given to students could change and criteria for obtaining rewards could become more challenging.

4.4.2.4. Identifying resources

Identifying resources involves selecting the resources required to gamify learning. This includes giving consideration to which aspects should be gamified and what tracking, reward and scoring mechanisms should be adopted. Possible rules and feedback mechanisms are also explored.

At the outset, participants were given a Game Guide (Figure 4-8 and Figure 4-9 – see Appendix B1 for higher quality images) which detailed how the game was structured and how it would progress. It also explained the storyline and elaborated on how the storyline related to the course. Associated themes and some available rewards that were also explained. Furthermore, the Game Guide informed students about certain soft-skills that would be expected of a corporate citizen and how these would be rewarded. The guide also described how engagement on the platform could also yield rewards.

Figure 4-8: Game Guide (Page 1)

Figure 4-9: Game Guide (Page 2)

4.4.2.5.   Applying the gamification elements

Once the resources are identified and assembled, the researcher may shift focus to applying the gamification elements. This step focuses on which elements of gamification to include and how to apply them.

Once the course commenced, rewards and game-related feedback was provided to students on a weekly basis after the weekly deadlines expired. The researcher focused on providing feedback in relation to the game whilst the lecturers provided feedback in relation to academic progress in the course. Participants were also able to request feedback on the platform, via email or in person. Based on some of this feedback, tweaks were made to the game.

An example of such a change is when the progress bar (Figure 4-10) was introduced at the request of participants. This request was made as it was believed that a progress bar would provide real-time indication of the current progress in relation to the overall gamified course thus providing participants opportunities to plan and strategise.

Figure 4-10: Screenshot of progress bar
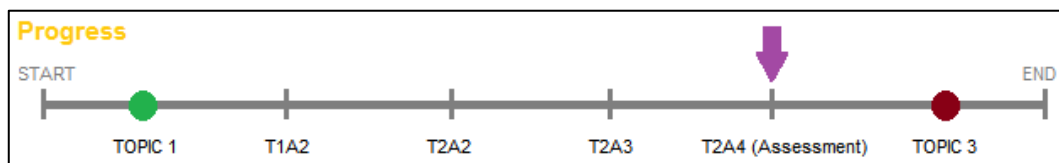
In this study, since the objective is to investigate the influence of gamification of e-learning on students' motivation, the researcher introduced an array of game elements to investigate how participants responded to each. Elements may be categorised into self-elements and social-elements (Huang and Soman, 2013). Whilst some of the categorisations of elements may overlap, self-elements and social-elements are used here primarily as a means of presenting how these elements were applied.

4.4.2.5.1   Self-elements

Self-elements focus on driving internal competition within students, thus allowing them to recognise their own achievement (Huang and Soman, 2013). These elements may comprise points, badges, limited badges, levels, hidden rewards and dynamic deadlines that evolved with the storyline.

Badges were awarded to participants based on them meeting learning objectives (Figure 4-11). Each badge carried a point-score which was higher when tasks associated with a specific learning objective required more effort. Each badge was designed to match the storyline and carried a short summary of possible recipients of each badge.

Figure 4-11: Screenshot of badges available in a single week with brief explanation

Whilst the platform facilitated automatic awarding of badges for tasks like uploading assignments, completing activities and engaging on the social blog, most badges were manually awarded since many of the activities required allocation of rewards based on more complex tasks, like posing arguments, completing essays or building websites. For such activities, badges could not automatically be allocated.

As badges were awarded to students, they were able to view a list of all badges awarded to them, as depicted in Figure 4-12. If they selected a badge, they could view the description of that badge.

Figure 4-12: Students view of badges earned
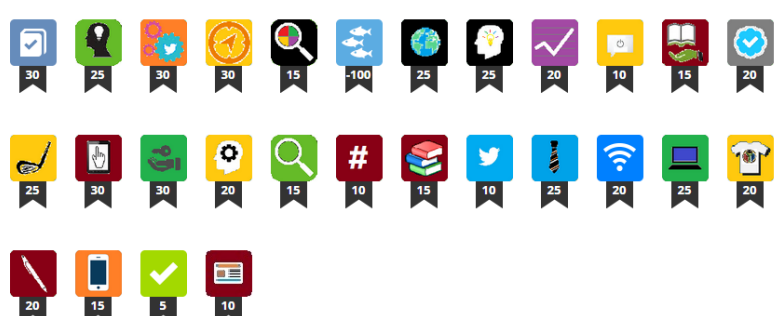
As the course progressed, the researcher also incorporated limited badges. Typically, these badges were only available to the first few students who submitted an activity, or to students who submitted before a particular deadline. Furthermore, these deadlines were sometimes dynamic and shifted within the context of the storyline.

4.4.2.5.2   Social-elements

Social-elements place students in a broader community with one another whilst making their progress and achievements more public (Huang and Soman, 2013). These elements may comprise a storyline, leaderboards, competition between students and groups for top places, project-driven rewards and public rewards.

Once badges were awarded, the leaderboard updated automatically based on the points associated with each awarded badge. The researcher also placed the Top 5 students for each week on the course homepage (Figure 4-13).

Figure 4-13: Screenshot of Top 5 leaderboard on the course homepage

If students clicked on this leaderboard, they were taken to a page with a view of a Top 10 leaderboard. Whilst students were unable to see beyond the Top 10, they were able to see their own position, even if not in the Top 10 (Figure 4-14).

Figure 4-14: Student view of the leaderboard

To further encourage social recognition, reference letters were publicly awarded to students' CVs based on displaying selected qualities in line with soft-skills which developed better corporate citizens (Figure 4-15).

Figure 4-15: Screenshot illustrating awarding of soft-skills badges
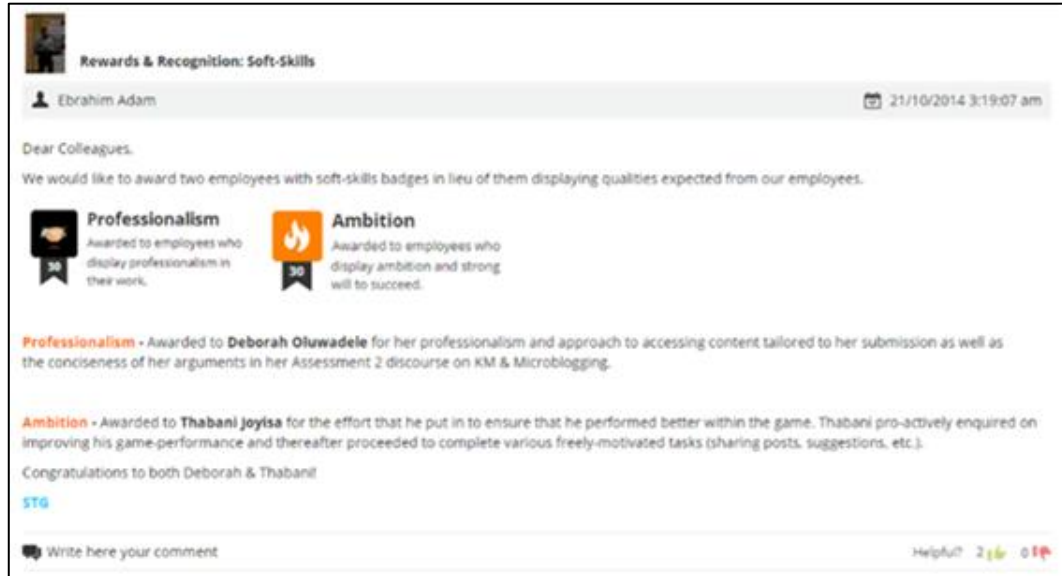
Additionally, students were able to spend points earned to "purchase" in-game choices for self-elected project groups (Figure 4-16). There was also the possibility offering students the option of "buying" extensions but this was not included so as not to interfere with the academic progression of the course.

Figure 4-16: Screenshot of the Group Selector badge
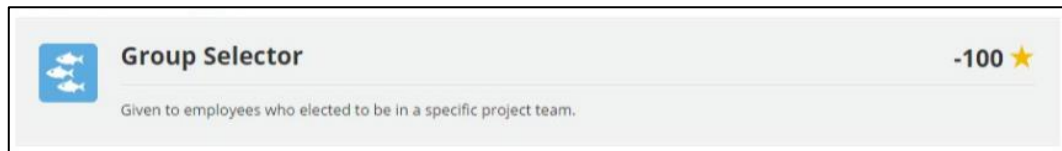
Rather, a hidden deadline extension was offered to students who engaged more than their colleagues in the course (Figure 4-17). This was a shareable extension on a 24-hour assessment which attracted a reward if shared. Since assessment deadlines are academic activities, this reward was introduced by the lecturer. Furthermore, it also served as a means of reinforcing gamification as an academic tool.

Figure 4-17: Introduction of transferable extension by lecturer

Craig Blewett   18/08/2014 2:16:58 pm

Related to: **Special Topics in IS&T**

Hello ALL...

This week we are getting into the real fun as you get to experience the first assessment. If you have kept up with all the activities then you will have no problem. So here's the deal...

TOMORROW (Tue) at 9am your assessment will be released! You will have ONLY 24 hours to complete and submit the assessment. **So make sure you are in Docebo at 9am ready to get it as soon as it is released.** The Good News is that 3 people (not necessarily the current top 3) will be assigned a special reward for consistent hard work, great quality posts and submissions - that reward is a 24 hour extension. That means that 3 people who have proved themselves by performing above the rest will have 48 hours to submit their work. See this as a small promotion :-) The 3 winners of this reward will be informed tomorrow at 9am.

HOWEVER...should any of these 3 people feel that they do not need the bonus 23 hour extension, they can give this award away to another class member, but only up until 12noon on Tuesday. If someone is kind enough to do this they must inform us before 12 noon of who they are giving the extension to.

CHAT TIME: Tomorrow (Tuesday) between 9am and 12pm we will be available in a live chatroom for you to pop in and ask questions. So, if you have any questions or need some advice, or if you just want to say "hi" we will be available in the chatroom to talk to you.

You can access the ISTN731 HipChat group by following this link to register an account:
https://ukzn.hipchat.com/invite/135557/dcb918f69a347a04e4826b0123ed5b66

Do that NOW - as we will be using this chatroom for future online sessions too. There is a mobile app that you can also use as well as a desktop and web-based versions.

So, let the fun begin....We are looking foward to some great submission!

CR@!G
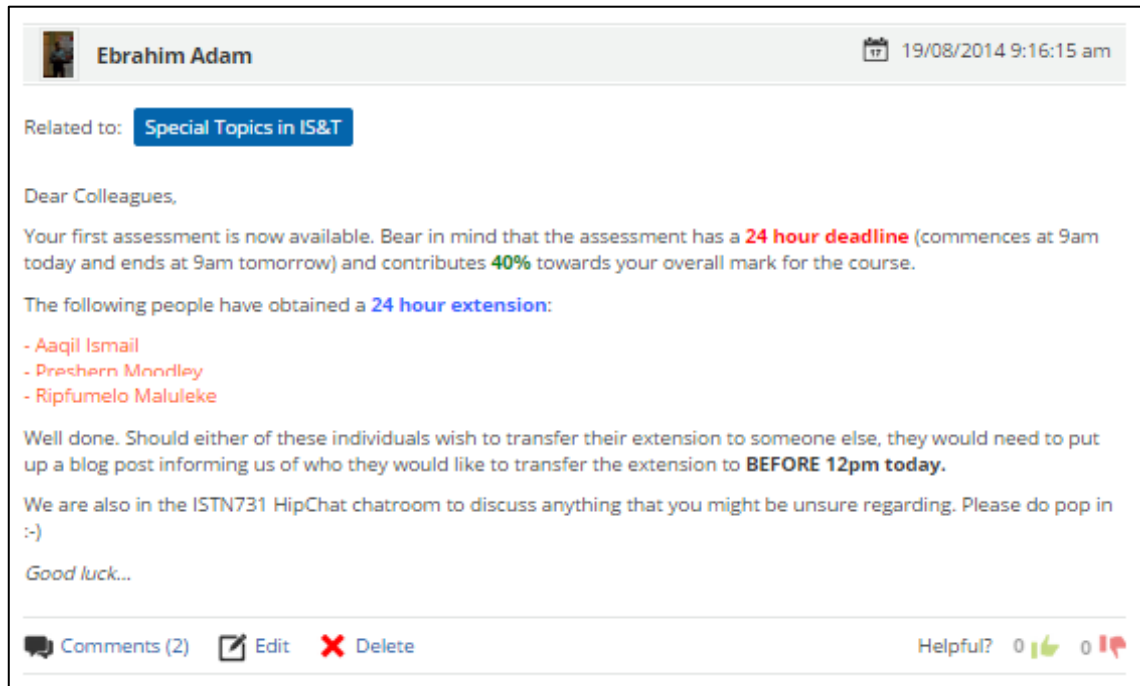
Comments (1)   Helpful?   2   0

Once the lecturer announced these extensions, the researcher announced the recipients of the extension (Figure 4-18).

Figure 4-18: Awarding of extensions

A student responded to this intervention and shared their extension with a peer who needed it (Figure 4-19). This student was duly rewarded with a soft-skills badge. This act of sharing was identified among a list of desired soft-skills and resulted in the recipient receiving a soft-skills badge. The impact of this was a change at the top of leaderboard.

Figure 4-19: Participant offering extension to peers

Lastly, participation marks for the course were derived from the outcomes of the gamification project. Students were informed of this at the commencement of the course. Marks were allocated to winners on the leaderboard as well as to other students who might have excelled in the gamified course in any way, other than just the leaderboard. These students were identified by the lecturers and the researcher.

Inclusion of different game elements and reward structures into the gamified course would allow the researcher to understand the influence of each element on student motivation.

4.4.3. Game design from the perspective of existing theoretical frameworks

Since gamification seeks to motivate behaviour and is being explored in this study from the perspective of addressing challenges in e-learning associated with motivation, it would be appropriate to explore the game design from the perspective of motivation.

4.4.3.1. Self-determination theory

As discussed, van Roy and Zaman (2017), using SDT as a foundation, propose nine heuristics to design gamification in education successfully. Table 4-1 outlines each of these heuristics, their relation to SDT, and how each was integrated into the design of the gamification.

Table 4-1: Gamification heuristics based on SDT and their integration into the design

Heuristic	Relation to SDT	How this heuristic was integrated into the design
1. "#Avoid obligatory uses"	Autonomy	Whilst participation in the course was mandatory, participation in the gamified activities was optional.
2. "#Provide a moderate amount of meaningful options"		Participants were able to choose which rewards to pursue and how to go about this.
3. "#Set challenging, but manageable goals"	Competence	Early rewards were easier, and they grew in complexity as the course progressed.
4. "#Provide positive, competence-related feedback"		Updates were provided to participants as rewards were given and students were able to seek guidance on their game progress.
5. "#Facilitate social interaction"	Relatedness	This was intrinsic to the ISTN731 course and gamification sought to motivate participants to engage each other on the platform
6. "#When supporting a particular psychological need, wary to not thwart the other needs"	Nexus of psychological needs	Ensuring that autonomy, relatedness and competence was supported in different ways.
7. "#Align gamification with the goal of the activity in question"	Contextual support for activity	Gamification objectives were closely related to learning objectives.
8. "#Create a need-supporting context"	Contextual support for environment	The platform was presented to the participants as an open space for discussion, collaboration and support. However, some platform limitations hindered the potential to achieve this heuristic.
9. "#Make the system flexible"	User motivators	Whilst the platform was not customisable per user, the researcher made changes for the group based on feedback from participants.

Each of these heuristics has implications for designing effective and successful gamification which harnesses intrinsic autonomous motivation (van Roy and Zaman, 2017). These heuristics support the argument for careful planning and design of gamification.

4.4.3.2. The Octalysis framework

This section explores the game design on the basis of the eight core motivational drives as identified by Chou (2015) in the Octalysis framework.

4.4.3.2.1 The 8 core drives

As discussed in the literature review, the Octalysis Framework comprises eight core drives (CDs) of motivation. These drives include: epic meaning and calling, development & accomplishment, empowerment of creativity and feedback, ownership and possession, social influence and relatedness, scarcity and impatience, unpredictability and curiosity, and loss and avoidance (Chou, 2015).

The epic meaning and calling core drive (CD1) harnesses the human need to engage in an important endeavour which has a greater purpose than oneself (Chou, 2015). In this gamification project, the researcher harnessed this driver through the storyline. By placing students within a "company" where they were engaging with "colleagues" with rewards associated with collaboration, soft-skills and corporate citizenry. Furthermore, positioning students toward becoming future executives in a company resulted in a sense of elitism. Lastly, students were exposed to rewards which were initially easy to attain to secure initial engagement.

The development and accomplishment core drive (CD2) involves motivating influence of growth, progress and skills-development towards a goal and eventual accomplishment (Chou, 2015). In this project, various goals existed. These included weekly goals, topic-based goals and course-wide goals. Game elements adopted here included progress bars, harnessing collaboration, badges, points and the leaderboard. Furthermore, since the course adopted a scaffolded learning approach, the practice of linking rewards to objectives allowed the students to progress through the course and the game in tandem.

The core drive of empowerment of creativity and feedback (CD3) incorporates the motivational influence felt when users are consistently involved and engaged in creative processes, each requiring a varied approach (Chou, 2015). In this project, various badges were on offer with each activity, each requiring different skills and approaches. Additionally, points earned became a form of currency in the game which allowed students to boost their perceived chances of academic success by choosing their own groups. Furthermore, game elements like levelling up their career, unlocking activities and making decisions in terms of how they progressed through the course.

The ownership and possession core drive (CD4) harnesses the motivating effects that are present when a user assumes ownership of an activity or task and seeks ways to enhance the task and how it is completed (Chou, 2015). Within this project, students were recognised and rewarded with badges and reference letters, among other rewards which remained theirs. They were also provided the chance to adopt each activity as their own and select which badges (or objectives) to pursue. Additionally, participants were given the choice to "spend" their points earned (as a virtual currency) to select their own project groups. Furthermore, limited badges also sought to appeal to this core drive.

The core drive of social influence and relatedness (CD5) incorporates the social elements that may motivate people such as collaboration, competition and mentoring (Chou, 2015). Various aspects of the gamified course harnessed this drive. These included the leaderboard, titles associated with badges, allowing participants to post blog posts, make comments, use like buttons, and participate in group activities. Additionally, participants were able to share some rewards and also choose project groups in exchange for points. Furthermore, when badges were awarded, placing of notices of each badge and its recipient, or recipients, also sought to harness this core drive.

The scarcity and impatience core drive (CD6) involves the human drive to want something that one cannot not easily have or by introducing a sense of urgency (Chou, 2015). In this project, the concept of scarcity was achieved through the provision of limited badges, static and dynamic deadlines, shareable rewards and limiting the number of considered activity submissions to only the first few submissions. Additionally, the leaderboard instilled a sense of scarcity in that only the Top 10 players were visible to everyone.

The core drive of unpredictability and curiosity (CD7) involves the motivational influence of wanting to find out what might happen next (Chou, 2015). This drive was harnessed by means of hidden badges, surprise deadline changes and various twists in the storyline. The use, in some instances, of locked activities requiring completion of previous activities also harnessed this drive.

The loss and avoidance core drive (CD8) is based on the human need to avoid something negative (Chou, 2015). This driver was introduced into the project by introducing restricted submissions and limited rewards. Furthermore, the ongoing nature of the game, which was governed by the course, placed students in a position where they would suffer some loss if they fell off the game as a result of missing activities. Additional options to be explored here, though not incorporated into this project, might be a loss of points for missing deadlines and not completing activities. This was consciously omitted since the motivational influence of gamification is being investigated.

4.5. Game Delivery

As described above, the process of game design follows a structured approach. Similarly, when delivering a gamified experience to users, a structured approach would be useful.

In this light, Chou (2015) introduces four phases in the journey of a game player: Discovery, Onboarding, Scaffolding and the End game. Each of these phases, argues Chou, is necessary as a user's interaction with an experience is an evolutionary process. The realisation and inclusion of each phase is necessary to keep users continuously motivated as they progress through the experience. In close alignment with Chou (2015), Werbach and Hunter (2012) also introduce four core principles which gamification focuses on: Identity, Onboarding, Scaffolding and Mastery.

Each of the four phases outlined by Chou is briefly described along with an explanation of how the gamified course will allow students to pass through these phases. Within each of the phases, comparisons are also provided with Werbach's core principles.

4.5.1. Discovery

The Discovery phase commences when users first become aware of a particular experience and involves the processes which enable this awareness (Chou, 2015). This phase concludes once a user engages in the experience.

In this course, this phase commenced when students were invited to the introductory lecture. When inviting students to the lecture via email, they were notified that gamification would be integrated into the course. At the lecture, the course lecturers, when introducing the course, encouraged and supported gamification being integrated into the course. Thereafter, the researcher introduced gamification in more detail and commenced with the onboarding.

4.5.2. Onboarding

The onboarding phase is where users are introduced to the rules, dynamics, mechanics and structure of the game (Chou, 2015). This phase is often accompanied by a guide or tutorial video. Chou argues that a more effective practice is to expose users to the experience as soon as possible. This phase ends when users are adequately equipped to navigate the gamified experience unassisted.
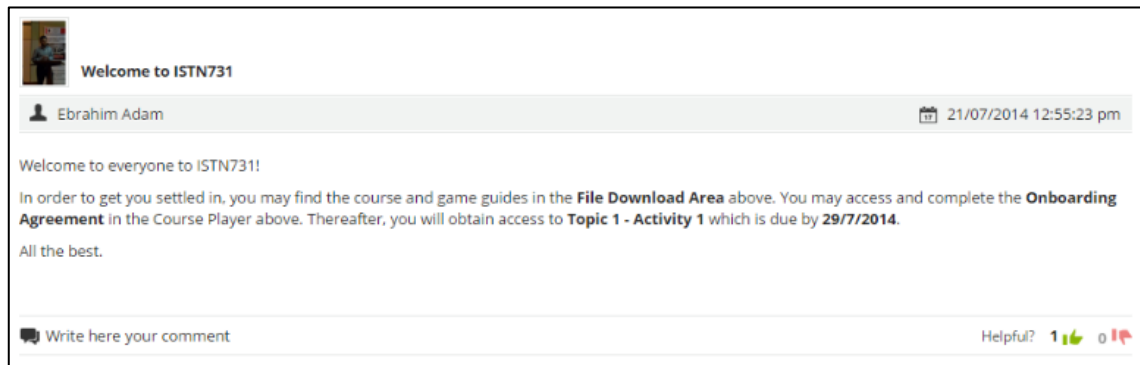
This phase closely aligns with Werbach's phases of identity and onboarding. Identity manifests when students enter the gamified experience for the first time, creating an account and/or avatar (Werbach and Hunter, 2012). This phase seeks to enable users to assume an identity which they relate to and motivate them onto onboarding. Werbach describes onboarding as allowing users to experience elements like engagement-loops, progression-loops, motivational triggers and easy-wins (Werbach and Hunter, 2012). Critical to onboarding is the introduction of iteration which stems from the idea that people learn from iteration.

In this course, onboarding was carried out at the introductory lecture, which is traditionally a face-to-face session to introduce students to how the course will work. Here, students were also exposed to the concept of gamification, taken through the Game Guide (which included the rules, dynamics, mechanics and structure of the game), and were introduced to the gamification platform.

Once they created an account, logged in and completed a simple task based on instructions in the Game Guide, they were awarded a simple onboarding badge. Students were then afforded the opportunity to pose questions and seek clarity. Students were also encouraged to explore the platform on their own.

Introductory blog posts were also posted for students by the researcher (Figure 4-20) and a lecturer (Figure 4-21) to allow them to become acquainted with the platform, social elements and gamification.

Figure 4-20: Researcher onboarding students through a blog post
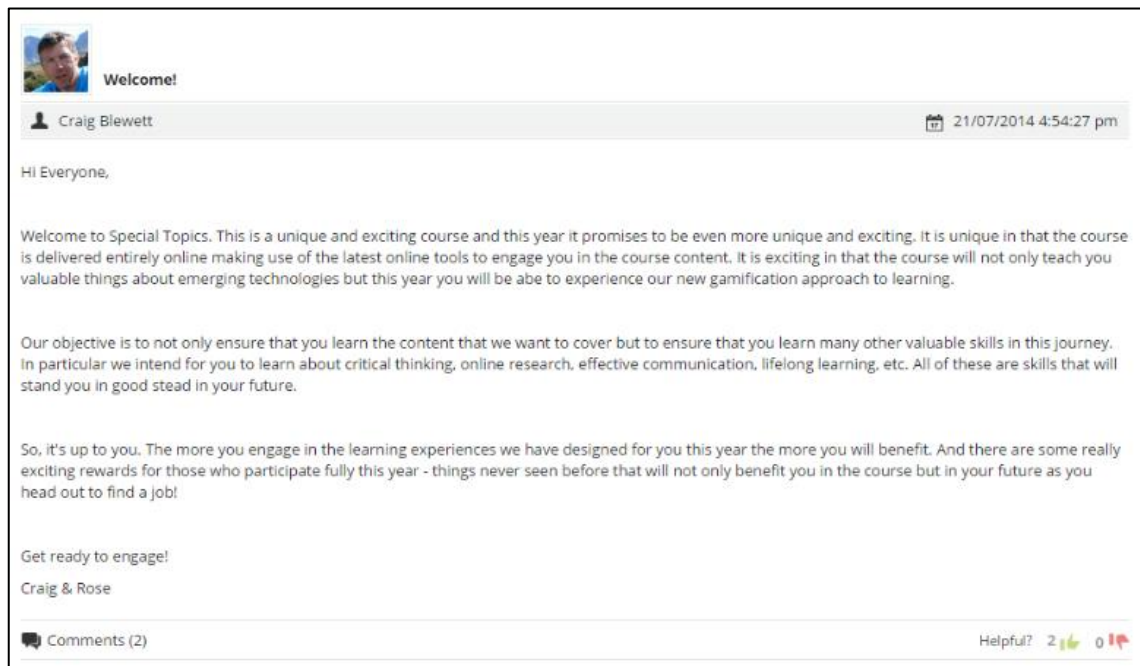
Figure 4-21: Onboarding contribution by course lecturer

Due to the importance of onboarding, further onboarding sessions were held as some students missed the initial onboarding session.

4.5.3. Scaffolding

The Scaffolding phase occurs when users begin to use the knowledge from onboarding to earn rewards and progress in the game (Chou, 2015). This would include levelling up and unlocking new rewards which would require users to return to the game on a frequent basis. If done correctly, this results in a higher retention rate and will sustain motivation. This phase ends when users feel that they have attempted all challenges in the game and reach a status of veteran users.

Werbach defines scaffolding as a process of where users are offered choices and abilities to achieve rewards in the game (Werbach and Hunter, 2012). In the onboarding phases, these choices are limited so users are not overwhelmed but increase as the game progresses. Each step in the scaffolding process provides users with more choices and demands new skills and knowledge. Users are prompted to develop additional capabilities and, through this development, are motivated to reach mastery.

In this course, scaffolding was used as the predominant pedagogical approach. However, the concept of scaffolding as a pedagogical approach differs from the scaffolding phase in Octalysis. Nonetheless, since rewards were paired with learning outcomes, students were awarded in the game in line with their scaffolded development through the course. This synergy allowed the game to progress in a manner that allowed students to earn rewards as they met learning objectives.

4.5.4. Endgame

The Endgame phase commences when users feel that there are no new experiences or challenges available to them (Chou, 2015). This phase is crucial and is centred on sustaining interest to avoid amotivation. This phase is useful in maintaining long-term commitment to an experience.

An alternative view to the end-game is the Mastery phase outlined by Werbach where students, having experienced Scaffolding, believe that they have reached their outcome in a naturally flowing manner (Werbach and Hunter, 2012).

In this course, the game concluded at the end of the ISTN731 course. Hence, the endgame was to provide students with a clear end to the game and provide them with feedback on their game performance. In some way, the aim was also to conclude the game in a manner that kept students wanting to engage with e-learning and gamification in the future. To this end, the game concluded with an "End of Year Function" – a concept which followed a corporate storyline. An invitation was circulated to all students (Figure 4-22).

Within the context of Mastery, a further intention was to inculcate motivation to master the contents of the course whilst also providing insight into the structures and experiences in a corporate organisation.

Figure 4-22: "Year-End Function" invitation forwarded to participants

At this face-to-face event a final leaderboard, hidden rewards, participation rewards and bonus marks were also presented to students (Figure 4-23). This event simulated a company end-of-year function

where "outstanding contribution" was recognised. The session ended with light snacks to fit in with the storyline of an end-of-year function at a company.

Figure 4-23: Final leaderboard and announcement of participation marks in badges
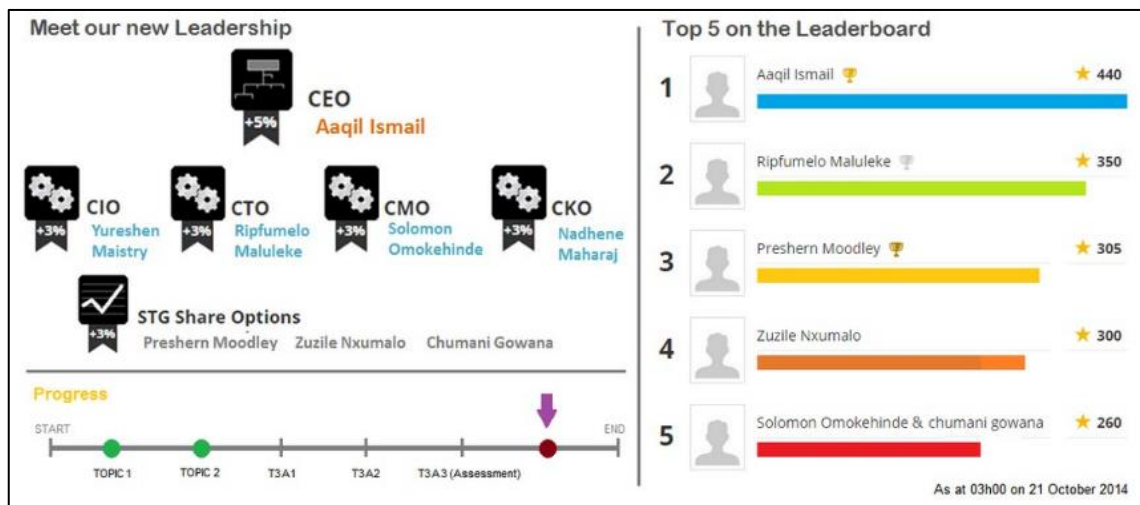
4.6. Conclusion

The development, design and delivery of gamification is a complex and resource-intensive exercise with many variables. Despite this, it is crucial to follow the design stages and delivery phases to ensure success. As implied in the chapter, when dealing with complexity and motivation, it is important to ensure that users' experiences are simple to avoid demotivation or amotivation.

Additionally, it should be noted that whilst the practices presented this chapter may be applied to any instance of gamification, the process of integrating gamification demands a unique approach with decisions based on the context, users and objectives. A one-size-fits-all approach, particularly when gamifying learning will not necessarily yield success.

5. CHAPTER FIVE: EXPECTATIONS OF GAMIFICATION

5.1. Introduction

In this dissertation, results and analysis are presented across three chapters. This chapter relates to the first research question (RQ1 below) whilst the next two chapters explore the subsequent research questions.

To reiterate, the research questions underpinning this study were:

RQ1.   What are students' expectations of a gamified e-learning course?

RQ2.   What factors influence students' experiences of participating in a gamified e-learning course?

RQ3.   How does gamification of e-learning influence students' motivation in a gamified e-learning course?

As discussed, in order to answer the research questions, a number of instruments were utilised before, during and after the gamified course as depicted in Table 5-1.

Table 5-1: Summary of sequence of research activities, instruments and research questions.

	Pre-course	**In-course**	**Post-course**
Research Question	1	2 & 3	2 & 3
Instrument	Initial questionnaire (See Appendix G1)	Interviews (See Appendix H)	Interviews and end-of-course questionnaire (See Appendix G2)

As can be gleaned from the table, this chapter provides analysis of results obtained in the initial questionnaire. Whilst there were some instances where students did not complete the entire questionnaire, the researcher found that in such questionnaires only a few questions were unanswered. Thus, all attempted questionnaires were rendered usable.

As discussed in Chapter Four, it was necessary to understand the distribution of the data as this would inform the statistical tests to be conducted. When the Shapiro-Wilk test was conducted in SPSS on the Likert-scale data obtained in questionnaires, a significance value < 0.05 was obtained in all cases, thus confirming that data is non-normally distributed. As a result, non-parametric statistical tests were adopted.

Furthermore, as discussed in the research methodology chapter, a five-point Likert scale was adopted where: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree.

The chapter commences by outlining the demographic details of participants. Then, prior exposure and expectations of both e-learning and gamification are analysed. Thereafter, this chapter explores participants' game preferences and BrainHex profiles. The chapter then concludes by summarising the key results and analysis of the first research question.

5.2.   Demographic details

As the study commenced, two students indicated that they were not willing to participate in the study. Therefore, the sample comprised 35 students out of a possible 37 students enrolled in the course. This led to a participation rate of 95%. Most participants completed both initial and end-of-course questionnaires.

Figure 5-1: Participants' gender
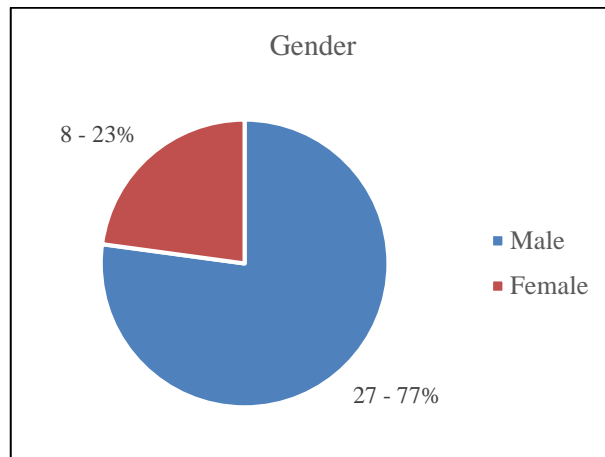
As indicated in Figure 5-1, 77% (27) of participants were male whilst 23% (8) of participants were female. A similar male-dominated population was also found in a study by O'Donovan et al. (2013). Furthermore, the trend of males being dominant among IT students and professionals prevails in literature (Govender and Khumalo, 2014; Klawe, Whitney, and Simard, 2009).

Whilst this scenario was male-dominated, this closely mirrors enrolments in the course in the years prior to and since this study. On average, over the period 2011-2015, the ISTN731 course enrolment comprise 82% (27) males and 18% (8) females ("Institutional Intelligence Reports," 2017). The trend of gender representation being predominantly male is also present across the broader Information Systems and Technology programme for the year of data collection ("Institutional Intelligence Reports," 2017).

At a macro-level, gender representation differs from this study considerably. At a provincial level, it was estimated that during the year of data collection, the population of KwaZulu-Natal was estimated to be 47.7% male and 52.3% female (*Statistical release P0302 - Mid-year population estimates 2014*, 2014). At a national level, the South African population was estimated to be 48.8% male and 51.2% female (*Statistical release P0302 - Mid-year population estimates 2014*, 2014).

Figure 5-2: Participants' race
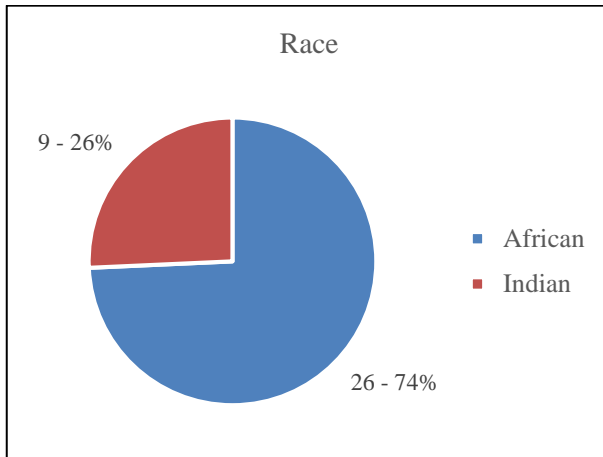
Furthermore, as depicted in Figure 5-2, participants comprised 74% (26) African students and 26% (9) Indian students. There were no White or Coloured students enrolled in the course. It should be noted that racial representation in terms of registrations across the broader Information Systems & Technology Honours programme for the year of data collection was also found to have no white or coloured students ("Institutional Intelligence Reports," 2017).

At a macro-level, national racial representation was similar in that African citizens were the predominant race (80.2%), albeit to a greater extent than in this study. Results differed in this study in that the next predominant South African race were Coloureds (8.8%), Whites (8.4%) and Indians (2.5%).

Figure 5-3: Participants' qualifications
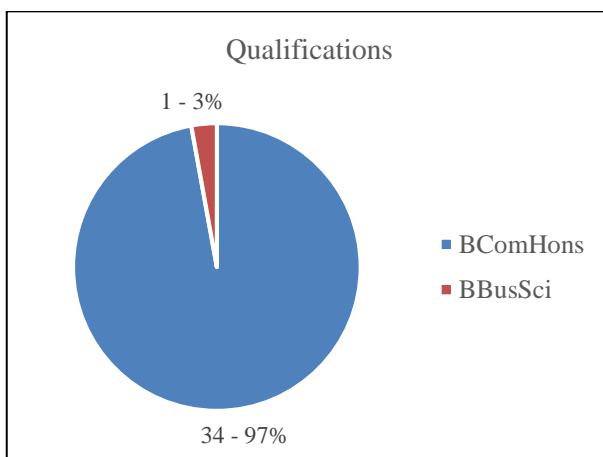
Additionally, as illustrated in Figure 5-3, 97% (34) of participants were enrolled in the Bachelor of Commerce Honours in Information Systems & Technology programme whilst only 1 participant was enrolled in the four-year Bachelor of Business Science programme. Regardless of their academic programme, all participants completed the same course. However, this result indicates the strong prevalence of Information Systems & Technology students as compared to Business Science students

among participants. This high level of technology-oriented students may influence expectations, factors influencing experiences and how gamification influences motivation.

It should be noted that the Honours students may have held either a Bachelor of Science in Computer Science & Technology degree or a Bachelor of Commerce in Information Systems & Technology degree. However, this was not determined in this study.

Figure 5-4: Participants' age
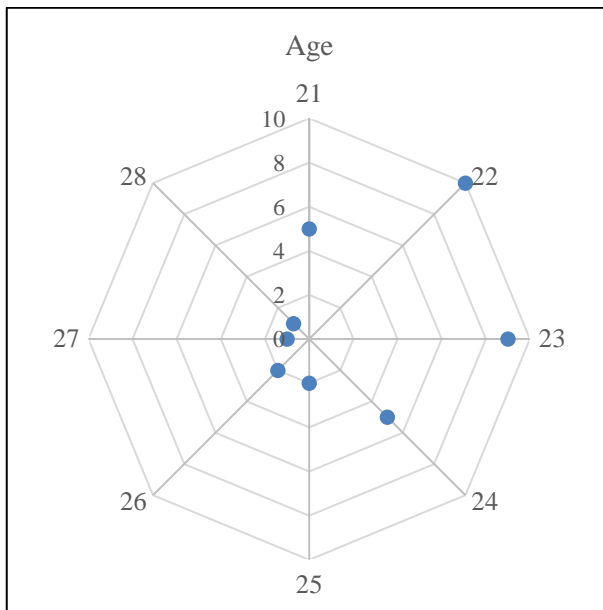
The age of participants, as illustrated in Figure 5-4, ranged from 21 years old through to 28 years old with the average age being 23 years old. Lastly, in terms of family commitments, one female participant was married and had children.

5.3. E-Learning – Prior experience and expectations

Since gamification will be applied into e-learning, it is necessary to explore prior experiences and expectations of participants in relation to e-learning. In a study on incorporating e-learning into higher education, Tagoe (2012) found that critical factors governing e-learning acceptance include ownership of technology, prior experience and perceptions.

Participants in this study were asked regarding their prior experience with e-learning. As indicated in Figure 5-5, 12% (4 out of 35) of participants in this study indicated that they had no prior experience with e-learning whilst 57% (20) of participants indicated prior experience with one e-learning course. The remaining 31% (11) of participants indicated experiencing more than one e-learning course.

Figure 5-5: Participants' prior experience with e-learning
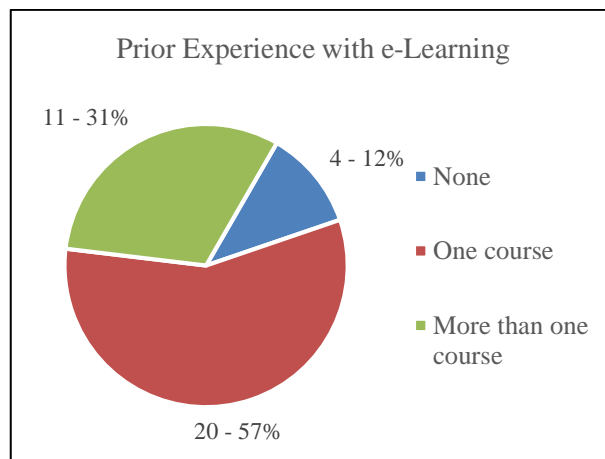
Coupled with understanding prior exposure, it was also necessary to understand how students perceive their proficiency with e-learning platforms (Figure 5-6) as this could influence their use of e-learning. This would allow the researcher to differentiate between participants reporting challenges with experiencing gamification as opposed to those who may not be as proficient with e-learning platforms.

Whilst participants in this study were Information Systems and Technology students and it was likely that they would feel proficient in using e-learning, exploring proficiency in any e-learning endeavour is beneficial as proficiency among students expedites the learning process (Bharuthram and Kies, 2013). In order to harness the benefits of e-learning, some students may require additional support (Tagoe, 2012).

Figure 5-6: Participants perceived e-learning proficiency
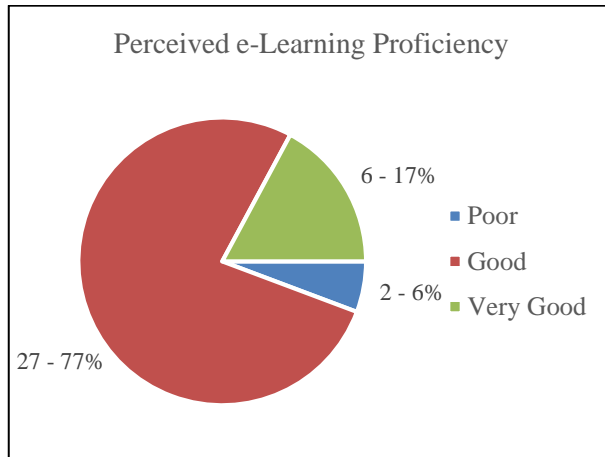
As depicted in Figure 5-6, 6% (2) of participants perceived their ability to use e-learning platforms as Poor, 77% (27) of participants perceived their ability to use e-learning platforms as Good and 17% (6) of participants perceived even greater ability to use e-learning platforms.

In a study about introducing e-learning in a South African university, Bharuthram and Kies (2013) found that students who did not feel proficient in their use of technology also felt marginalised. Such sentiments were also present in other studies cited in their paper. Evidence in that study suggests that the ill-effects of a lack of computer literacy skills and low perceived e-learning proficiency may serve to widen the gap between proficient and non-proficient students (Bharuthram and Kies, 2013).

However, in this study, since prior experience and proficiency were reported positively by students, no further support was necessary to acquaint participants with e-learning. Once it was determined that participants generally felt proficient in their e-learning abilities, it became necessary to understand their expectations of e-learning.

In order to explore participants' expectations of e-learning, the researcher turned to the study by Tagoe (2012) where they utilised the Technology Acceptance Model (TAM) to analyse participants perceptions and expectations to e-learning in respect to ease-of use, usefulness, attitude and behavioural intentions. Whilst TAM is not a theoretical framework in this study, these questions were adapted into the initial questionnaire since they provide insight into participants' expectations and perceptions of e-learning. Participants were asked to provide responses on a five-point Likert scale to seven statements, as included in Figure 5-7 (also Table A-1). Note that statements are ordered by sum of responses which results in most positive responses appearing first.

Figure 5-7: Expectations of e-Learning
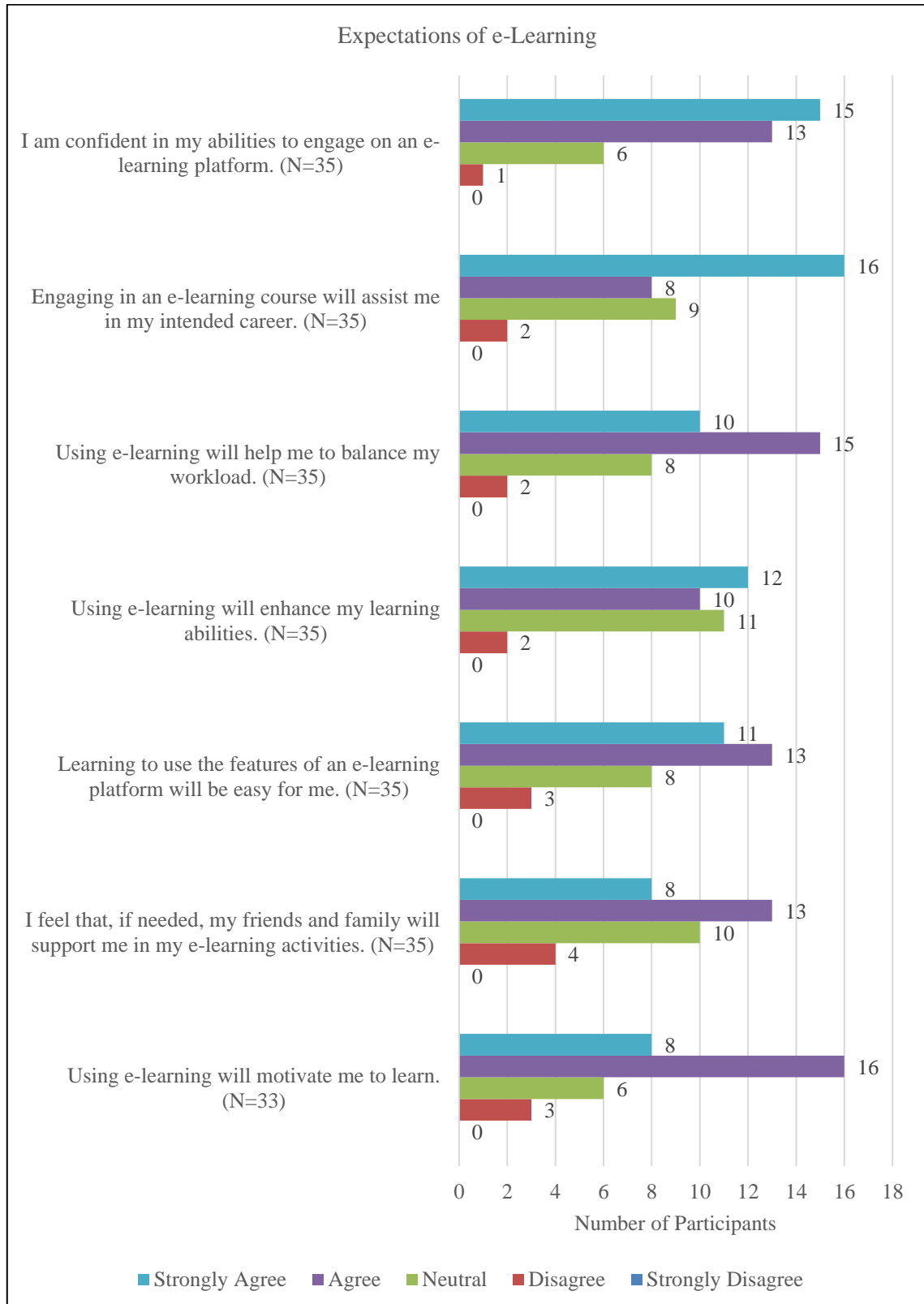
As indicated in the Figure 5-7, participants felt confident in their ability to engage on an e-learning platform (74% agreement, median=4.00, variance=0.694). Whilst this finding echoes the general sentiments regarding perceived proficiency with e-learning, it should be noted that no participants strongly disagreed with this statement despite two participants ranking their perceived e-learning

proficiency as Poor. Hence, it may be argued that these participants held higher expectations in terms of using e-learning but did not view proficiency as a factor influencing expectations.

In the longer term, they believed that e-learning would aid and add value in their intended career (68% agreement, median=4.00, variance=0.963). This question aimed to looked at e-learning and its perceived longer-term value to participants. It may be argued here that a positive expectation of this nature may indicate willingness to use e-learning in the longer term whilst suggesting that participants expect to use e-learning in the future. More importantly, it also signals the need for tertiary institutions to ensure that such exposure motivates students and prepares them to fulfil their expectations. Adam, Wassermann, and Blewett (2015), in a paper on personal cloud adoption, argue that the demand for graduates with technological aptitude in using emerging technologies has grown substantially, thus necessitating that tertiary institutions need to play a role in providing students with the required exposure.

When viewed in the context of academic work, participants felt that using e-learning will help them to balance their workloads (71% agreement, median=4.00, variance=0.761), will enhance their learning abilities (62% agreement, median=4.00, variance=0.904) and will motivate them to learn (68% agreement, median=4.00, variance=0.797). Based on the fact that participants viewed e-learning more as a tool to balance workloads rather than a tool to enhance and motivate learning, it may be concluded that they view e-learning more as a tool to gain efficiencies in learning than as a tool to enhance and motivate learning.

In terms of onboarding onto e-learning, participants felt that they would easily adapt to using a new e-learning platform (68% agreement, median=4.00, variance=0.904), and felt that they received adequate external support to engage in an e-learning course (60% agreement, median=4.00, variance=0.916). At this point, it should be indicated that support external structures like academic and ICT support staff were accessible to students who stay in on-campus residences whilst students residing off-campus could access support when at campus. However, the lower percentage of agreement may indicate that students were unaware of support or that existing support was not adequate.

Furthermore, whilst these responses came from students who are enrolled in a technology programme, it was necessary to determine whether participants might be negatively influenced by e-learning as it was the medium being used as the means to offer the gamified course. Also, the researcher sought to understand students' outlook towards the possible value the e-learning might offer to students in both the short and longer term. This knowledge allowed the researcher to determine students' affinity and willingness to participate in a gamified e-learning course.

There were outliers across several items in this construct. Upon further analysis, it emerged that the outliers were not previously enrolled in more than two to three e-learning courses. In the case of most

outlying responses, participants' experience across all items in this construct was limited to one e-learning course. The researcher contends that the limited e-learning experience of many of the outliers contributed to their responses. Among the participants with experience in more than one course, participants did not expect that the e-learning platform would be easy to use nor that they had support from friends and family. Furthermore, some outliers expected that e-learning would not assist them in their intended career nor would it help to balance their workload. The researcher argues that the prior experiences of these participants shaped these expectations and signals that these participants might require some assistance during the course.

Nonetheless, within the broader context of this study, further intervention and support was not needed to acquaint participants with e-learning as they reported prior expectation, proficiency and positive expectations of e-learning (composite median=4.00, variance=0.588). If results indicated that an intervention was needed, the researcher would have explored interventions like digital literacy bridging programmes and driving peer-assisted learning.

5.4. Gamification – Prior experience and expectations

As was the case with e-learning, it was also important to understand participants prior experience and expectations of gamification. Furthermore, it was necessary to differentiate between e-learning and gamification to ensure that participants provided accurate reflections on their prior exposure to each.

Such insights enabled the researcher to deliver gamification to participants in a manner that was aligned with their experience and expectations. The value of the designing gamification giving strong consideration to participants has been stressed in the literature and understanding participants prior experience and expectations of technologies also influences acceptance. Furthermore, in terms of gamification, these results and results shared by participants later in the study informed modifications and adaptations of the gamified course. Additionally, these results also presented the researcher with insights into what might work or not when gamifying e-learning. Hence, the researcher argues that when gamifying e-learning, failure to probe these aspects prior to gamifying could result in ineffective gamification and amotivation.

Participants were asked about their prior experience with and expectations of gamification. In order to obtain these results, questions in the initial questionnaire about gamification were designed based on the questions that were used to understand prior e-learning experience and expectations. Additionally, participants were also asked about their gaming preferences in the questionnaire using some questions adapted from O'Donovan et al. (2013).

Since expectations tend to be shaped by prior experiences, understanding participants' prior experiences was crucial. When asked about prior enrolment in any gamified course (Figure 5-8),

only 6% (2) of participants indicated that they had previously enrolled in a gamified course. This result indicates the possible need for extra support during onboarding and through the gamified course. In order to further understand the prior experience of students in relation to gamification, the researcher explored participants' gaming habits.

Figure 5-8: Participants prior experience with gamification
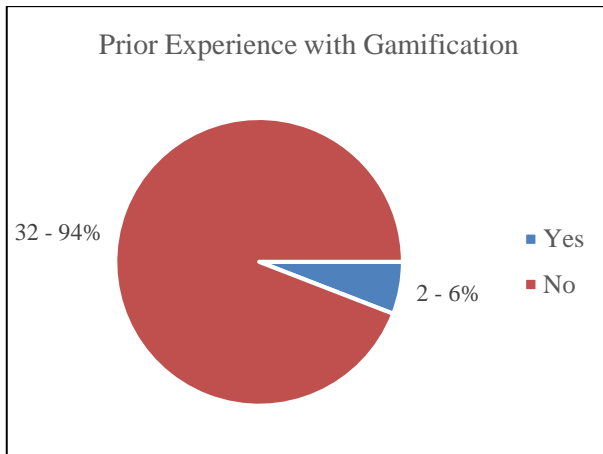
When asked if they played video games, 74% (26) of participants shared a positive response. These participants were further asked regarding their game-play habits. Notwithstanding the fact that literature establishes a clear distinction between games and gamification, the results may be extended to gamification as it has its roots in game play, which these results explore.

Participants were asked about their use of gaming devices (Figure 5-9). It emerged that gaming consoles (used by 69% of gamers) were most commonly preferred devices followed by gaming PCs (used by 65% of gamers) and smartphones (used by 58% of gamers). These results suggest that gaming consoles are a likely space where gamers would engage a gamification endeavour. Similarly, the strong tendency to use PCs, smartphones and laptops also suggests that participants would engage on such platforms.

Figure 5-9: Gaming devices used by gamers in the group
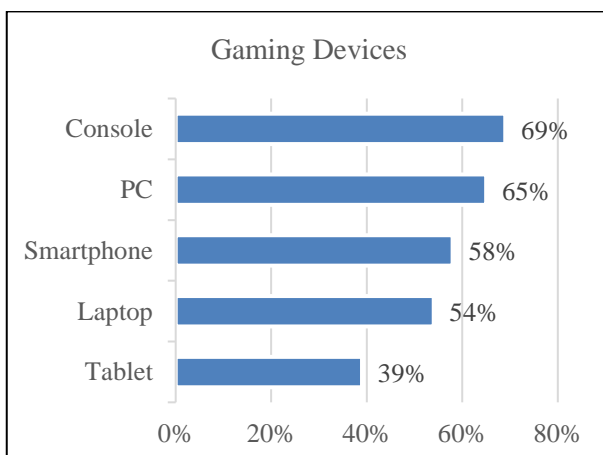
In the context of this course, PCs are provided in the LANs and students were not explicitly instructed about what types of devices to use when engaging the gamified course. However, it was likely that, due to the presence of LANs, students would predominantly utilise PCs and, due to the prevalence of wi-fi on campus, they would venture into the mobile device space. Whilst propensity to use gaming consoles with browser capabilities cannot be commented on, there seems to be a marginally higher preference in playing games on fixed devices as opposed to mobile devices. Since this margin is not broad, greater utilisation of smartphones than laptops coupled with the prevalence of high-powered smartphones suggests the importance of providing a mobile-optimised gamified e-learning experience to users on a variety of devices.

Early in the gamified course, one participant elected to use a mobile device to access the gamified platform. The participant shared the following feedback, *"In reference to the Docebo SaaS mobile site, add better support like viewing blog posts on mobile device."* (Initial questionnaire ID 9). Based on this, it is apparent that mobile device compatibility plays a role in offering gamified learning and is expected. Additionally, since this participant signalled the need to view the course blog posts on a mobile device, it may be argued that mobility and collaboration are expectations of gamified e-learning.

In terms of their usage (Figure 5-10), 15% (4) of gamers played games on a daily basis, 42% (11) of gamers played games on a weekly basis, and 42% (11) gamers played games on a monthly basis. Whilst it would be ideal to have participants engaging games more frequently, many gamers fall into the category of occasional gamers. It should be reiterated that these participants were students enrolled in a full-time programme which required them to dedicate time to their academic work. This might present challenges if a gamified course is presented more as a gameful activity as opposed to an academic activity. The researcher believes that it is essential to strike the balance and present the correct mindset to participants.

Figure 5-10: Game-play frequency
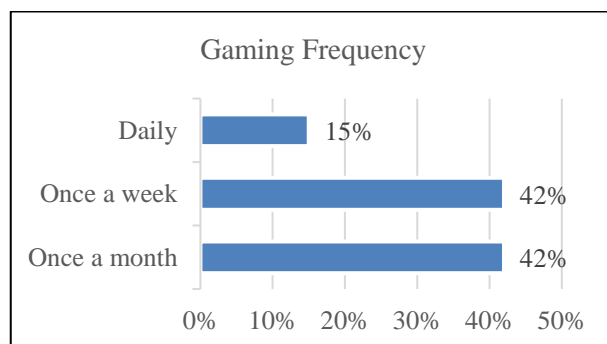
In order to gain further understanding of gamers' playing habits, the researcher explored preferred devices against gaming frequency (Table 5-2). Results indicate that gaming consoles, PCs and smartphones were most used. Gaming consoles and PCs were most frequently used on a weekly basis

followed by PCs which were used once a week or once a month. Extending these results across to gamification, it may be argued that if one were to embark on a gamification of e-learning endeavour, gaming consoles, PCs and mobile devices would be the preferred platforms. The case for gaming consoles and mobile devices is further supported when one considers that they are the most prevalent devices amongst those used on a daily basis.

Table 5-2: Crosstabulation: Devices vs Frequency

Crosstabulation: Gaming Devices vs Gaming frequency	Gaming Console	PC	Smartphone	Laptop	Tablet
Once a month	6	7	5	3	2
Once a week	8	7	6	8	5
Daily	4	3	4	3	3
N	18	17	15	14	10

It was necessary to explore online gaming habits since the gamified course would be offered through an e-learning platform. In this study, 46% (12) of gamers (or a third of all participants) indicated that they played games online. Whilst this result might be attributed to their gaming preferences, it may also hint that some participants face challenges in terms of Internet access. The researcher believes that this might be the case off-campus. However, challenges around Internet access are overcome on-campus as Internet access and computing facilities to engage the gamified course were provided by the institution.

When analysing online gamers against preferred devices (Table 5-3), the most used devices were PCs, followed by gaming consoles, laptops, and tablets and smartphones. This adds another dimension to the discussion since gamers who connect to the Internet for gaming prefer their consoles and PCs as opposed what was found when analysing gamers in general.

Table 5-3: Crosstabulation: Online gamers vs preferred gaming devices

Crosstabulation: Plays online video games vs Gaming devices	Percentage of Online Players
PC	83%
Gaming Console	75%
Laptop	58%
Smartphone	42%
Tablet	42%

From both analyses, there seems to be tension for device between consoles and PCs. Additionally, there seems to be a degree of tension between consoles, smartphones and laptops. In the context of the gamified course, whilst support is not provided for engaging the platform using gaming consoles, results indicate that there is a possibility that some participants might expect to engage a gamified

platform using their gaming consoles. The Docebo platform did not cater specifically for gaming consoles but a mobile application was available.

Continuing with the theme of expectations of gamification, participants were asked, in the initial questionnaire, to voluntarily make additional comments. These comments were not restricted in terms of topic and participants could give comment on any aspect of the course that they wished.

From these comments, it emerged that some participants displayed uncertainty coupled with optimism at the presence of gamification in the course. The researcher believed that this dichotomy may be explained by the novelty of gamification giving rise to this optimism among participants, more so due to them being technology students, whilst a lack of prior experience with gamification led to the uncertainty. This is reinforced by the statement of one participant, *"It's something different, innovative and seems exciting. Looking forward to more information as the semester progresses."* (Initial questionnaire ID 11). Another participant provided a more reserved response, *"It's quite interesting."* (Initial questionnaire ID 32). It is almost as though a sense of curiosity emerged or that participants found gamification to be novel.

When bearing in mind their discipline of study being technology, it emerged that some participants decided to share their views on gamification from a theoretical perspective. *"Gamification is in its development stages in e-learning and it does have a room for learning and motivating students to well in their studies."* (Initial questionnaire ID 12). This view implies a sense of optimism towards gamification for learning whilst indicating that some participants viewed gamification as an emerging technology. Thus, there may have been a sentiment among participants that they were participating in a research project exploring a technology with future potential which might have encouraged participation.

Continuing with the discussion on participants' discipline being technology, one participant, whilst signalling positive expectations, also reflected on how gamification may only be well received by IT students and students who like games, *"I think gamification is a great platform, but its advantageous to those who like games and IT people."* (Initial questionnaire ID 27). Whilst integrating gamification is arguably an approach or methodology which sees the integration of game elements into real-world contexts to motivate behaviour, it was interesting to note the use of the word *"platform"* which again alludes to participants viewing gamification as a technology. The deliberation as to whether gamification is a technology or a methodology is heated (Cortizo, 2014; Marczewski, 2014a).

The researcher is in agreement with Marczewski (2014a) who argues that gamification is an approach or methodology, with much potential, which is offered through the medium of technology. This is because gamification has real-world applications whether or not these applications are facilitated by technology. For example, when applied within the context of e-learning, gamification serves to motivate students to learn, rather than facilitating learning. Similarly, in classroom applications,

gamification serves to motivate students to learn, rather than facilitating learning. In both instances, gamification is an approach to motivate students in some real-world activity, regardless of the presence, or absence, of technology.

Furthermore, whilst gamification was being applied to a technology course where majority (n=26, 74.3%) of the participants were gamers, this reflection that gamification would be well-received by technology students hints that students in other disciplines might not experience the same. This highlights the need for gamified experiences to cater for a variety of audiences, or audiences comprising users from multiple diverse backgrounds. Since gamification is applied across a multitude of disciplines and business functions, a need to increase awareness on gamification and its potential may be argued.

In the initial questionnaire, participants were also asked to provide Likert scale responses to seven statements to understand their expectations of gamification. As discussed, these questions were adapted from Tagoe (2012). Results are presented in Figure 5-11 (also Table A-2) and discussed thereafter.

Figure 5-11: Expectations of Gamification
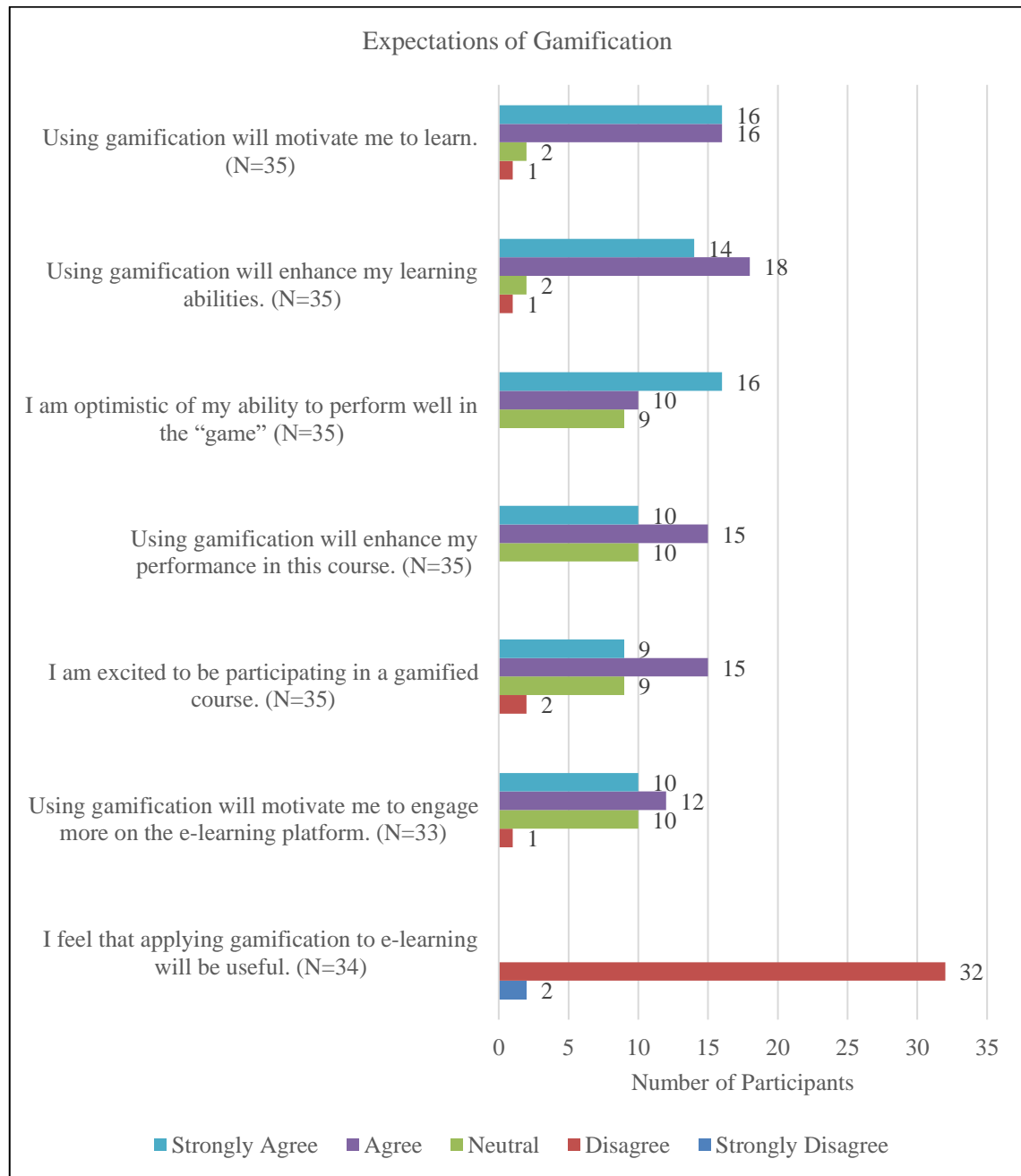
When analysing the expected motivational influence of gamification, participants felt that gamification would motivate them to learn (91% agreement, median=4.00, variance=0.526) whilst they expected that gamification would, to a lesser extent, motivate them to engage on the e-learning platform (62% agreement, median=4.00, variance=0.746). Possible reasons for this will be discussed in the following sections. Participants also expressed excitement at embarking on a gamified course (68% agreement, median=4.00, variance=0.751) and were optimistic of their success in the game.

In terms of their expectations of the influence of gamification on their performance, participants indicated optimism in their ability to perform well in the gamification aspect of the course (83% agreement, median=4.00, variance=0.694). This optimism was complemented by an expectation that

gamification would also enhance their academic performance (71% agreement, median=4.00, variance=0.588), albeit to a lesser extent.

In terms of the value of gamification, participants expected that gamification would enhance their learning capabilities (91% agreement, median=4.00, variance=0.504) but did not expect that applying gamification to e-learning would be useful (91% disagreement, median=2.00, variance=0.057). When considering participants' strong negative views on the usefulness of gamification, alongside the other results presented above, the researcher believes that participants did not associate usefulness with learning and academic activities. However, since this statement did not specifically elaborate on the nature of the usefulness being asked about, this result may simply be attributed to different understandings of usefulness being held by different participants. Whilst the researcher endeavoured to develop an instrument aligned with recommended practices, this result suggests that the phrasing of statements in questionnaires should be more explicit. To this light, domain of usefulness must be stipulated in the statement, e.g. for learning, understanding or efficiency.

Nonetheless, results indicate that the focus seemed to be on motivation, performance and learning. It might be the case that some participants, due to a lack of prior exposure, might not be aware of the potential of gamification of e-learning to be useful for learning. Consequently, as a result of their lack of prior exposure to gamified e-learning, they might have expected that gamification of e-learning would have game play as a central component of the course. Being at 4th year level, this might have contradicted expectations of academic work. These results signal the need for onboarding, wherein clarity must be provided regarding what exactly gamification is and how it will be integrated into and influence a course.

Ultimately, whilst most participants had no prior exposure to a gamified course, they still held high expectations of gamification (composite median=4.00, variance=0.594). It should be noted that these expectations were to a much lesser extent for academic activities and a greater extent for aspects relating to performance and motivation.

5.5. Game preferences and expectations

Whilst the core focus of gamification is to motivate behaviour, it must be restated that the roots of gamification lie, to a large extent, in games. Therefore, it was essential to explore participants game preferences and how their expectations influenced their game preferences. This understanding allowed the researcher to adapt the design of gamification in a manner that appealed to participants. Developing a game that appeals to an audiences' preferences or motivators would be more likely engage participants at a deeper, more intrinsic level.

The researcher posed a series of questions meant to unlock the game preferences of participants. In the initial questionnaire, participants were asked to rank various game elements in order of preference. Twenty-six participants provided responses to this question. As depicted in Figure 5-12 (also Table A-3), participants indicated a preference for points followed by badges, leaderboards, progress bars and the storyline, respectively.

Figure 5-12: Participants ranking of game elements in the initial questionnaire

These results suggest that participants expected quantifiable measures of success (points) more than non-quantifiable measures like titles or representations of success (badges). Furthermore, participants seemed to expect individual recognition more than being ranked in a position against peers. The low expectation of progress bars and the storyline suggest that participants in the gamified course expected to be less motivated by tracking their progress and the appeal of themes.

The researcher believes that it is possible that participants' prior experience may have influenced their preferences. In traditional education, there is strong emphasis on quantifiable means of measuring achievement like marks and positions in a class, course or module whilst there is less emphasis on navigating oneself and embracing an experience. However, the preference for badges might challenge this notion. Furthermore, there seems to be a greater affinity for participants being rewarded for their own merit rather than being compared to and rewarded against other participants.

When asked their preferences in terms of criteria to be used for allocation of rewards in the game, as depicted in Figure 5-13, participants again seemed to indicate expectations for rewards measuring their own merit like mastery of knowledge (77% replied positively), relevance of interactions (66% replied positively) and ability to conduct research (63% replied positively). They indicated significantly lower expectations for rewards involving engaging or competing with others, like social interactions (43% replied positively) and speed (40% replied positively).

Figure 5-13: Participants preferred criteria for allocation of rewards
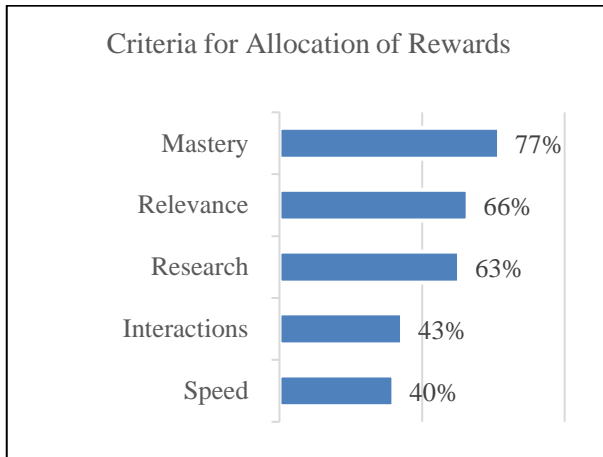
Based on the above results, it may be argued that when applied to a learning context, participants expect a gamified experience that is closely aligned with a formal learning experience. It may also be argued that whilst gamification provides a method of integrating game elements into the real-world, when applied to an academic context, it is the academic context that governs participants' expectations.

However, it is also possible that gamification lightens the gravity of a context as indicated by one student, "*It's a good approach. Everybody likes games … (and) has played some kind of game. Thus, takes off the seriousness of the course of meeting deadlines even if essential to.*" (Initial questionnaire ID 21). Caution should be maintained to ensure that gamification does not make too light of a somewhat serious context. Furthermore, this sentiment raises a discussion about distraction, which already confronts e-learning. Gamification, whilst striving to motivate behaviour, should not serve as a distraction from academic work.

In order to further understand criteria for allocation of rewards, the researcher contrasted participants expected motivational rankings of game elements against their preferred criteria for rewards (Figure 5-14).

Figure 5-14: Ranking of game elements vs criteria for allocation of rewards

Ranking of game elements vs criteria for allocation of rewards
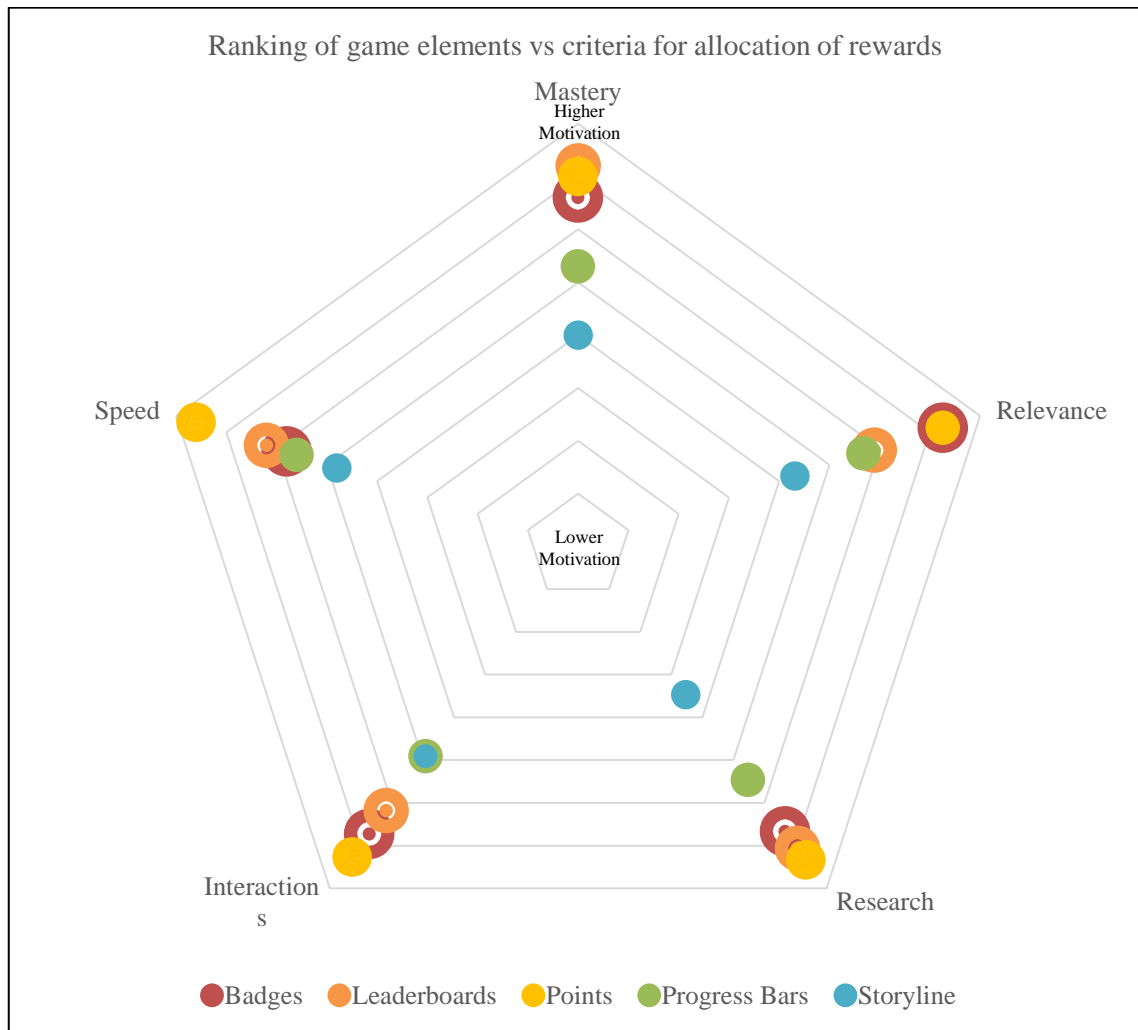
As can be gleaned from Figure 5-14, participants who expected to specifically be rewarded for mastery of knowledge, expected that badges, points and leaderboards be used, with leaderboards being the most motivational of the three. This further reinforces the view that gamification was viewed as an academic endeavour to the extent that participants expected to be rewarded publicly for mastering knowledge.

Similarly, when considering being rewarded for research ability, participants tended to expect badges, points and leaderboards. However, in the case of research ability, participants indicated that points held the strongest motivational influence. Here, it seems as though participants expected quantifiable rewards for displaying research ability, like marks, is core to the academic programme.

In terms of social interactions, participants indicated a lesser degree of motivation by game elements. When analysing relevance of interactions, participants expected that they would be rewarded with points, badges and, to a lesser extent, leaderboards. This suggests that whilst participants want to be rewarded for interacting in the gamified course, they expect that rewards will be given for relevant interactions. When considering that distractions present challenges to e-learning, expectations of

being rewarded for relevance suggest that gamification may alleviate this challenge. Furthermore, participants seemed to expect to be rewarded for interacting, but not in a manner that places them against others.

Whilst participants did not strongly expect to be rewarded for speed, they expected to be rewarded by only points and leaderboards, with points serving as a stronger motivator than leaderboards.

As may be gleaned from the discussion, there seemed to be expectations of quantifiable or tangible rewards for a variety of activities. Also, as depicted in Figure 5-14, progress bars and storylines were found to have poor motivational influence, in terms of expectations across all criteria.

5.6. Gamer profiles - BrainHex

In order to further explore participants' preferences and expectations of a gamified course, they also completed an online survey to determine their BrainHex gamer profile. It was necessary to understand participants' player profiles as different individuals are motivated in various ways. As discussed, the BrainHex typology defines seven player profiles or types which enables classification of an individual into a particular type based on their motivational drives.

Students were asked to share the results of their profile in the initial questionnaire based on their completion of a BrainHex online survey. Thirty-one participants provided BrainHex data (Figure 5-15) with the most predominant profiles being Mastermind (9 participant) and Conqueror (9 participants) followed by Daredevil (5 participants), Achiever (5 participants), Seeker (2 participants) and Socialiser (1 participant). There were no participants fitting the Survivor player type in this study.

Figure 5-15: Treemap of participants' BrainHex profiles
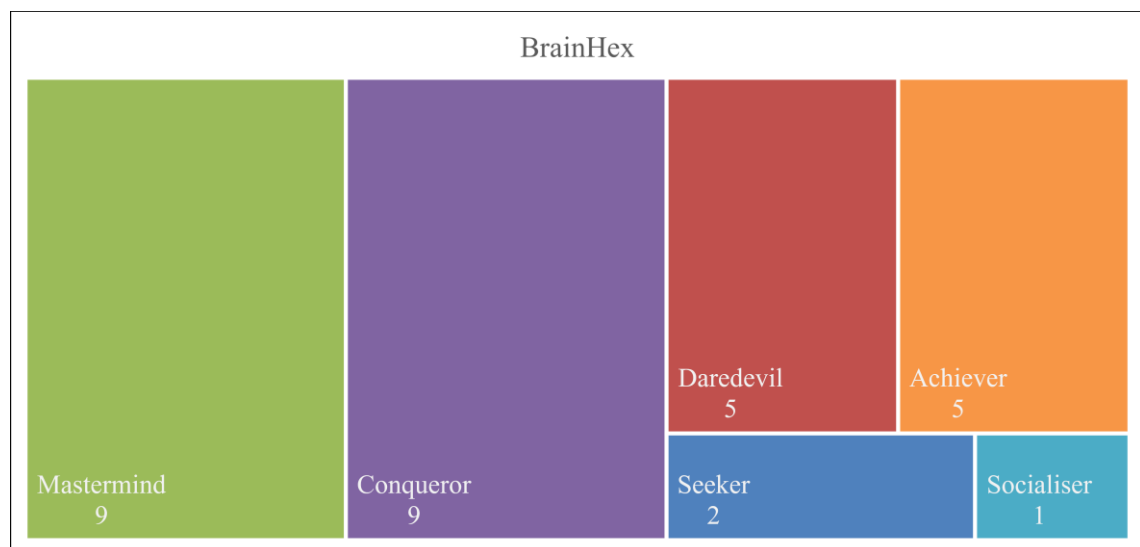
When contrasting the BrainHex profiles against prior experience with gamification, both participants who indicated prior experience with gamification fell into the Mastermind player type.

When analysing player profiles in terms of BrainHex alongside whether or not participants play games (Figure 5-16), it emerged that gamers comprised eight Conquerors and Masterminds, five Daredevils, two Achievers and one Socialiser. At the other end of the spectrum, most Achievers were not gamers (3 of 5), nor were the two Seekers.

Figure 5-16: BrainHex vs Gamer/Non-Gamer
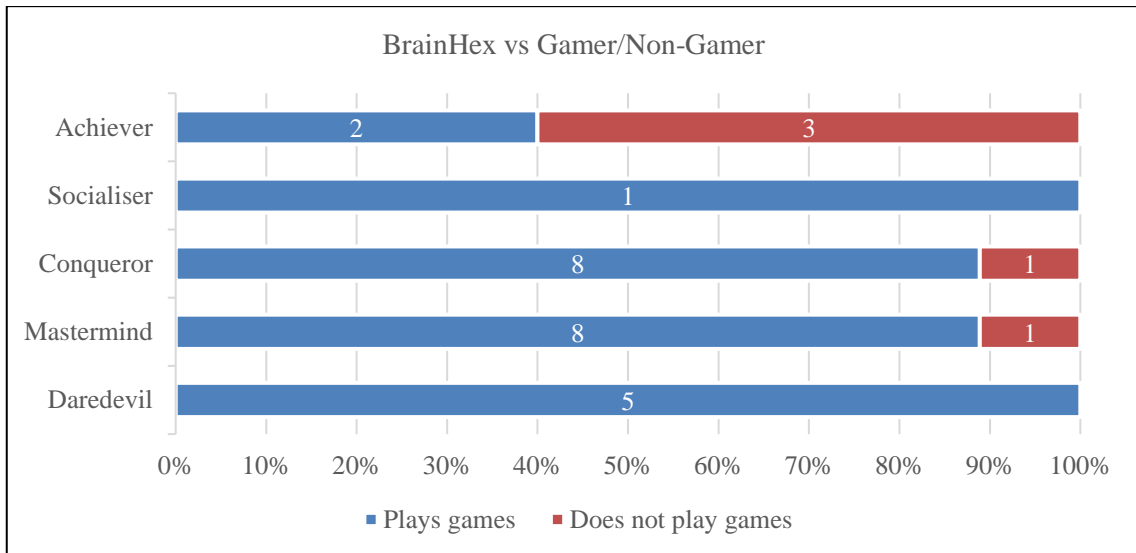
Furthermore, from the twelve online gamers discussed earlier, the predominant profiles who played online games were Socialiser (1 of 1 in this profile), Achiever (2 of 3 in this profile who provided responses), Daredevil (3 of 5 in this profile), Mastermind (3 of 9 in this profile) and Conqueror (3 of 9 in this profile).

In terms of gaming frequency, depicted in Figure 5-17, most Conquerors played games on a daily basis with Masterminds tending to play on a weekly basis. Daredevils played at least once a month. Other types of players were less frequent in their gaming habits.

Figure 5-17: BrainHex vs Gaming Frequency
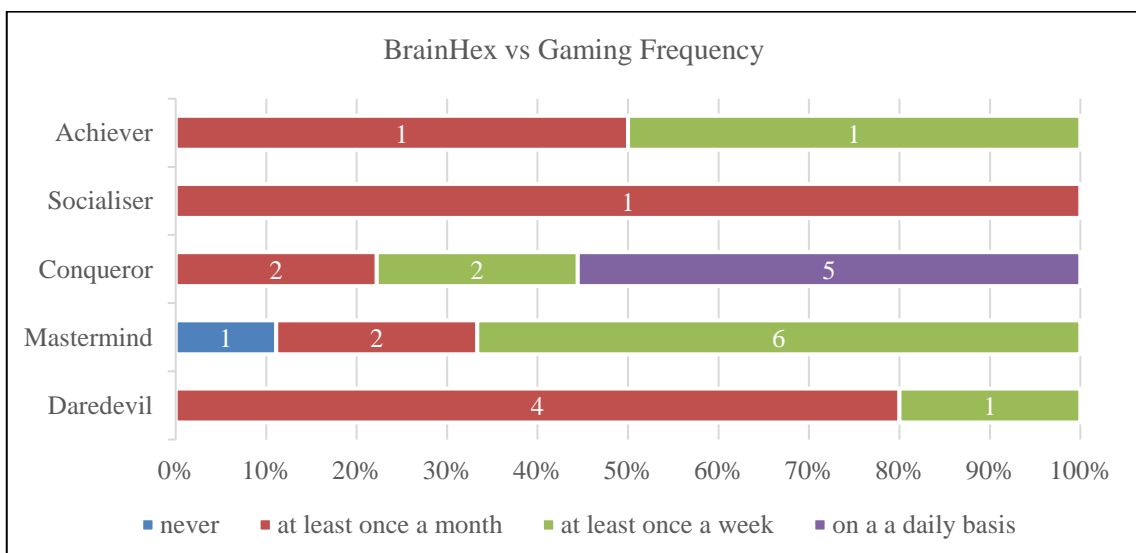
In terms of preferred gaming devices against the backdrop of BrainHex (Figure 5-18), Masterminds indicated stronger preference for gaming consoles and smartphones, followed by laptops and PCs. Similarly, Conquerors indicated stronger preference for gaming consoles and smartphones, followed by laptops and then PCs. For these two types of players, results suggest that gamified endeavours must cater for mobile use and, possibly, browser-equipped gaming devices. Daredevils preferred smartphones less but favoured gaming consoles and PCs. More than half of the Daredevils displayed support for tablets.

On the other end of the spectrum, Achievers indicated low preference for consoles and smartphones and preferred to use PCs and laptops. This aligns with their motivational preference for completing activities that lead to attainment of goals. It is as if they display preferences for devices which are commonly associated with productivity and work. The Socialiser in the group indicated preference for PCs, which in an age of social media and being constantly connected, seems to suggest a contradiction between their preference and player profile.

Figure 5-18: BrainHex vs Gaming Devices
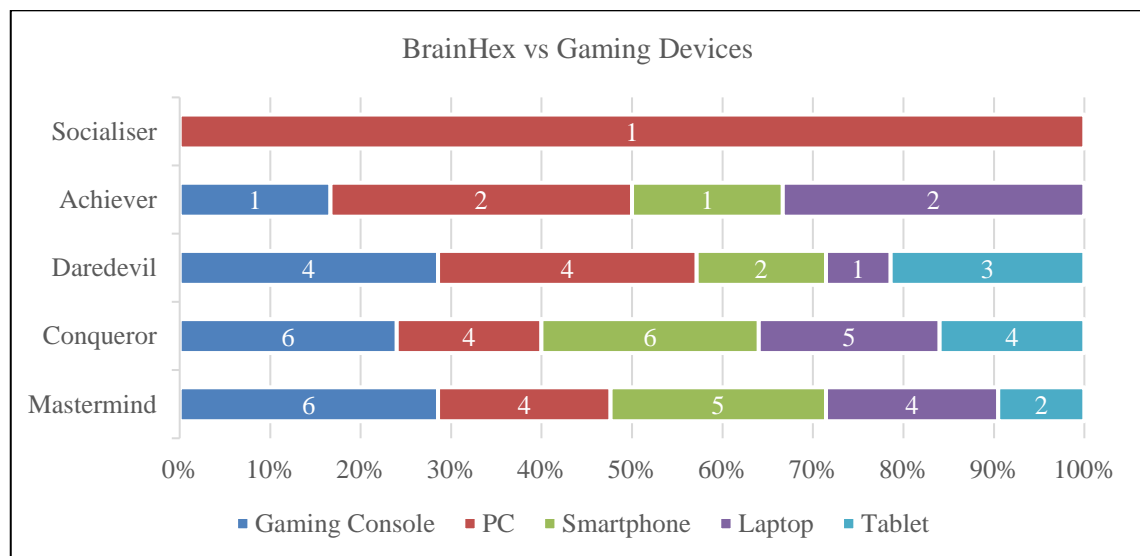
As discussed, participants were asked to rank game elements in terms of how motivational they perceived each. In order to understand the BrainHex profiles further, the researcher explored the expectations of the different BrainHex profiles in relation to each game element (Figure 5-19).

Figure 5-19: BrainHex vs motivational rankings of game elements at the commencement of the course
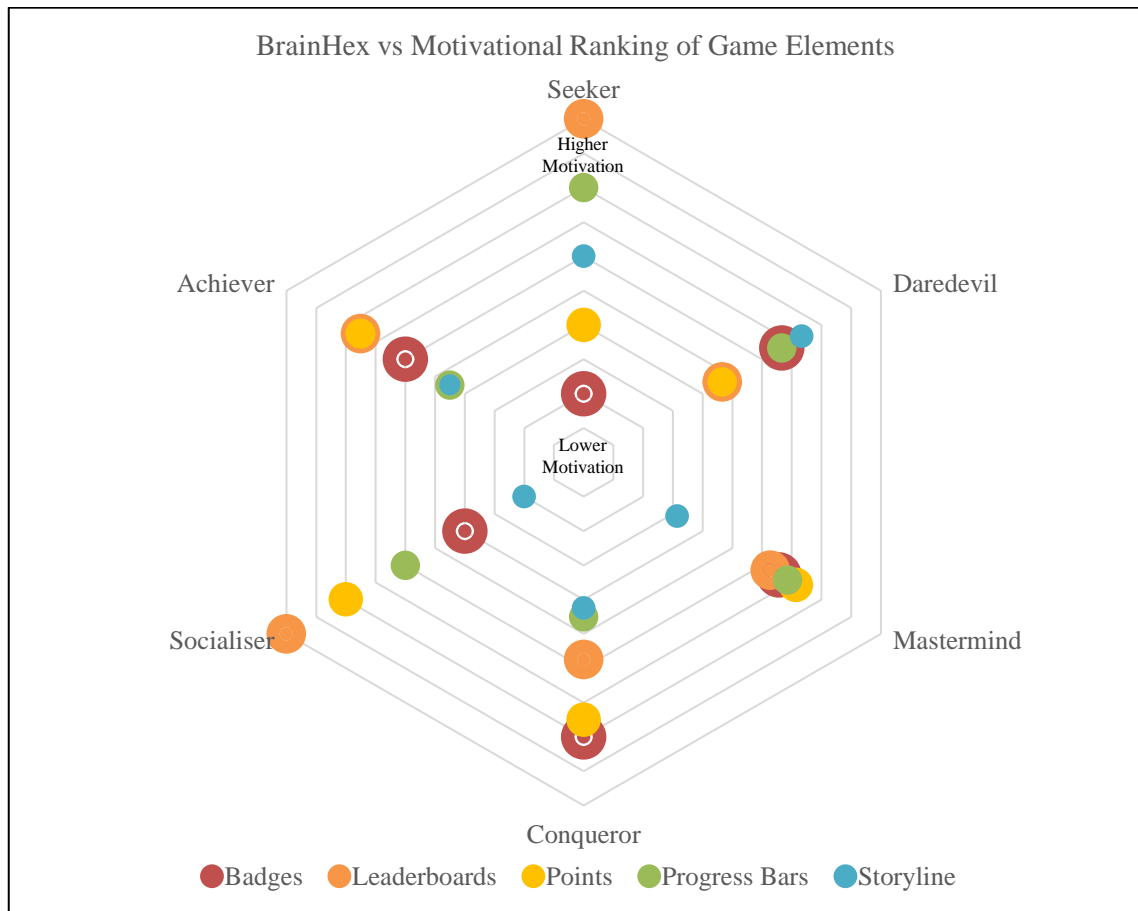
As can be gleaned from Figure 5-19 (also Table A-4), participants expected that points would be most motivating among Socialisers, Conquerors and Achievers. This Socialiser, who reported expecting to be motivated by points seemed to fall outside the definition of a Socialiser who would normally be motivated by conversation, collaboration and trust. When considering that Conquerors are challenge-orientated, motivated by struggling against adversity and defeating others, their expectation of points fitted their profile. In terms of Achievers, who are motivated by long-term achievements which contribute to attainment of goals, it would seem that quantifiable rewards like points were expected to fulfil the desires of Achievers. Masterminds, to a lesser extent, reported expecting to be motivated by points. This level of motivation might be explained by the fact that Masterminds prefer solving puzzles or problems based on strategy and efficiency. Points, whilst not directly expected to serve this motivational need, will require some strategic planning and solving to attain. On the other hand, the least motivation was expected to be derived from points among Daredevils and Seekers. This might be explained that points might not provide Daredevils with suspense or thrill. Similarly, Seekers might not have their interest and curiosity piqued by points.

In relation to badges, Conquerors and Daredevils expected to be motivated by this element. When considering that badges are visual representations of achievement, it fits within the Conqueror profile that they expect to be motivated by badges. The fact that Daredevils expected to be motivated by

badges suggests that badges offer a sense of a thrill and suspense. To a slightly lesser extent, Masterminds expected to be motivated by badges. This may be explained by the fact that, in a similar manner to points, badges have been initially perceived as a basic type of reward not requiring strategic planning on the part of Masterminds. Nonetheless, there seems to be a degree of alignment between Masterminds expectations from points and badges. Achievers expected to be less likely motivated by badges. Since Achievers are motivated by working towards longer-term goals, this may suggest that quantifiable measures like points tend to provide a greater sense of pursuing an achievement as opposed to a visual representation of a reward. In essence, whilst badges are often positioned as highly motivational, this was not prevalent among participants.

Leaderboards were expected to be strongly motivating among Seekers, Socialisers and Achievers, albeit to varying degrees. This suggests that leaderboards provide the required level of curiosity and wonder, conversation and collaboration, and indication of attainment of goals which are respectively sought by each of these profiles. On the other hand, some Daredevils, Masterminds and Conquerors reported not expecting to be motivated by leaderboards. From this it may be argued that being placed ahead of peers does not provide a thrill to Daredevils (whilst this might have been expected from this profile). Furthermore, Masterminds do not find strategic planning associated with attaining position on the leaderboard motivational. It is possible that Masterminds expected that obtaining rank on the leaderboard might be easier. Furthermore, and contrary to their profile, Conquerors did not seem to expect to be motivated by defeating peers on a leaderboard. It would seem that leaderboards, whilst motivational to the group, were not a preferred game element among all participants. This is perhaps since the academic context already places students in some of ranking based on final results, thus simply extending the metaphor that students already experience might not increase motivation. This might signal the need to approach leaderboards with caution in order to avoid amotivation. Rather, it seems like participants expected focus on rewards which do not place participants in direct competition with each other.

Whilst progress bars were not expected to motivational overall, some Seekers, Daredevils and Masterminds reported expecting to be motivated by progress bars. The researcher reasons that progress bars provide a level of curiosity and wonder to Seekers, due to their sense of curiosity about to what is to come in the gamified course. In terms of Daredevils, progress bars motivate in that they provide a level of suspense, which increases as the progress bar nears completion. Masterminds, might obtain motivation from progress bars due to the fact that it provides a platform upon which to strategise further.

As discussed, the storyline was also not expected to be motivational overall. However, some Daredevils, Masterminds, Conquerors and Achievers expected some motivation. This is due to the fact that Daredevils attain suspense and excitement by what is to come in the storyline, Masterminds utilise it as a basis to strategise and grow within the context to strategise, Conquerors find a sense of

triumph against adversities of challenges introduced through the storyline, and Achievers see the storyline as a tool for working towards the attainment of goals.

Furthermore, as discussed, participants were asked to share their expectations and preferences in terms of how rewards might be allocated. Participants were asked to indicate whether rewards should be based on five criteria: mastery of knowledge, relevance of interactions, research ability, social interactions and speed. This was a binary response and participants could stipulate as many criteria as they preferred. In order to further understand expectations of various BrainHex profiles in relation to these criteria, the researcher provides analysis of Figure 5-20 (also Table A-5).

Figure 5-20: BrainHex profiles vs Criteria for Allocation of Rewards
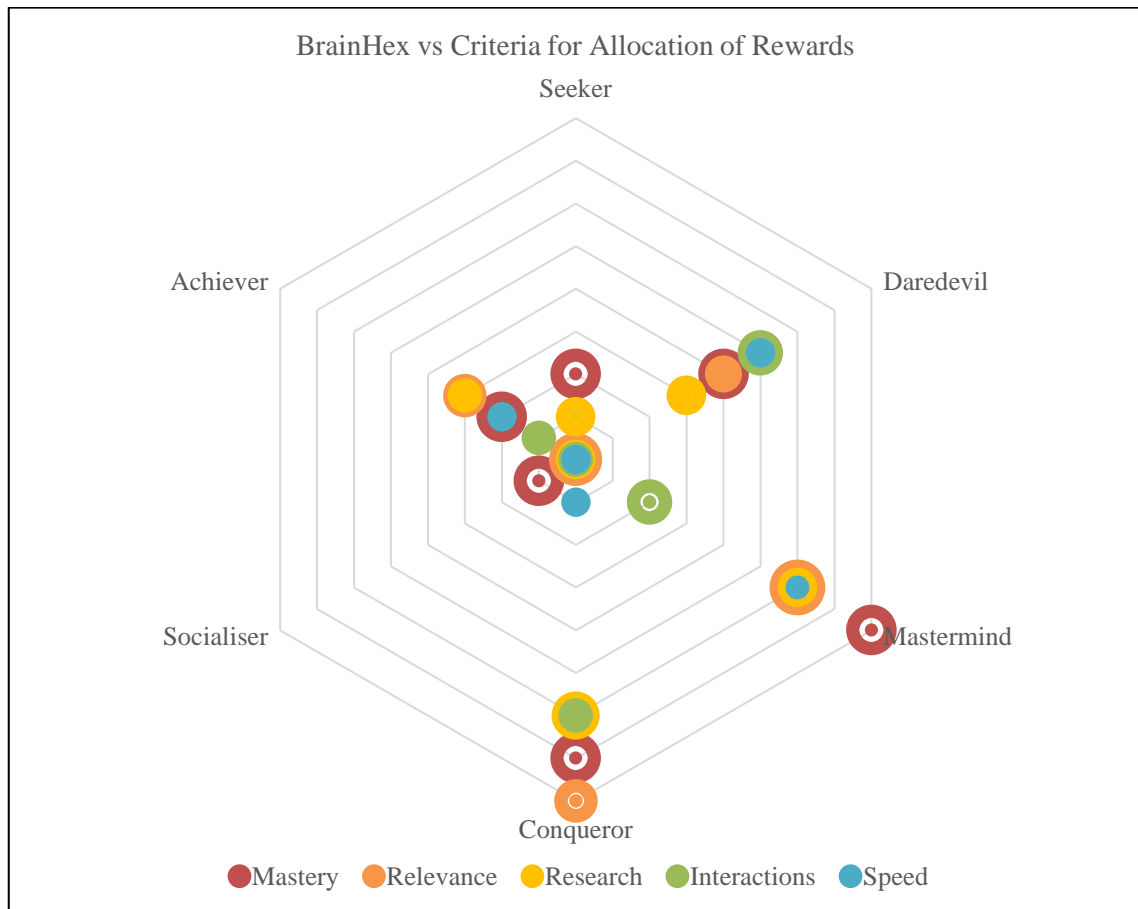
When analysing these preferences against BrainHex, Masterminds expected rewards to be allocated for mastery of knowledge, followed by relevance of interactions and research ability. Similarly, Conquerors expected that rewards be allocated for relevance of interaction and mastery of knowledge, followed by research ability and social interactions. In a similar light, Daredevils expected to be rewarded for social interactions, speed, mastery of knowledge and relevance of interactions. Socialisers indicated preference for mastery of knowledge being rewarded whilst, uncharacteristically, not preferring social interaction being rewarded. Achievers indicated expectations for rewards being allocated for relevance of interactions and research ability whilst not

expecting mastery to be rewarded. Seekers indicated expectation for being rewarded for mastery of knowledge.

When profiles are contrasted against participants' preferences of rewards, it is interesting to note that whilst individuals with the predominant gamer profiles in the group (like Conquerors and Daredevils) are said to prefer speed and fast-paced action, participants in this study did not expect these aspects to motivate them in gamified learning. A similar contradiction exists for participants' displaying a degree of expectation for being rewarded for social interactions despite the Socialiser profile being least prevalent. Another theme which emerged among the predominant gamer profiles is that research ability should be rewarded. Since the gamified course was part of a 4th year programme with a year-long research project, it would seem that participants perceived these skills to be necessary to recognise and reward. Furthermore, this might indicate that the perceived effort required in developing research abilities surpasses the perceived effort required to fulfil other criteria, like mastery of knowledge.

Despite reporting an expectation for being rewarded for social interactions, there were indications that participants do not hold this preference when completing academic tasks. For example, one participant said, *"Focus on individual work rather than group work."* (Initial questionnaire, ID 20). As a result, the researcher believes that whilst participants may carry a specific gamer profile, when it comes to integrating gamification into learning activities, participants may deviate from their profile, possibly due to the motivators within an academic context being different to those in traditional games to the extent that academic motivators seem to carry more strength that game motivators.

5.7. Summary of participants' expectations

Participants had exposure to e-learning, reported proficiency, and held high expectations of the technology (composite median= 4.00, variance=0.588). As a result, e-learning proficiency was determined to not be a challenge that would likely distract or disadvantage participants in relation to the gamification. Based on their prior experience and perceived proficiency, no additional support for e-learning was necessary.

On the other hand, participants had minimal prior experience with gamification. Nonetheless, they held high expectations of the gamified course, possibly due to their game-playing habits and the novelty of gamification (composite median= 4.00, variance=0.594). In terms of game-playing habits, not all participants were gamers. From amongst those who played video games consoles, PCs and smartphones were most the preferred devices. Possibly due to academic commitments, most gamers were not frequent gamers with most playing once a week or once a month. Additionally, a small number of participants played games online. Whilst they held high expectation of gamification,

participants' minimal prior experience signalled that support might be required in relation to the gamification itself.

Participants mostly expected to be rewarded with points, badges and leaderboards and expected that allocation of rewards be based predominantly on mastery of knowledge, social interactions and relevance of engagements.

In terms of the BrainHex player profiles, the most predominant were Mastermind and Conqueror followed by Daredevil, Achiever, Seeker and Socialiser. No participants fitted into the Survivor player type. When unpacking these types further, most gamers comprised Conquerors, Masterminds, Daredevils and Achievers. In terms of gaming frequency, Conquerors were the most frequent gamers. Whilst there was stronger preference for gaming consoles across gamers who were Achievers, Daredevils, Masterminds and Conquerors, but it emerged that all player profiles displayed strong preference for PCs.

From the perspective of BrainHex, the preferred criteria for reward for each profile and the top 3 preferred elements are summarised in Table 5-4.

Table 5-4: BrainHex profiles vs preferred criteria and game elements

BrainHex	Preferred Criteria	Preferred Game Elements
Mastermind	Mastery of Knowledge	Points, Progress Bars, Badges
Conqueror	Relevance of Interactions	Badges, Points, and Leaderboards
Daredevil	Social Interactions and Speed	Storyline, Progress Bars and Badges
Achiever	Relevance of Interactions and Research Ability	Points, Leaderboards and Badges
Socialiser	Mastery of Knowledge	Leaderboards, Points and Progress Bars
Seeker	Mastery of Knowledge	Leaderboards, Progress Bars and Storyline

In the analysis, it was clear that the academic context served as a stronger motivator than gamification. As a result, the researcher argues that alignment between gamification objectives and learning objectives is crucial to ensure that gamification enhances and sustains motivation in an academic context.

5.8. Conclusion

This chapter sought to answer the first research question relating to participants' expectations of a gamified e-learning course.

In order to understand expectations of a gamified course, the analysis explored prior experience and expectations of gamification. In order to identify whether or not e-learning might influence results, prior experience and expectations of e-learning was also explored. Furthermore, this chapter explored participants gaming habits, preferences and BrainHex profiles.

6. CHAPTER SIX: FACTORS INFLUENCING EXPERIENCES OF GAMIFICATION

6.1. Introduction

Once the researcher understood participants' prior experiences and expectations from a gamified course, focus shifted towards exploring the factors influencing participants' experiences of the gamified course. As discussed, the results and analysis are presented in three chapters. This chapter explores the second research question (RQ2 below).

To reiterate, the research questions underpinning this study were:

RQ1.   What are students' expectations of a gamified e-learning course?

RQ2.   What factors influence students' experiences of participating in a gamified e-learning course?

RQ3.   How does gamification of e-learning influence students' motivation in a gamified e-learning course?

As discussed, in order to answer the research questions, a number of instruments were utilised before, during and after the gamified course as depicted in Table 6-1.

Table 6-1: Summary of sequence of research activities, instruments and research questions.

	Pre-course	In-course	Post-course
Research Question	1	2 & 3	2 & 3
Instrument	Initial questionnaire (See Appendix G1)	Interviews (See Appendix H)	Interviews and end-of-course questionnaire (See Appendix G2)

As may be gleaned from the table, this chapter provides analysis of results obtained during interviews and in the end-of-course questionnaire. Furthermore, analysis also incorporates observations of the researcher. Based upon the selection criteria defined discussed in Chapter Four, twelve interviews were conducted. Ten of these interviews were conducted on-campus whilst two were conducted off-campus, at the request of the two interviewees. Interviewees agreed to interviews being audio recorded.

As discussed in the research methodology chapter, a five-point Likert scale was adopted in questionnaires where: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree.

The chapter commences with a discussion on the three types of interviewees identified in this study and places interviewees on a Continuum of Engagement. Thereafter, participants' experiences are framed and presented through the lens of four phases in the journey of a game player, as defined in the Octalysis framework. Included in this is analysis of participants' understanding of gamification and experiences of onboarding and accessibility. Thereafter, participants' experiences of the game

design and game elements are provided. This chapter concludes with a summary of the key factors influencing students' experiences in a gamified e-learning course.

6.2. Types of interviewees

As discussed, interviewees were selected based on selection criteria which are illustrated in Table 6-2. These types are discussed based on the researcher's notes of observations and key points noted during the interviews. These types serve to provide insights into factors influencing the experiences of a specific type of participant.

It should be noted that whilst position and observed level of engagement were both used in purposively sampling potential interviewees, interviewees were selected if they fitted both criteria. Whilst participants generally fell into one or other type, there may have been instances of participants who might have been, for example, in a top position but not necessarily engaging. Such participants were not considered.

Table 6-2: Criteria for interviewee selection

Interviewee Types	Position	Observed Level of Engagement
Engaged	Position 1-10 on the game leaderboard at time of interview	Observed to be engaging strongly with the gamified e-learning course
Partially-Engaged	Position 11-20 on the game leaderboard at time of interview	Observed to be engaging moderately with the gamified e-learning course
Disengaged	Position 20+ on the game leaderboard at time of interview	Observed to be engaging poorly with the gamified e-learning course

6.2.1. Engaged

Engaged interviewees comprised five males (Interview ID 1, 3, 7, 8, 10) and one female (ID 11). In terms of race, these interviewees comprised four Indians and two Africans. The age of these participants ranged from 21 to 23 years old. In so far as BrainHex profile, Conquerors were dominant (ID 3, 8, 10) among Engaged interviewees, followed by an Achiever (ID 11) and a Daredevil (ID 1). One interviewee in this band did not specify a BrainHex profile (ID 7).

Engaged Conquerors signalled being motivated by pleasing aesthetics and deadlines. Two Conquerors were motivated more by academic work than gamification with one interviewee explicitly stating that marks hold greater weight to them than points (ID 10). Whilst holding this sentiment, the interviewee stated that gamification was not devoid of motivation as achieving more rewards led to greater motivation and vice versa. Furthermore, Engaged Conquerors generally held a positive outlook towards gamification with one perceiving that it brought purpose to learning. They attributed their engagement to the creativity afforded by gamification, applying themselves to academic work, achieving academically, and to the structure of the course. In terms of social interaction, Conquerors did not avoid posting content, with the exception of one. In keeping the

Conqueror profile, they regretted when they slipped down the leaderboard. Most Engaged Conquerors attended onboarding and even suggested improvements for the game.

The Engaged Achiever attributed a large portion of their performance to receiving positive feedback on an assignment. They adopted a positive view of gamification since it encouraged learning. This interviewee was also motivated by the storyline and badges. To extend this further, they perceived badges as testaments of skills associated with the badge. This might have also been brought about by the fact that Achievers are motivated by completing activities which contribute to goals.

The Engaged Daredevil did not entirely fit the Daredevil profile. They reported being driven by objectives and their experience of gamification motivated them to "go the extra mile." Furthermore, this interviewee, contrary to their profile, did not strive to be highly ranked on the leaderboard and was reluctant to be placed at this rank. In fact, whilst being motivated by earning points and rewards, the interviewee felt that this might lead to them being a "target" or standing out.

With regards to the participant who did not specify a BrainHex profile, they were motivated by getting work done and collaborating with peers. They attributed their performance to dedication, working efficiently and seeking help when required. Furthermore, this interviewee felt that it was easy to earn points and that gamification played an encouraging and motivating role in the course.

6.2.2. Partially-Engaged

Partially-Engaged interviewees comprised two males (Interview ID 5, 9) and one female (ID 12). In terms of race, these interviewees comprised four Africans. The age of these participants ranged from 22 to 29 years old. BrainHex profiles were distributed in this band. Profiles comprised an Achiever (ID 5), a Conqueror (ID 9) and a Seeker (ID 12). Two interviewees in this band were not able to attend interviews on campus. In the case of one participant, this was due to family commitments (ID 12).

The Partially-Engaged Achiever felt that gamification motivated them to improve their performance in the course and experienced a sense of "reassurance" at having their work recognised through gamification. This is in keeping with the fact that Achievers are goal-oriented and are motivated by progress towards a goal. Furthermore, they reported being motivated by instant feedback and learning concepts which bear relevance to his intended career. This longer-term outlook fits into the Achiever profile who seek to complete activities to meet longer term goals. A unique experience shared by the Partially-Engaged Achiever was that they were under the misconception that the class was really being hired by a real technology company called Specialist Technologies. They attributed this to the themed approach used during the onboarding where the researcher donned corporate attire and introduced participants to the hypothetical company used in the storyline. Like in the case of Engaged Conquerors, this interviewee also suggested improvements for the game.

The Partially-Engaged Seeker did not fit the traditional profile of participants in that they were a married parent and qualified secondary school teacher. As a result, they did not actively engage peers on the gamified platform due to lack of time. Initially, this interviewee was performing weakly in the terms of gamification and emerged as a strong performer in terms of the gamification towards the end. They attributed poor performance to experiencing difficulty and not understanding expectations and experienced a conversion to stronger performance as a result of achieving academically. In fact, this Partially-engaged Seeker "separated the game and the course". Since gamification rewards were based on meeting learning objectives, it effectively in increased their game performance. When contrasting this with their BrainHex profile, this contradicts the traditional Seeker profile who is motivated by interest and curiosity in the game and enjoys wonder. This may indicate that Seekers who are faced with considerable external commitments deviate from their profile and become less engaged. Lastly, like in the case of the Engaged Achiever, they perceived badges as professional accolades as opposed to "just a badge."

The Partially-Engaged Conqueror was least engaged from interviewees in this category. Whilst they found the storyline positively challenging, they seemed to experience a sense of disdain at gamification being integrated into the course. Consequently, they questioned the motivational influence of gamification. Some of negative experiences were shaped by format the ISTN731 course. They expressed negative sentiments regarding the fact the one could not engage peers in person, the timing of the gamified course so late in the year, and their perceived lack of formal structure. Additionally, this interviewee contemplated quitting the course and felt that course registrations would drop in the future if gamification was continued. He also indicated that he discussed the course with friends and other lecturers who held similar views. These results seem to indicate that participants who face challenges with a course may have these challenges magnified by the presence of gamification. This interviewee did not attend onboarding, which might have negatively contributed to their experience. Furthermore, the researcher believes that the negative factors contributing this Conqueror's experience resulted in them engaging like-minded peers and academics outside the course who might have held similar views. This result might caution that whilst gamification may be viewed as novel, its value for learning is still being questioned.

6.2.3. Disengaged

The Disengaged interviewees all were African students, with two aged 23 and one aged 29. Two were males (ID 2, 4) whilst the other was female (ID 6). In terms of BrainHex profiles, one interviewee was a Mastermind (ID 6), one was a Socialiser (ID2) and other did not specify a BrainHex profile (ID 4).

Whilst describing themselves as self-motivated, the Disengaged Mastermind attributed their decreased game performance to not understanding what was expected from them in the game.

Analysing this further, this participant felt that objectives were not clearly defined, the scoring mechanism was not clear, and that concrete feedback was not provided. Additionally, this interviewee missed two weeks of campus. During this time, this participant tweeted about the gamified course, particularly about being worried about missing out. It would suggest that, Masterminds are motivated by continuous contact and engagement with a gamified endeavour. Whilst reporting some sense of motivation as a result of the gamification, this interviewee experienced a stronger sense of frustration at not earning rewards.

In terms of the Disengaged Socialiser, they attributed their poor level of engagement with the course to the perceived increase in workload. In terms of gamification, they felt that it was good but that it did not fully motivate them. It would seem that the effects of the increased workload as a result of the course itself followed through into how this participant engaged the gamification. Whilst this was the case, when motivated, the Disengaged Socialiser reported being driven by understanding a context and by pleasing aesthetics. Also, it is worth considering that this interviewee was older than the other participants. Hence, it could be possible that they were pressured by commitments which other participants might not have faced. This result further motivates that when trying to engage older players in a gamified course, designers should be cognisant of outside commitments of participants. Since external commitments are a recurring theme seeming to influence engagement, perhaps insight into external commitments should be sought from participants, regardless of player profile, prior to the commencement of a gamified course.

Another type of Disengaged interviewee was one who did not specify a BrainHex profile. Whilst this interviewee reported being motivated by seeking knowledge rather than obtaining good marks, they attributed their poor game performance to missing early tasks and, consequently, not earning rewards in the game. Additionally, this interviewee reported diminishing motivation as the course progressed. It should be noted that this participant did not attend onboarding.

In essence, two predominant themes emerged here. Firstly, missing activities in the context of e-learning may yield negative consequences for players. Secondly, onboarding and ongoing support are critical to acquaint players into a gamified course and sustain their engagement.

6.2.4. Continuum of Engagement

These interviewees may be placed along a Continuum of Engagement ranging from Disengaged through to Engaged. These types are categorised in terms of their BrainHex profiles (Figure 6-1).

Figure 6-1: Continuum of Engagement comprising interviewees
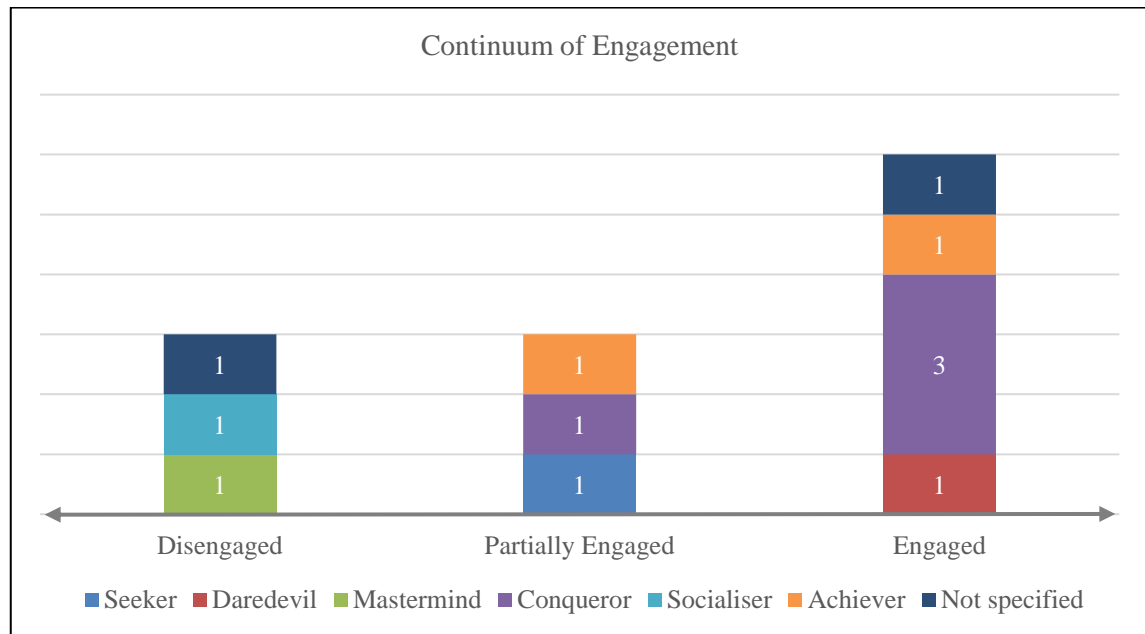
As depicted in Figure 6-1, Disengaged interviewees comprised one Mastermind (out of nine in the course) and the only Socialiser in the course. Partially-Engaged interviewees comprised one Seeker (out of two in the course), one Conqueror (out of nine in the course) and one Achiever (out of five in the course). Engaged interviewees comprised one Daredevil (out of five in the course), one Achiever (out of five in the course) and three Conquerors (out of nine in the course). It should be reiterated that this continuum comprises only the twelve participants who participated in interviews as the course progressed.

In essence deviation from BrainHex profiles were observed. Conquerors would be likely motivated by factors like aesthetics, deadlines and perceiving value whilst not earning rewards could result in strong demotivation. Achievers value and derive reassurance from positive feedback. They are also motivated by being rewarded and experiencing gamification which might relate to their future career. Daredevils in a gamified course may deviate from their profile and may not enjoy suspense whilst Seekers seemed to be motivated by academic achievements. Masterminds are likely to be motivated at being rewarded and experience frustration at not earning rewards or not understanding the game well. They also experienced fear at missing out.

Notably, the academic context and external commitments contributed to participants deviating from their BrainHex profiles and affected their engagement with the gamified course. Based on this, it may be argued that whilst gamification does motivate participation and engagement, there may be

certain external factors which limit its motivational influence. In such instances, it might be necessary for academics to intervene or for the gamified platform to encourage users through channels outside the platform. This was attempted on an ad-hoc basis in this study, with mixed results.

The Continuum of Engagement proposed by the researcher provides insight into how various interviewees responded to gamification, in terms of their BrainHex profiles. Additionally, the researcher believes that understanding where participants sit on the continuum provides insight into participants level of engagement. Since the aim is to motivate behaviour and engage students, the researcher argues that basing the continuum on gamer profiles suggests factors which may shift Disengaged or Partially-Engaged participants along the continuum. These factors will be derived from analyses and discussions that follow.

6.3. Experiences through the lens of Octalysis

In order to present results and analysis in a structured manner, this section follows the four phases in the journey of a game player as outlined by Chou (2015) and discussed in the chapter on the gamification project.

In presenting this journey, analysis of the discovery phase and awareness of participants is provided. Thereafter, participants' experiences of onboarding and introduction into the gamified course are analysed. Within this phase, participants' experiences in terms of accessibility, facilities and support are analysed. Thereafter, scaffolding and experiences of the gamification are discussed from the perspectives of game design, game elements, reward structures and social influence. Then, this section analyses the endgame as experienced by participants, along analysing their experiences of the workload associated the gamification.

6.3.1. Discovery and awareness

As discussed, the discovery phase commences when users first become aware of a particular experience and involves the processes which enable this awareness (Chou, 2015). Due to the importance of the discovery phase, it was necessary to explore participants' awareness of gamification.

In terms of their understanding of what gamification is, some distinct understandings emerged. Participants conceptualised gamification as a tool for learning, entertainment, engagement or motivation. In some instances, they understood gamification as a hybrid between two or more of these domains.

The predominant theme was that of learning, with many interviewees explaining gamification in this manner. There was a perception among some interviewees that gamification was synonymous with e-learning whilst giving it a more visual and online participatory component, *"I think it is the usage*

of the visual or mostly online participation in learning. Gamification is e-learning." (Interview ID 2). When considering that this interviewee was a Socialiser, the inclusion of participation in their explanation fits their BrainHex profile. Also, closer to the non-gamified academic context, there emerged a perception that gamification was similar to the practice of awarding marks (Interview ID 10).

Other interviewees perceived gamification as an enhancement to learning from various dimensions. One participant perceived that gamification was being applied to enhance performance and dedication to the course through this statement, *"The outcomes make you try and bring out the best that you can because you want to attain a certain position."* (Interview ID 1). It would seem that the thrill derived from being the best and attaining a higher position relative to peers motivated this Daredevil. It is further supported by the fact that this Daredevil profile places leaderboards second in terms of preference. A similar understanding of gamification seeking to enhance learning was shared by other interviewees (ID 6 and 11) who were a Mastermind and an Achiever. In alignment with the Conqueror profile, one interviewee suggested that gamification serves to increase competition among students to encourage learning. *"The concepts that are applied to a game to make it competitive are applied to learning"* (Interview ID 3). What is notable here is that this participant seemed to perceive application of course concepts to a game rather than game element to the course itself. It is almost as though they are foregrounding playing the game as opposed to the course.

Enhancement of learning was not isolated to competition. Interviewees perceived it to increase collaboration and participation - *"For me gamification is a model that is designed to make students participate in a manner in which everyone who participates will be able to share their views."* (Interview ID 7). Whilst such a sentiment fits the Socialiser profile, this interviewee did not specify a BrainHex profile. The theme of gamification being a tool for engagement was also presented by another interviewee who stated that *"It is basically taking the concept of a game and applying it to learning, making it competitive to make us interact more."* (Interview ID 3). In terms of this participant's preferred criteria for rewards (whilst being a Conqueror), relevance of interactions was cited as most preferred. These results suggest that in an effort to possibly attain points, badges and a place on the leaderboard, all which motivate Conquerors, they might focus on quantity as opposed to delivering quality.

Gamification, with the aim of increasing ability to grasp knowledge, was also raised (Interview ID 4) whilst gamification was also positioned as a tool to make the course more dynamic (Interview ID 8).

In between entertainment and education emerged the theme of gamification for edutainment as was explained by one interviewee, *"In my understanding gamification is more of edutainment. I would say it is education and entertainment combined."* (Interview ID 5). This Achiever elaborates further

by stating, *"When I heard the word game I thought it was just a game but realized that it is serious work."* When considering that Achievers are motivated by longer term achievements and activities contributing to a goal, it is possible that this interviewee might have been discouraged in some way (denoted by their use of the words "just a game"). Once it became apparent that gamification was not just a game, the academic focus (or nature of serious work) seemed to be restored. It seems as though gamification being perceived as part serious work brought some motivation to this interviewee. This further strengthens the notion that academic motivation surpasses motivation derived from gamification.

As indicated, some participants also understood gamification as a tool for entertainment, where it follows a process of *"taking a traditional task and making it more like a game"* (Interview ID 1). Whilst this view was provided, Daredevils are typically motivated by curiosity and it would seem that such an understanding of gamification would not demotivate a Daredevil. The element of fun and entertainment was reinforced by the Seeker who, as per their player type would be motivated by interest, curiosity in a game and experiencing moments of wonder. *"It is an application of some real concepts to learning that gives it a dimension which is fun and motivation to actually participate and makes learning not so much of only a book that we normally use."* (Interview ID 12). This participant was seemingly motivated by breaking through the traditional methods of learning and exploring what was possible. However, it should be noted that gamification did not drive the learning approach in the course.

Whilst it would seem almost as though interviewees held the view that gamification may only be applied in an academic context, an interviewee (Interview ID 5) touched on the multidisciplinary nature of gamification, *"(gamification) can be applied outside the academic environment but for the same reasons of learning"*. Whilst the interviewee did not specifically mention motivation as a reason for applying gamification elsewhere, the researcher believes that motivation features here. Other participants also understood gamification to be a tool for motivation by specifically citing or alluding to the role of gamification in influencing motivation (Interview ID 1, 8, 9 and 12). One interviewee, a Conqueror, went to the extent of comparing gamification to e-learning, *"I would say both e-learning and gamification are important, but gamification has more progress and is much more motivational than e-learning."* (Interview ID 8).

Ultimately, participants viewed gamification as a tool to primarily enhance learning or serve to add a sense of entertainment with a secondary objective of motivating. It would seem as though the context continues to govern the experience. However, considering that game elements are being applied to this real-world context to motivate behaviour in that context, perhaps these results actually suggest that gamification is perceived as a motivational tool.

6.3.2. Onboarding and introduction

As discussed, the onboarding phase determines interest and sustainability of a gamified initiative (Chou, 2015). Furthermore, the value of onboarding in gamification has been reflected on in the literature review (Iosup and Epema, 2014). An explanation was provided in Chapter Four detailing the onboarding process followed in this project and why onboarding is necessary. Due to its role in fostering interest and enhancing sustainability, it was necessary to explore participants' experiences of being onboarded and introduced to the course.

During onboarding, the researcher donned corporate attire, introduced the project using corporate language and distributed a themed game guide to everyone present. This approach was adopted to maintain alignment with the theme of the storyline. Speaking of this approach, one Achiever commented, *"When you first presented I thought it was an actual company, a real company … I only realized recently that it is just a storyline."* (Interview ID 5). From this, it can be realised that whilst it is beneficial to follow a theme, the boundaries of the game must be made explicit. Furthermore, it is possible that in their excitement to achieve, Achievers may miss some details within a game.

Whilst most participants attended onboarding and understood the gamified course and the expectations, the researcher observed that some participants displayed uncertainty regarding expectations of the gamified course, which warranted further exploration.

In an interview, one participant commented of their initial experience in the course, *"I did not know how one earns badges. At times, I would do my work, but it would not reflect as I expected. I think the elaboration from the start was not clear as to how one gets points."* (Interview ID 2). This interviewee provides context into some aspects that would need to be clarified in an onboarding session (namely, game elements and how rewards are allocated). Therefore, it can be deduced that to gain buy-in into a gamified endeavour, participants need clear information upfront of what they are enrolling into. In terms of their BrainHex profile, this Socialiser expected to be rewarded for mastery of knowledge and not to be highly motivated by badges when the course commenced. This might signal a shift in perceptions towards game elements once a participant has experienced it.

To facilitate the onboarding process, a game guide detailing the aim, scoring, game elements and levels present in the game, was discussed in detail at the onboarding session. Additionally, an electronic copy was available throughout the course on the gamified platform. The researcher posed questions around the use of the game guide. Two participants, one who was interviewed early in the course (Interview ID 2) and one who was interviewed towards the end of the course (Interview ID 9) were seemingly puzzled when asked about the role of the game guide in providing clarity and were unaware of the presence of a game guide. Within the context of implementing gamification, this signals the need to reinforce the messages provided during onboarding on a consistent basis

rather than upfront. This also presents the situation whereby players within a gamified context may not have complete understanding but will not seek assistance through means made available.

Focusing on the onboarding session itself, whilst every effort was made to provide a seamless experience, it could have been possible that certain aspects of the game and game guide were not adequately covered during the onboarding session. Hence, the researcher probed further and asked participants which aspects of onboarding might not have been effective. It was at this point that some participants conceded that they did not attend onboarding.

"I got an email about the onboarding lectures, but I missed the first lecture and I missed the second lecture due to some personal commitments." (Interview ID 2). From this, it can be realised that there is a need for onboarding to possibly take the form which is accessible to a wider audience whilst providing a less text-heavy and more interactive experience. This is reinforced by the view of another participant who attributes their lack of understanding of the game to being absent from campus, *"I wasn't on campus for two weeks and I think sometimes my lack of understanding on what is required by the course has made me land on number 25 on the leaderboard."* (Interview ID 6). Whilst participants could view only the top 10 students on the leaderboard, their position, if not in the top 10, was still viewable, but only to them. This experience suggests that leaderboards may demotivate participants who are not appearing higher up. In the specific case of this Mastermind, they initially did not expect the leaderboard to be motivational. It would seem as though Masterminds in this study would derive motivation from being acknowledged at an individual level through points and badges rather than being compared to others.

Participants' experiences of not attending onboarding is stressed by the arguments presented in the literature on the significance of onboarding and is corroborated by way of this statement, *"I think onboarding is crucial and it would have been effective if I attended."* (Interview ID 2).

6.3.2.1. Accessibility and facilities

Once students were introduced and onboarded into the course, it also became necessary to understand their access habits. The researcher explored access and usage habits from the perspectives of participants' experiences with the platform, frequency of access, motivation for access, devices used and the availability of Internet access. It should be noted that these results explore factors influencing their experiences after being exposed to the gamified course. This differs from their expectations prior to engaging the gamified course which was analysed in Chapter Five.

In the end-of-course questionnaire, participants were asked to share their rating of using the gamified platform on a scale ranging from "Very Poor" to "Excellent".

Figure 6-2: Participants' rating of the gamified platform
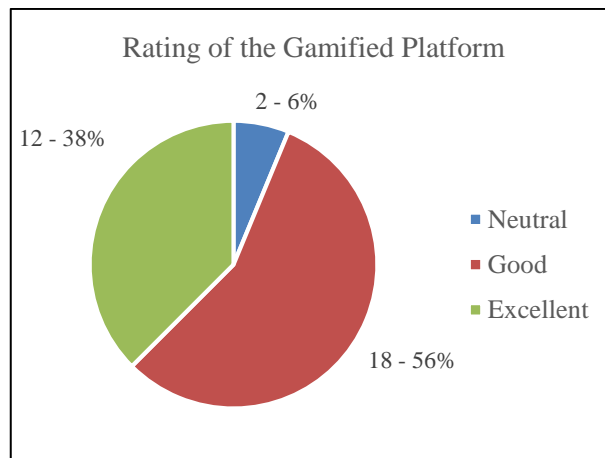
As can be gleaned from Figure 6-2, participants reported a largely positive experience of the gamified platform. It should however be reiterated that the participants in this study were students who held a technology major and reported expecting proficiency on the e-learning platform. Since it was determined that participants rated the platform positively, the researcher also felt it necessary to further explore how students utilised the gamified platform.

Frequency of access varied between interviewees ranging from logging onto the gamified platform multiple times a day to logging on only when required. In terms of those who log on frequently, some interviewees logged on at least once daily (Interview ID 1, 2, 3, 5, 6 and 7). In terms of BrainHex profiles of these interviewees, there was near even distribution between profiles of daily users. The researcher posits that Daredevil (Interview ID 1) was motivated by the suspense associated missing out if they did not access the platform, the Socialiser (Interview ID 2) was motivated by collaboration and engagement opportunities present on the platform whilst the Conqueror (Interview ID 3) was motivated by the possible opportunity to triumph or attain a win over peers, which would require them to log on. Lastly, the Achiever (Interview ID 5) was motivated by the possibility of activities being posted which would contribute to them attaining a longer-term goal.

In terms of their gaming habits, only Conquerors reported being daily gamers. These results contradict their game playing habits discussed in Chapter Five. This may be explained by the fact that academic work tends to emerge as the focus. This is supported by the experience of a Mastermind who stated, *"I access the programme once a day because there are so many other things to do."* (Interview ID 6). It would seem as though this participant, in keeping with their profile, was motivated by getting things done efficiently.

There were instances where interviewees logged on every few days (Interview ID 4, 9, 10 and 11), most of which were Conquerors and an Achiever. Two interviewees logged on only when needed. One interviewee attributed this to being occupied with external commitments (Interview ID 12) whilst the other based their access pattern based on the email notifications introduced as the course progressed (Interview ID 8).

In terms of devices, the preferred device was PCs (Interview ID 1, 2, 3, 4, 6, 8, 9, 10) followed by laptops (Interview ID 5, 7, 11) and mobile devices (Interview ID 3, 9) and tablets (Interview ID 6). When contrasting this against gaming habits, the PC was also the preferred gaming device among the BrainHex profiles interviewed. Additionally, mobile devices emerged to be second prevalent. A trend which emerges in these results is that whilst mobile devices are being used to learn, many participants in this study still relied on the computers provided by the institution to learn.

In terms of experiences of using mobile devices in particular, some participants reported challenges. One participant indicated that some features were not visible *"Some of the challenges I have with the mobile phone is that I can't see some blocks."* (Interview ID 1) and greater support for mobile devices was required, *"The platform is good it motivates and encourages involvement, but I would suggest more support for mobile users."* (Interview ID 1). This was anticipated as the platform was not, in the view of the researcher, adequately optimised for mobile devices. Whilst Docebo did provide a mobile app, this also posed a challenge, *"I use the computer because I tried to download the app to my phone, but I failed."* (Interview ID 11). On the other hand, it was interesting to note that one participant (Interview ID 9) found the site easy to use on mobile devices, *"The site is mobile friendly. I use my mobile phone to view the site and use a computer to complete and submit some activities."*

Nonetheless, these participants sought to use mobile devices to access the gamified course out of their own preference and not as a result of lecturer or researcher encouragement. In terms of their BrainHex profiles, two of these interviewees represented profiles who did not prefer playing games on a mobile device (Interview ID 1 and 11 – Daredevil and Achiever, respectively). Initially, only the Conqueror (Interview ID 9) indicated that they play games on mobile devices. It is worth highlighting that this interviewee actually perceived the platform to be mobile-friendly (Interview ID 9). This seems to suggest that if students were to engage with mobile devices for gaming purposes, they might face less challenges learning using mobile devices, or at least, overcome any challenges without significant difficulty.

In a previous paper, Adam et al. (2015) discussed the high rate of mobile adoption among students at the University. In the paper, they affirm the need for mobile-optimised experiences to accommodate students who, in that study, used mobile devices to learn. Similarly, the researcher contends that the willingness of interviewees to use their mobile devices coupled the fact that they cited challenges signifies the need for mobile-optimised gamified experiences.

In terms of reasons for accessing the gamified platform, common threads which emerged were that of logging into the platform with the purpose of remaining abreast of any new activities and engage with peers. These threads may be analysed within the context of motivation primarily through the perspective of relatedness (Deci and Ryan, 2000). Additionally, there are hints of avoidance (Chou, 2015) in that participants did not want to miss anything.

Participants displayed a sense of relatedness with the course and felt the need to login to the course regularly particularly to engage the course and avoid missing out on activities (Interview ID 1, 2, 3, 4 and 12). In a similar manner, participants felt the need to engage with and recognise content posted by peers (Interview ID 5, 6, 7, 10, 11, 12). Additionally, participants felt the need to contribute to discussions, albeit to a lesser extent (Interview ID 11, 12). The sense of relatedness and desire to avoid missing prevailed across all BrainHex profiles. Whilst only one of these participants was a Socialiser, the desire to engage and collaborate seemed to be universal. The differentiator between the Socialiser profile and others may lie in the fact that Socialisers, by definition, tend to establish more trusting relationships with others in the game.

Whilst all participants were encouraged to log on regularly, no game mechanism was put in place to monitor their activity with the aim of rewarding those who logged on regularly and penalising those who didn't. Participants were afforded autonomy in this regard. Participants' exposure to the course commenced in July 2014 and concluded in October 2014. However, as depicted in Figure 6-3, participants progressed through the semester, they tended to login less frequently with spikes occurring around assessments. Whilst this may be attributed to various reasons, this also supports the notion that motivation was more centred around academic activities as opposed to engaging the game itself.

Figure 6-3: Platform login sessions per month – based on Docebo reporting feature
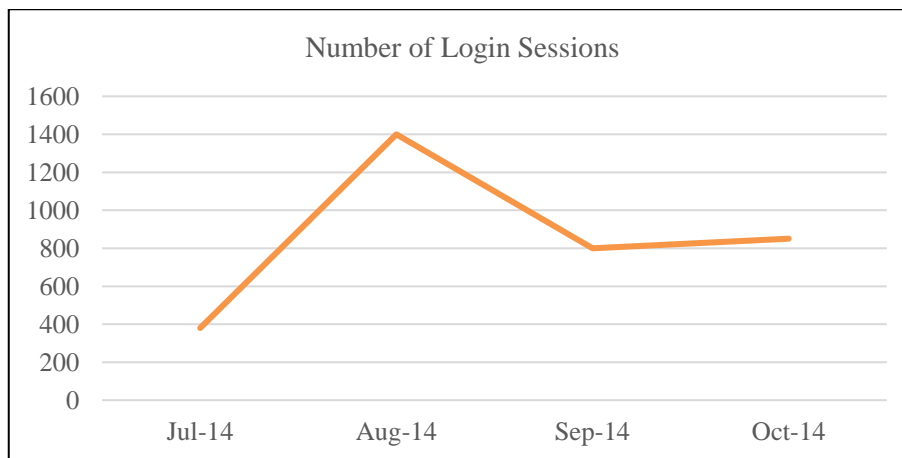
Based on participant's comments, an increased workload was a factor (Interview ID 6) alongside developing an understanding of the routine of the ISTN731 course as the course progressed (Interview ID 11). To elaborate on the routine being referred to, activities were posted early in the

week (Monday or Tuesday), rewards for the previous week were allocated early in the week of toward the middle of the week (Tuesday to Thursday), and activities requiring interactions with peers closed at the end of each week (Sunday). Participants seemed to tailor their login routine around these days of the week.

An argument was presented earlier that some participants faced considerable external commitments, which may also explain their access. Through the semester, participants were invited to attend job interviews away from campus. During this time, some of these participants were unable to access the platform.

An additional factor the researcher believes played a role in a gradual decrease in login sessions was possible fatigue with the gamified course. The researcher attributes this to the perceived intensity of the game which might have led to some participants burning out whilst others might have been demotivated by not receiving rewards on a regular basis, especially as the game became more challenging and rewards more limited. This is evidenced by the fact that only one interviewee (Interview ID 3) explicitly cited a game element (leaderboard) as a reason for logging on. However, the researcher is cognisant that social engagement is also a game element. Whilst results further allude to the notion that gamification was not perceived or experienced by students primarily as to a tool to motivate behaviour but rather as a tool to enhance learning, it seems that its value to students may diminish as the course progresses. This introduces questions on whether gamification should be applied to entire courses or parts thereof.

Within the broader context of access habits, participants' motivators and practices varied at different levels and stages of the course. Initially, they accessed the gamified platform in order to not miss out on activities and engagement opportunities. As the course progressed and participants adjusted into the routine of gamified course, there was a distinct presence of participants logging in to view peers' engagements. Towards the latter part of the course, participants cited logging on to post their own content.

Readily available Internet access proved to be a challenge for some participants (Interview ID 2, 4 and 8) whilst others cited a cost-implication associated with accessing the gamified platform over the Internet (Interview ID 9, 10 and 12). It should be noted that wireless Internet access and LANs are provided to students whilst on campus, which some interviewees found to be beneficial (Interview ID 7, 10 and 11). These results were similar to findings by Adam et al. (2015) where it was found that Internet access off-campus was a challenge for students whilst facilities on campus were adequate.

When considering the influence of Internet access on posting content, two participants cited Internet access as a challenge with negative consequences for participation in the gamified course, *"I don't normally post content due to the lack of internet access."* (Interview ID 8). Another student shared a

similar view, *"You might be at a restaurant watching a TV and see something interesting but due to lack of internet access you can't post it."* (Interview ID 2). Hence, it may be argued that in order for sustainable and seamless gamification among students, Internet connectivity is crucial. Essentially, experiencing frustration in an experience meant to motivate is counterproductive.

Whilst avoiding frustration is crucial, consolation lies in the fact the participants will try adapting to their circumstances as evidenced by this statement, *"There is internet access on campus, so I save as many documents as I can."* (Interview ID 8). Despite this, the researcher concedes that not all students will be able to adapt in a similar manner.

6.3.3. Scaffolding and experiences of game

Whilst the term scaffolding is used in education as the process associated with enabling a student to complete a task or attain a goal which lies beyond their unassisted efforts (Wood, Bruner, and Ross, 1976), its utilisation in gamification refers to a phase in the journey of a player in a game when they gain a degree of autonomy or independence. The scaffolding phase occurs when users begin to use the knowledge from onboarding to earn rewards and progress in the game (Chou, 2015). Whilst there are similarities apparent in the use of these terms, they are distinct from each other.

The researcher believes that after being onboarded onto the course, participants were in a position to reflect on their experience of the gamification endeavour from the perspective of game design and game elements.

6.3.3.1. Game design

As discussed, whilst motivation is the primary objective of gamification, an integrated and structured approach is required to design successful gamification. Failure to achieve this may yield an opposite outcome.

Whilst the game design process was discussed in Chapter Four, interviewees were asked to share their view of how they perceived the game design. It might have been the case that participants perceived that gamification was being applied to an existing course. On the other hand, they might have perceived that the course and associated gamification were designed simultaneously and in an integrated manner. To explore this, an analogy of icing on a cake was adopted as it illustrated the difference between application and integration in an easy to understand manner. Interviewees were asked if they perceived the gamification as being a layer of icing on a cake (application) or the icing in between the layers of a cake (integration).

One interviewee responded, *"I personally see gamification as integrated to the course."* (Interview ID 10). This sentiment was shared by other interviewees (Interview ID 3, 6, 8, 9 and 12), i.e. the perception that participants had of the gamified course was that the course and gamification were

designed to complement one another. In terms of BrainHex profiles, these interviewees were Conquerors, one Mastermind and one Seeker. One Conqueror provided more insight into their perception on gamification, *"I think the course and gamification are both intertwined ... it seems like one concept. I think the course itself has this content to teach you and the gamification motivates you to learn."* (Interview ID 3). Whilst in terms of game design, this result hinted at some distinction between the course and gamification, perception of close integration could have positive and negative effects.

Despite the wide perception of integration between the course and gamification, two interviewees perceived application. One of these interviewees was a Disengaged Socialiser (Interview ID 2) whilst the other was an Engaged Achiever (Interview ID 11).

Therefore, in terms of BrainHex profiles, it emerged that Conquerors, Masterminds and Seekers may perceive integration whilst Socialisers and Achievers perceive application. In terms of the Continuum of Engagement, the perception of integration was present among Engaged, Partially-Engaged and Disengaged participants.

As discussed in Chapter Four, this course was an existing course which was run following a similar structure in the past. By approaching gamification from the perspectives of understanding the learning objectives and gamifying based on these objectives, it is possible to achieve gamification perceived by users as integration rather than application. The researcher argues that this results in a more authentic and sustained experience. Additionally, such an approach also signals the possibilities that exist with gamifying existing courses and repackaging them as opposed to completely redesigning courses.

6.3.3.2. Game elements

Once participants explained their understanding of the design of the broader game, it was necessary to drill deeper to understand their experiences with the various game elements. Since a variety of elements were utilised, the analysis presented below is structured accordingly.

As described earlier, at the commencement of the gamified course, participants were asked to rank their preference for game elements. At the time, they indicated preference for points, badges, leaderboards, progress bars and story lines respectively. Participants were also asked to rank game elements at the end of the course.

Figure 6-4: Participants' ranking of game elements in the end-of-course questionnaire
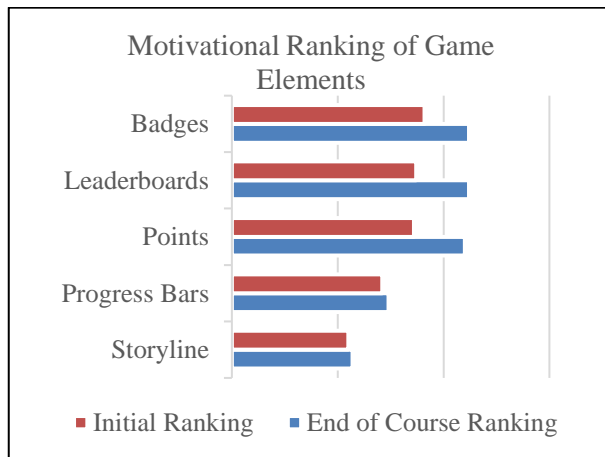
As depicted in Figure 6-4 (and supported by Table A-6), there was a shift in rankings of game elements at the end of the course. If these findings are contrasted with expectations of participants prior to experiencing gamification, the lower rankings of storylines and progress bars remains unchanged. Towards the higher end of the rankings, there was initial preference was for points followed by badges and leaderboards. At the end, rankings shifted such that an equal motivational ranking for badges and leaderboards was experienced. Points were ranked third in terms of motivation. In essence, the motivational ranking of leaderboards increased whilst that of points decreased. Hence, it would seem that participants might derive motivation from being rewarded and ranked whilst deriving less motivation from being given a quantifiable reward. This was challenged to some extent and is discussed later.

In order to further understand the factors which contributed to these experiences, participants' experiences of game elements are presented. Elements are explored in order of participants' preference at the end of the course. These subsections will endeavour to explore the motivational influence of each of these elements from the perspective of the qualitative results whilst also providing insight into each game element within the context of BrainHex profiles.

6.3.3.2.1   Badges

In terms of badges, participants reported varying but largely motivational experiences. As discussed in the literature review, badges are visual representations of game achievements which may adopt varying levels of complexity. They have the potential serve to fulfil a player's need for success, serve as a virtual status symbol, function as a form of group identification, enable goal setting, and foster feelings of competence. Badges are also useful to engage and motivate students to achieve goals and objectives.

On one hand, participants found badges motivational in the gamified course, albeit to varying degrees. A Conqueror reported that simply the concept of a badge motivated them, *"The badges have motivated me the most thus far. The entire concept of a badge motivates me."* (Interview ID 3). Other

participants reported motivation derived from receiving badges due to specific factors pertaining to the badge. For example, one Achiever reported that the concept of limited badges was motivational: *"Badges also motivate me especially when I get limited badges."* (Interview ID 5). Based on the BrainHex profile, it is expected that this participant is goal-oriented and will strive to collect as many items as possible within a game setting. Thus, it is apparent that this participant profile and in-game behaviour match.

Whilst participants reported motivation because of the nature of badges, other participants offered deeper insights into their experience of badges. There seems to be allusion to the fact that badges motivated Seekers through providing interest and moments of wonder. *"If the point that a person gets is not just called a badge, but it is related to a person's performance (an accolade) there would be more competition and people would work harder to get the badges. If the terminology could be changed it could be a driver for some people to achieve."* (Interview ID 12). When analysing the participants experience in terms of their BrainHex profile, they perceived badges as symbols of distinction, honour and recognition. In particular, this participant viewed a badge as more than a means of simply giving credit for meeting an objective and as something which one would intrinsically aspire towards. This perspective motivates the necessity of presenting game elements in a manner that appeals to various types of users. Essentially, what may be viewed as just a badge by some might hold deeper meaning for others. A similar experience is shared by another participant, *"The badges based on titles have motivated me the most."* (Interview ID 7). Badges seemed to hold a sense appeal among participants in that they represent some form of qualitative reward which supersedes a numerical score.

This experience is supported by a statement shared in an online activity which took place towards the end of the course. At this, it became apparent which participant would end the gamified course at the top of the leaderboard. In this instance, another participant addresses the individual who they perceived as CEO-to-be as "Mr CEO" when responding to an earlier message from him in a group chat (Figure 6-5). It was as if addressing this individual using the title of CEO was acceptable and befitting to the extent that it was conferred in an open space.

Figure 6-5: Another participant referring to the potential winner as "Mr CEO" in a group chat activity

Aside from holding deeper meaning, one participant explained their experience of badges as a means of increasing self-confidence: *"I really like the way the course/gamification and has helped me develop self-confidence especially seeing my work rewarded (badges)."* (End of course questionnaire ID 7). Whilst this was an unintended consequence of gamification, it signifies the value of rewarding participants amongst their peers. The researcher believes that experiencing recognition among peers

led to the participant experiencing increased self-confidence. The counter-point may also apply that not experiencing this sense of recognition decreases self-confidence.

Within the context of e-learning, where noise and unrelated comments are prevalent, it becomes necessary to ensure that appropriate visible recognition is given to participants due to its potential to motivate. In the case of some participants, motivation by badges was experienced alongside leaderboards and competitiveness. This was experienced by one Socialiser, *"The badges and leaderboard motivate me to work hard."* (Interview ID 2). This sentiment was shared by other participants including two Conquerors who shared the following experiences: *"The badges and the competition have led to my current performance."* (Interview ID 8); *"Receiving badges also motivates me as well as the leaderboard."* (Interview ID 10). These results suggest that whilst badges motivate Conquerors, the motivational influence of badges is enhanced by a spirit of competition. Achievers display a similar sense, *"The leaderboard and badges have motivated me the most. Leaderboard comes first then badges are second."* (Interview ID 11). When comparing these results against participants ranking of game elements, there is a correlation between the quantitative and qualitative results.

In other instances, participants specifically reported motivation due to factors outside badges. As was indicated by a Socialiser, their reasons for engaging were for the social nature of badges: *"I don't do it for badges, when you find something that interests you; you just post it for people to see."* (Interview ID 2). However, when analysing this participants BrainHex profile, the researcher believes that this statement is directly influenced by their profile since Socialisers are typically motivated by collaboration and conversation.

Some participants seemed to view the gamified course as a primarily academic activity. Whilst this was indeed the case, the sentiment deserves mention. A Daredevil suggested that academic work should take precedence, *"You should not tell people how the badges are earned. People should work hard so they can pass, not to get badges."* (Interview ID 1). In terms of BrainHex it is expected that this participant should be motivated by the thrill, excitement of risk and living on the edge. When analysing this statement within the context of the BrainHex profile, it is evident that this participant would be more motivated to continue with the game whilst discovering (with risk) badges as the game progresses. This is in contrast to the request of many participants for more information on badges, thus signifying the need for a balance when onboarding participants into a gamified course.

Whilst acknowledging the academic objective, one participant highlighted their experience and reflected upon how gamification would increase in complexity as academic levels progress. *"Gamification at an honours level is hard work; maybe if it was at third (year) level everyone would get badges for logging in and something like that but at honours level you have to work for everything."* (Interview ID 5). This Achiever's statement bears close alignment to their profile which

indicates motivation through being goal-oriented and willingness to persevere to achieve. Another participant shared a similar view, *"I am demotivated by easy points and easy badges."* (Interview ID 7).

On the other hand, some participants reported experiencing demotivation in respect to badges. One participant attributed this demotivation to a lack of understanding, *"Badges do not motivate me because I do not understand how to get badges."* (Interview ID 6). Whilst this Mastermind's profile does expect that participants will be motivated by problem-solving and strategizing, this participant did not report motivation as a result of this. It might well be the case that this demotivation is brought about by a situation that inhibits a Mastermind's ability to strategise, plan and solve-problems. However, this participant provided additional details, *"I wasn't on campus for two weeks and I think sometimes my lack of understanding on what is required by the course has made me land on number 25 on the leaderboard. I am very confused by what's going on there."* When considering this feedback, the researcher believes that it further illustrates that value of onboarding and introducing participants into a gamified endeavour.

Some participants reported demotivation due to not obtaining badges. One participant reported a decrease in motivation at not being awarded badges: *"Gamification led to the dwindling because I stopped getting some badges. The badges kept me motivated; as long as I was receiving badges I was motivated."* (Interview ID 4). Based on this finding, the question of intrinsic versus extrinsic motivation emerges. In this instance, it may be argued that this participant was extrinsically motivated working more for rewards than working to learn or engage in academic work. As discussed in the literature, if gamification is perceived to extrinsically motivate, questions emerge on the sustainability of the gamification endeavour.

Furthermore, this participant proceeded to debate between the fairness of the rewards mechanism and their understanding of the reward criteria, *"I do not understand it and I am not sure if it is fair. It can be fair but not perfectly fair. The criteria for awarding badges might not be accommodating to other people's work."* (Interview ID 4). In addition, this participant also indicated that perhaps badges were not ideally suited to the differing types of rewards which might motivate participants. The view of rewarding based on individual motivators is supported in the literature review.

The converse also applied where participants, in this case a Conqueror, indicated that they might have submitted an activity had they known specific badges were available*: "When badges are limited I get demotivated and there was once a case where I did not submit on time. If I knew that we were going to receive badges I would have worked harder."* (Interview ID 10). This statement raises two points for consideration. Firstly, other than being in direct contrast to the finding where participants motivated by limited badges, it also raises questions about competition versus co-operation in gamified e-learning. A distinction may be drawn here between participants motivated by limited

badges which would mean they exclusively earn a reward and unlimited badges which would give others in the game the ability to earn a reward. Secondly, in this statement, the participant displays, in some way, the motivational influence of gamification on this participant's experience whilst reflecting on the outcome of not submitting as was required. It should also be added that arguments in literature that gamification detracts students from learning and refocuses them on playing games is supported, to an extent, in this statement. Thus, it is necessary to ensure alignment between learning and gamification to avoid such detraction.

Additionally, there emerged participants who express frustration at not having enough badges available in the game. An Achiever shared an experience in this line, *"I think you should offer more options of getting badges it is frustrating to sit and wonder when you will make it to the top five."* (Interview ID 5). When analysing this experience, it also bears close alignment to the participants BrainHex profile of wanting to collect every available item within a game context. There is however a risk of disengagement from a gamified experience as is hinted at in this participant's statement. This further contributes to the notion of designing for a diverse audience.

Lastly, another Achiever shared an experience with respect to badges as follows: *"I would have loved to know why I couldn't get a particular badge, I would have loved some feedback that is more tailored to me concerning the badges."* (Interview ID 11). In this experience, the participant displayed the characteristics of their BrainHex profile in that achieving their goal is core. Additionally, this participant also highlights the importance of personalised feedback, which although resource intensive, might positively influence motivation.

This analysis was widely supported by participants in the end-of-course questionnaire when they were asked to rank the various game elements. Participants ranking of badges within the contrast of their BrainHex profiles are presented in Figure 6-6.

Figure 6-6: BrainHex vs Motivational Ranking of Badges
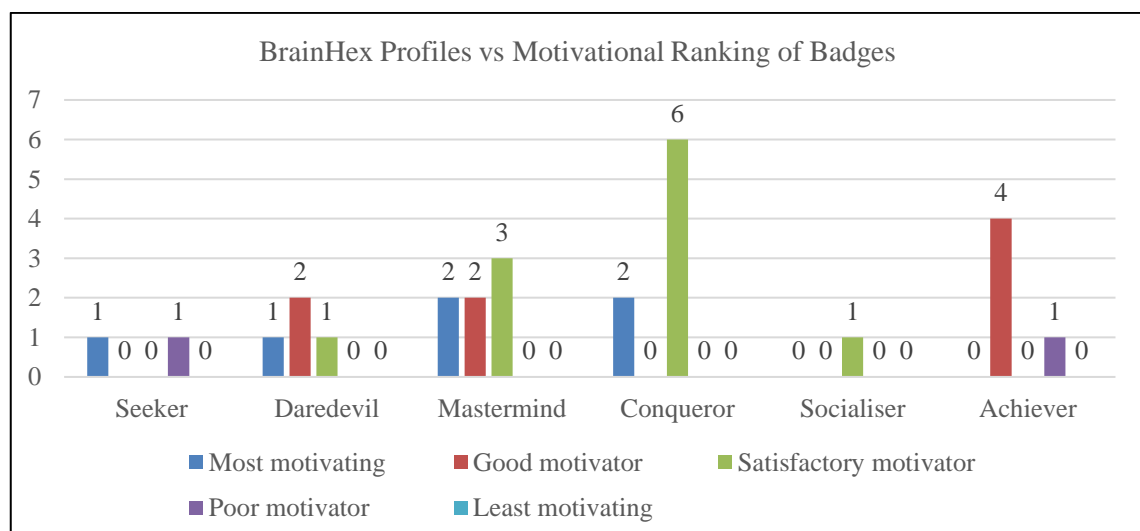
When contrasting participants' profiles against badges, they were experienced to be most motivating among Daredevils, Masterminds and Achievers (Figure 5-20). Contrasting this against prior expectations, whilst both Conquerors and Achievers expected motivation by badges, Conquerors now reported a lesser (moderate but not positive) degree of motivation from badges. From this it would seem that badges do not provide the sense of triumph and victory which Conquerors seek. The introduction of Daredevils being motivated by badges signals that attaining badges provides participants with a level of suspense and excitement. Similarly, the entry of Masterminds suggests that badges are perceived to require strategic planning and problem-solving skills, which motivate Masterminds. Seekers and Conquerors were mixed terms of their motivational influence of badges.

6.3.3.2.2   Leaderboard

In a similar manner to badges, participants reported varying but largely motivational experiences with the leaderboard. As discussed, the leaderboard on the gamified platform showed participants the list of the top 10, whilst each user was able to see their own position if not in the top 10. Furthermore, as discussed in the literature review, leaderboards provide details of a player's rank or success in a game. Rank or success may be provided at an individual level and for teams. They may play a motivational role to those players who are higher up on the leaderboard but could equally serve a demotivational role to those players who are lower down. Leaderboards foster competition, showcase achievement, assign power, inculcate feelings of competence, foster team collaboration and relatedness.

Some participants across different profiles reported that the leaderboard on its own was motivational with the biggest outcomes being enhanced performance or hard work. An Achiever shared an experience which links up with their trait of progressing towards a longer-term goal, *"The leaderboard motivates me. The leadership board gets demotivating when I am not moving."* (Interview ID 5).

Another Achiever extended this and shared an experience of being motivated by the leaderboard to exert effort and achieve, thus leading to motivation, *"You know, seeing the leaderboard, it really encouraged me to try and work hard. I am very competitive so if I see an opportunity I am like maybe I should try to work hard. So, having the leaderboard there has really motivated me."* (Interview ID 11). This participant's experience seems to reinforce the principle that Achievers search for opportunities to attain a longer-term goal. These results make a case for leaderboards being the element motivating Achievers the most.

Another participant, a Mastermind, shared a similar sentiment in that they looked to the leaderboard for inspiration and motivation to strategise and progress in the game, *"I motivate myself by looking at the leaderboard. I ask myself why I am at the bottom when others are number one."* (Interview ID

6). It would almost seem as though being at the bottom of the leaderboard is a challenge or puzzle that a Mastermind needs to solve.

As discussed, there were cases of other participants who felt that the leaderboard was motivational alongside badges. An example of a Socialiser's experience reinforces this, *"The badges and leaderboard motivate me to work hard."* (Interview ID 2).

Despite the motivational drive experienced by some participants, not all participants were motivated from the outset. One participant indicated that the leaderboard as a game element became motivational to them as the course progressed and they began to earn badges. This was probably due to the fact that earning rank-based rewards and experiencing triumph over peers motivated this Conqueror to engage further, *"When the course started, I just wanted to pass, it wasn't off much about being on the leaderboard or where I would finish off on the leaderboard but as I started collecting more badges I was motivated to work hard to maintain the standards."* (Interview ID 3). This result indicates that there may be situations where elements begin to serve a motivational purpose over time as a participant is exposed to that element, rather than immediately.

In a similar light, there emerged another type of experience where a Conqueror reported experiencing motivation as a result of being visible on the leaderboard. Whilst this is resonant of their profile, it is worth exploring. Once this participant dropped off the Top 10, this participant experienced demotivation which resulted in a reduction in their effort. However, at some point, this participant experienced motivation once again, this time to get back into the Top 10. Said this participant, *"At first I was on the top 3 and then dropped but I was still on the top 10, since I was getting less recommendation to my work, so I started putting less effort. Being out of the top 10 motivated me to work hard and get back to the top 10."* (Interview ID 10). The researcher believes that this student seemed to experience a degree of conflict and tension within themselves which culminated in increased motivation. Conversely, another participant, whilst reporting a similar experience of being motivated by the leaderboard and then falling off the Top 10, did not see it culminate in motivation: *"Gamification stopped motivating me just after I left the leaderboard. The fact that we have a leaderboard and we can actually see our performance motivated me the most."* (Interview ID 4). The researcher believes that the displaying of the entire group leaderboard might have motivated some participants further. This was supported by the experience of a Mastermind shared at the end of the course, *"There should be a place where you see the rest of the players. We would only see the top 10. Seeing the other members could help, because now I never really got to know people who were not in the top 10."* (End of course questionnaire 19).

Whilst participants experienced motivation as a result of the leaderboard, there were some who reported experiencing demotivation. For example, one Conqueror shared an experience, *"I am not facing any challenges with the game and I am not interested on being on the leaderboard."*

(Interview ID 8). This participant's BrainHex profile indicated that they would be motivated by winning with difficulty and some degree of struggle against adversity. In the case of this participant, the researcher noticed that their performance was strong at the time of the interview, which they attributed to hard work. When analysing their statement alongside their performance in the game, the researcher believes that the participant did not feel motivated by the leaderboard due to the fact that they did not need to experience difficulty or challenge in attaining a position in the top ten.

Another participant, a Daredevil who was at the top of the leaderboard at the time of the interview, offered an experience of the leaderboard being demotivational from a social perspective, *"The leaderboard has put me off, we were talking about it in class and I told my friends that I don't care all I was is to just do well … I don't like the acknowledgement that I am first"* (Interview ID 1). At the interview, this participant gave the impression that being at the top was like a target on their back which might result in a rift between them and their peers who were not performing as well. In essence, this recognition was, to an extent, uninvited. Whilst having a target one one's back might have resulted in a sense of thrill and suspense for a Daredevil, this was not the case with this participant. Perhaps co-operation in the context of the gamified course dominated this participant's experience, thus leading to a deviation from their profile.

The researcher believes that these impassioned experiences of leaderboard were shared as a result of this publicity that participants either liked or disliked. The researcher observed that this publicity is inherently different from receiving badges as recognition as badges serve as a title amongst peers whilst leaderboards provide distinction from peers.

Similar to the case of badges, the analysis of leaderboards provided was widely supported by participants in the end-of-course questionnaire when they were asked to rank the various game elements. There were slight exceptions where demotivation was experienced by some Conquerors and Daredevils despite a general ranking of leaderboards as motivating. Participants' ranking of leaderboards within the contrast of their BrainHex profiles are presented in Figure 6-7.

Figure 6-7: BrainHex Profiles vs Motivational Ranking of Leaderboards
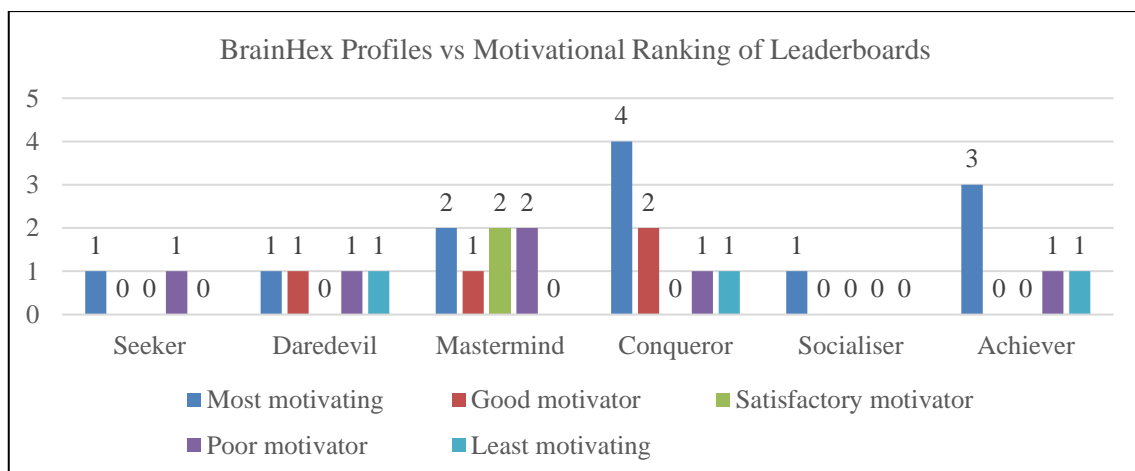
Whilst leaderboards were initially expected to be strongly motivating across all BrainHex profiles, motivational influences shifted in respect to various profiles at the end of the course. Having experienced gamification, Daredevils, Conquerors, Socialisers and Achievers all experienced positive motivation from leaderboards. Hence, it appears as though leaderboards provide participants with suspense and excitement, triumph and victory, trust and collaboration, and contribution towards attainment of a larger goal. Within an academic context, these behaviours represent some of the qualities which harness the benefits of e-learning.

When considering that leaderboards rank players in a game, it would seem that these profiles may be motivated by being ranked in gamification with or against players. On the other hand, Seekers and Masterminds were mixed in terms of their motivational influence. Thus, it would seem that leaderboards do not provide motivation to players motivated by a sense of wonder nor do they motivate players motivated by puzzle-solving or strategic-planning.

6.3.3.2.3   Points

Unlike in the case of badges and leaderboards, participants did not report a wide range of experiences with points. As explained in the literature review, points are the simplest form of game elements which serve as a measure of success or achievement. They numerically indicate progress and provide positive reinforcement. Points may be conceived as virtual rewards or a currency which may be utilised for to purchase objects/items to further progress or to increase status. They may also serve as an indicator of academic achievement.

As discussed, points were initially expected to be most motivating. However, as the course progressed, this high ranking of points dwindled. In terms of experiencing points as motivational earlier on, a Conqueror explained that points played a motivational and supporting role in keeping up with activity deadlines. *"I meet the deadlines to get the points and to keep up with the workload."* (Interview ID 3).

As experiences of points shifted during the game, one Conqueror echoed their experience on this, *"Points have motivated me the least."* (Interview ID 9). Hence, it would seem that points, after a prolonged period, do not provide a sense of adversity or challenge and attaining them does not provide a sense of triumph over colleagues. When analysing possible reasons for this, a Seeker offered their perspective, *"The points have motivated me the least, they just sound so blank, you cannot put a face to it."* (Interview ID 12). Considering that Seekers are motivated by interest, curiosity and moments of wonder, this experience suggests that quantifiable rewards fail to offer motivation to this type of participant.

Whilst results indicate that points are less motivational, one participant offered an experience that points were helpful to measure progress. However, this participant did not prefer that points

translated into a leaderboard. In the words of this participant, "*Having points was helpful with realising progress but displaying these points on a leaderboard should not be shown.*" (End of course questionnaire ID 23). Whilst position on the leaderboard was a direct result of points that were accumulated in the game, this result indicates that whilst some might benefit from accumulating points, the reluctance in their experience of being ranked against colleagues begins to resonate.

It would seem that points were experienced as a tool to measure progress and keep up with what was required. This was despite participants being able to purchase the ability to choose their own project groups in exchange for 100 points. It should be noted that this was a once-off opportunity provided late in the game. Therefore, it might be useful to allow participants to utilise points as an in-game currency earlier in a gamified e-learning endeavour.

As was found with badges and leaderboards, the analysis of points was widely supported by participants in the end-of-course questionnaire when they were asked to rank the various game elements. The slight exceptions in the cases of Seekers and Conquerors. Participants' ranking of points within the contrast of their BrainHex profiles are presented in Figure 6-8.

Figure 6-8: BrainHex Profiles vs Motivational Ranking of Points
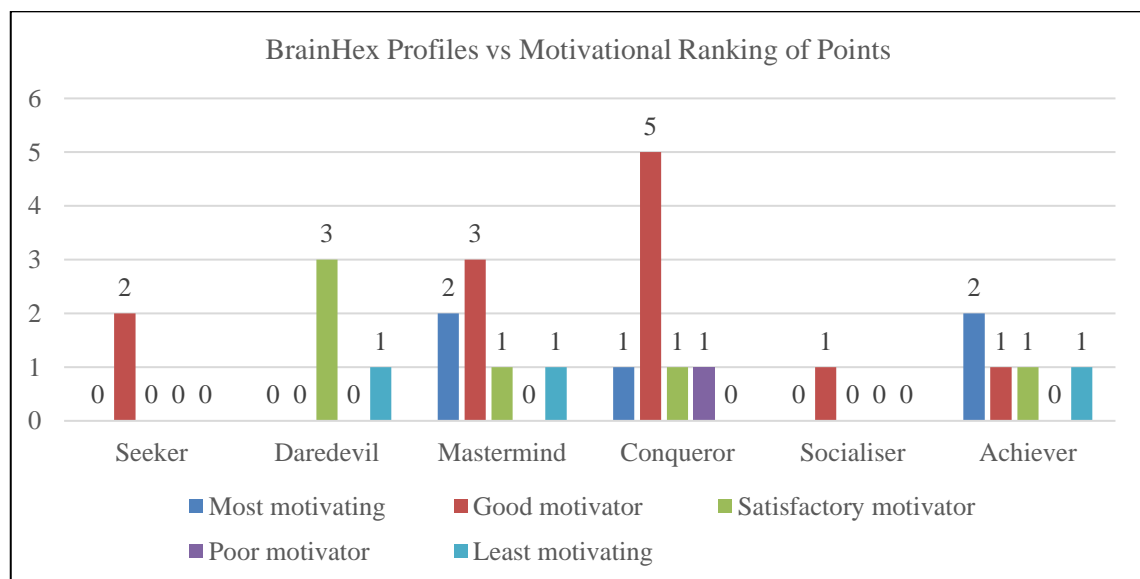
Initially, points were expected to be most motivating among Conquerors and Achievers. On conclusion of the course, whilst points dropped in overall weighted rankings, they were found to be motivational among Conquerors, Achievers, Seekers, Masterminds and Socialisers. Thus, it would seem that fulfilling motivational needs like triumphing against adversity and defeating others and accomplishing achievements which contribute to attainment of goals. Furthermore, results also suggest that points also provide interest, curiosity and moments of wonder, a degree of problem-solving and strategic thinking, and trust and collaboration. In these instances, results suggest that quantifiable rewards, like points, were expected to fulfil the desires of almost all player profiles. As

was indicated in the initial questionnaire, a lesser degree of motivation was derived from points by Daredevils which suggests that points do not provide thrill or suspense.

6.3.3.2.4   **Progress bars**

As discussed, progress bars were ranked by the group as less motivational both at the commencement and conclusion of the gamified course. In order to understand participants' experience of progress bars further, the researcher explored qualitative results. As explained in the literature review, progress bars provide insight into individual progress of a player within a game. They serve to provide feedback, track progression, establish clear goals and milestones, compare current performance to previous and expected performance, and foster mastery.

In terms of demotivation, one Conqueror indicated that, *"The least motivating factor for me is the progress bar…"* (Interview ID 3). This was perhaps since progress bars fail to provide the sense of triumph and victory sought by Conquerors.

Another participant, who was an Achiever, shared a similar experience and provided insight into the demotivational influence of the progress bar, *"The progress bar motivates me the least. Knowing where I am in terms of the course did not really help me. The first topic ended just when I thought I could still do more."* (Interview ID 11). When giving consideration to the participant's BrainHex profile, it would be expected that the participant would be goal-oriented, find no task too arduous and strive to collect as many rewards as possible. However, there seems to be a tension and disconnection between the need to plan and strategize in the game and the motivational influence to collect rewards. Progress bars may be considered a longer-term element since they represent the length of a gamified endeavour whilst other elements are used in the shorter term. This result suggests that Conquerors prefer shorter-term motivations which inculcate a sense of triumph and victory more frequently.

Despite the negative experiences, there were some positive experiences. Another Achiever reported that the progress bar served as a planning or strategic tool. *"I would say it is good for the timeline to be there, so I would know how far we are with the course."* (Interview ID 5). Considering that this participants in this profile would be motivated by long-term achievements and activities that support attainment of these achievements, this experience echoes their profile.

A similar experience was shared by another, in this instance, a Conqueror, participant when considering the likelihood of them achieving first place on the leaderboard, *"I am more relaxed now because I know I will not be the CEO since there are only three activities left. Looking at the progress bar, I can already see that I won't make it. I know my chances now, I just have to relax and do what I can do. I just want to be on the top 5."* (Interview ID 9). Whilst this participant's profile suggests that they would be motivated by struggling against adversity and winning, the researcher believes

that the progress bar brought a sense of reality and acceptance to this participant that they would not gain first place. The researcher contends that this did not necessarily result in demotivation. In fact, the researcher argues that frustration brought about by realising that one did not gain first place, near the end of the course, will more likely result in demotivation.

As was found with badges, leaderboards and points, the analysis of progress bars was widely supported by participants in the end-of-course questionnaire when they were asked to rank the various game elements. Participants ranking of progress bars within the contrast of their BrainHex profiles are presented in Figure 6-9.

Figure 6-9: BrainHex Profiles vs Motivational Ranking of Progress Bars
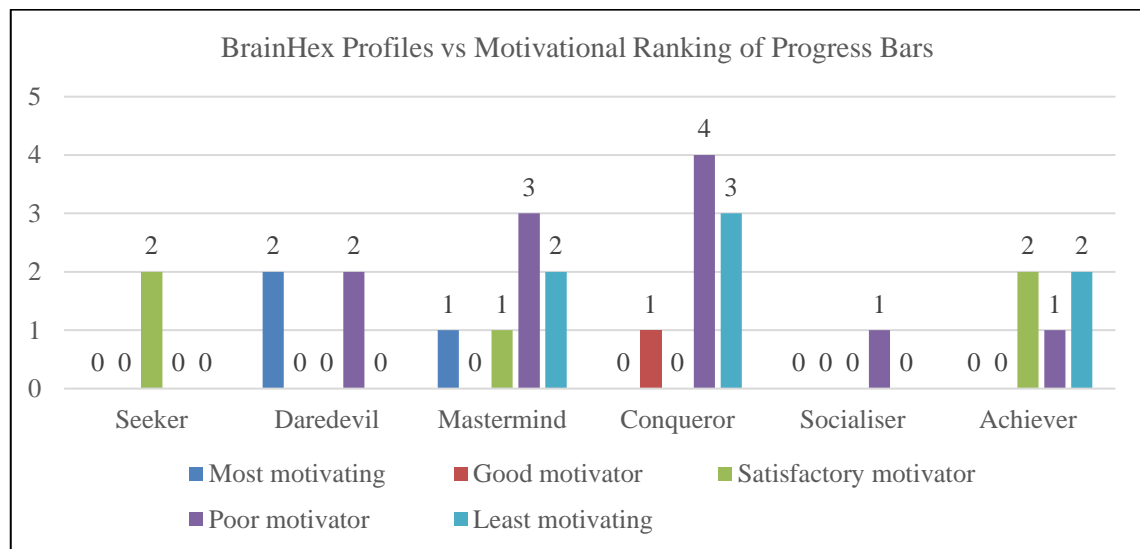
In the earlier analysis, it was found that whilst progress bars were not expected to be motivational, some Seekers, Daredevils and Masterminds reported expecting to be motivated by progress bars. After experiencing gamification, Seekers experienced a moderate degree of motivation, Daredevils were mixed in their experience of progress bars, and Masterminds shifted significantly in terms of their experience of progress bars in that they experienced a much lesser degree of motivation from progress bars. This suggests that progress bars do not provide a platform upon which to strategise further, as might have been the expectation at the outset. The poor degree of motivation by progress bars expected by Achievers and Conquerors seemed to resonate to the experience shared at the end of the course. However, qualitative results suggest a shift towards a moderate level of motivation in interviews. Nonetheless, there was no BrainHex profile where most participants were motivated by progress bars.

It is possible that the lower motivational rank may be explained by the nature of a progress bar. Whilst it is a game element, its purpose is to indicate progress within a game. A progress bar does not actually represent achievement or reward in the manner that badges, leaderboards and points do. Therefore, it may be argued that participants displayed a distinct preference for elements where they

achieved reward as opposed to elements which may assist them in the game. Whilst these motivated some, the reward-type elements were more preferred and motivational.

6.3.3.2.5 Storyline

The argument presented regarding the nature of a progress bar may be extended into the analysis of the storyline. As previously explained, the gamification of this course was offered through a corporate-themed storyline. As discussed in the literature review, storylines refer to the narratives or stories applied to a game. They play a role in delivering activities to pique player's interests, offer variety, encourage relatedness and autonomy, and foster positive emotions. Furthermore, storylines may also serve to provide context, illustrate real-life applications or sustain interest throughout the gamification endeavour or learning process. Since this game element was core to offering the gamified course, it was necessary to explore its participants experiences and its influence on motivation.

Whilst the group did, in the end-of-course questionnaire, rank storylines as having lowest motivation, during interviews they reported varying experiences of the storyline as they reported with badges, points and the leaderboard. This apparent contradiction warranted further exploration.

When considering the experiences of participants who reported motivation, the Daredevil, in sharing their experience, reflected on the similarities between their life experiences and the storyline. Said this participant, *"I play a lot of games in general and they have no fun, no storyline. You need a storyline to enjoy something. If you read a book you should reach a conclusion and there is a storyline"* (Interview ID 1). From this it may be argued that storylines provide the sense of excitement, thrill and suspense which Daredevils find motivational.

Bringing their reflection closer to academic work, the Daredevil (Interview ID 1) elaborates, *"We wouldn't be satisfied if we were just given activities. It is beneficial in a sense that it gives you motivation to work; you want to understand the storyline. It plays a realistic role because we are given a date and told when stuff is due."* Thereafter, this participant concludes by looking ahead into the future and says, *"the deadlines are a lot more like how the corporate world would be."* Considering that a career is unexplored territory for this participant, the ability to peek beyond their studies into what a career might provide seems to provide a sense of thrill. This suggests that the relevance of a storyline to the lives and life-goals of participants plays a critical role in motivating them.

Reflecting further on the Daredevil's experience from the perspective of motivation, two points of discussion emerge. Firstly, the addition of a storyline provided a degree of structure and purpose. This was also supported by the experience of one Conqueror who found the levels of the career journey and levelling up into the storyline appealing, *"the whole concept of moving up through the*

levels appeals to me." (Interview ID 3). Perhaps the concepts of levels in the storyline also motivated the Conqueror. Another participant, a Mastermind, experienced motivation since they received guidance and clarity in the course, *"I think it is a really good story because it somehow guides you where you should be going. It plays a motivational role because it clarifies what is going on."* (Interview ID 6). The motivation being experienced here related directly to this participant's profile as such clarity will allow this participant to strategise.

Secondly, the addition of a storyline gave participants some insight into the world of work. As was explained a Socialiser, *"I feel that the storyline is relevant because it exposes me to where I want to be in the future, I find it appealing."* (Interview ID 2). Similar experiences of being motivated by the preparation for the world of work and insight into growth in a corporate space were reported by two Conquerors (Interview ID 3 and 9) and two Achievers (Interview ID 5 and 11). Additionally, when asked about the experience of the storyline in terms of motivation, one participant experienced benefit but not motivation, *"The storyline is beneficial but not necessarily motivational."* (Interview ID 11 – BrainHex: Achiever).

Whilst there were participants who experienced motivation through the storyline, some participants were unsure of its motivational influence. One participant, the Socialiser, suggested that peers experienced tension and offered the following view, *"I think the storyline might be a bad thing for those who are poorly performing but might motivate them to work hard. On the other hand, it might be motivational to those who are on the leaderboard. It may be either motivational or not depending on the nature of the person."* (Interview ID 2). Considering that this participant found storylines motivational, the researcher believes that the social nature of this person resulted in them raising this point but resulted in them adopting the middle ground. Regardless, this experience indicates that storylines serve to motivate some types of players whilst not motivating others. Within this, it is evident that this participant seems to recognise that participants in the game differ in terms of their motivational drivers. It is almost as though they were suggesting the need to cater for the motivational drivers of different types of people.

Extending this thread, one Conqueror, whilst complimenting the storyline, also reported a sense of blurriness, "*The storyline is a bit blurry. It's a good storyline and motivates some people to work hard because there are a few percent extra but there is a sort of a loss in the middle.*" (Interview ID 8). The researcher believes that this blurriness might have been present due to the participant not understanding parts of the storyline or due to the storyline having many components. In terms of their profile, this result suggests that Conquerors require clarity in order to conquer even though they are strongly motivated by experiencing a sense of triumph in relation to peers. Additionally, this signals the need for simplicity when gamifying e-learning to avoid participants experiencing a sense of uncertainty, as this might result in a decrease in motivation.

Perceived complexity also influenced experiences of the storyline. One participant attributed a lower degree of motivation to the storyline being too complex to follow. *"The storyline motivated me the least because I hardly followed it."* (Interview ID 4). When trying to understand the possible reasons for participants not following the storyline, the experience of a Conqueror gave some insight, *"The least motivating factor for me is the progress bar and the storyline itself, I like the concept of starting low in a company, but I am not too interested in the finer details. Basically, what I took form the game guide was staring low in a company and working your way up but there was too much information that didn't really appeal to me."* (Interview ID 3). Whilst this result supports discussions about Conquerors presented earlier, it also suggests that Conquerors prefer to focus on getting on with the business of conquering as opposed to engaging in the finer details of a game. Furthermore, whilst onboarding is critical to gamification and the Game Guide was used as a tool for this, information overload has been attributed to increased e-learning dropout rates. This experience signifies the need to obtain the correct balance when onboarding participants and strengthens the call for simplicity when integrating gamification.

Another participant reported that not having an adequate understanding of how points were allocated led to demotivation despite holding a positive outlook towards the storyline, *"I feel great about the storyline but sometimes it demotivates me because I do not understand how you allocate points. I sometimes work so hard and get fewer points which make me question how you allocate points."* (Interview ID 7).

It is also worth mentioning that the participants who reported a decreased degree of motivation comprised Conquerors who, after persevering, would typically be highly motivated by achieving rewards and most frustrated by not achieving any reward. This further suggests that perhaps storylines are demotivational due to them being an element applied over the longer-term. Additionally, the researcher argues that this experience signifies the need for transparency in scoring mechanisms since perceptions that scoring is unclear may result in demotivation.

In order to understand groups' overall experience, they were asked, in the end-of-course questionnaire, to provide a rating of the storyline in particular (Figure 6-10).

Figure 6-10: Participants' rating of the storyline
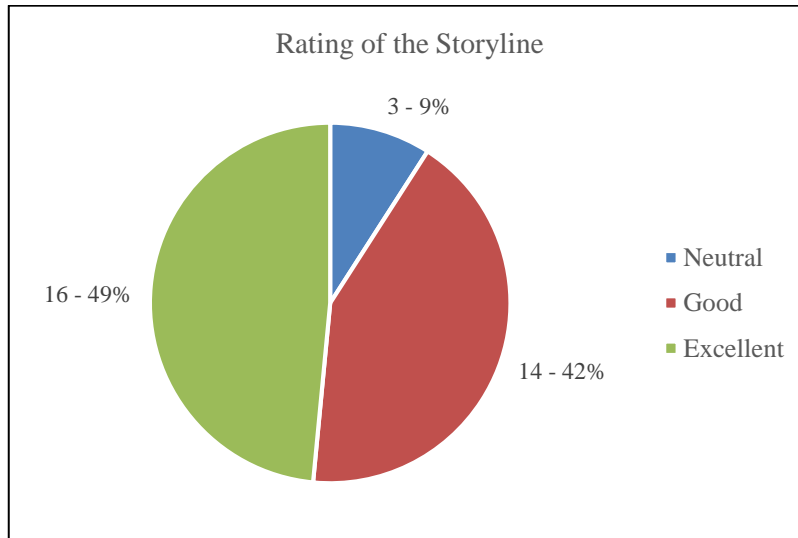
The results, from the end-of-course questionnaire, support the findings which indicate that participants reported a motivational experience of the storyline. However, when contrasting this against the findings where participants reported decreased motivation from the storyline coupled with fact that participants ranked storylines below all other game elements in terms of motivational influence, a strong contradiction seems to emerge. Perhaps it was a situation that certain profiles might have led to this contradiction. Hence, the researcher turned to the quantitative data available.

Figure 6-11: BrainHex Profiles vs Motivational Ranking of the Storyline
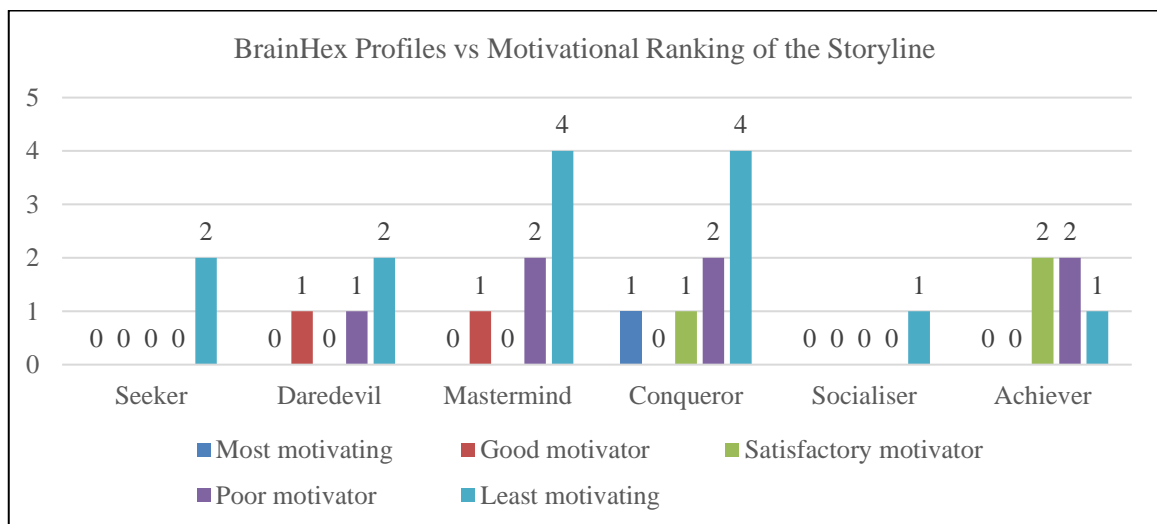
The participants' rating of the storyline in the end-of-course questionnaire (Figure 6-10) also seemed to contradict analysis of BrainHex profiles vs ranking of storylines (Figure 6-11).

As discussed earlier, the storyline was not expected to be motivational to the group. Despite this there were some Daredevils, Masterminds, Conquerors and Achievers who expected some motivation. In the end-of-course questionnaire, only one Daredevil, one Mastermind and one Conqueror reported experiencing motivation by storylines. Like in the case of progress bars, there was no BrainHex

profile where most participants were motivated by storylines. However, in interviews, Daredevils, Conquerors, Masterminds, Socialisers and Achievers reported a degree of motivation from the storyline.

The researcher believes that contradiction emerged here due to the fact that participants did not view the contribution of the storyline to their achievement in the gamification in the same manner as they did points, badges and leaderboards. This may be attributed to the degree of the control they had over their engagement with the storyline and progress bars as opposed to points, badges and the leaderboard. This is substantiated by the distinction described by Kim (2015) and Iosup and Epema (2014) between game mechanics, which govern how the game operates, and game dynamics, which provides players with greater control over the interaction. This suggests that participants are more motivated by elements which afford them greater control of the outcome of their engagement with that element.

Furthermore, the nature of a storyline also differs from points, badges and leaderboards. Points numerically represent success, badges visually represent achievement and leaderboards rank participants. Whilst each of these are interventions which influence and are influenced by individual tasks or activities, storylines are longer-term elements which may be integrated over a period of time, across multiple tasks. Thus, they motivated participants in a different manner. A similar view may be adopted for progress bars as they may be considered longer-term elements. Additionally, whilst points, badges and leaderboards may be adopted individually, the presence of a storyline integrates these various game elements.

6.3.4. Endgame

As discussed, the endgame phase commences when users feel that there are no new experiences or challenges available to them (Chou, 2015). The concept of an endgame bears resemblance to the Mastery phase defined by Werbach and Hunter (2012) where participants would, having traversed the path of mastery, reached their destination in a naturally flowing manner. However, the gamification in this project ended at the conclusion of the course which might be considered a point of mastery of course content. Since gamification is tied to learning objectives, this can arguably constitute an endgame.

At the end of the course, participants were asked about the influence of gamification on their experience in the course (Figure 6-12).

Figure 6-12: Participants experience with the course
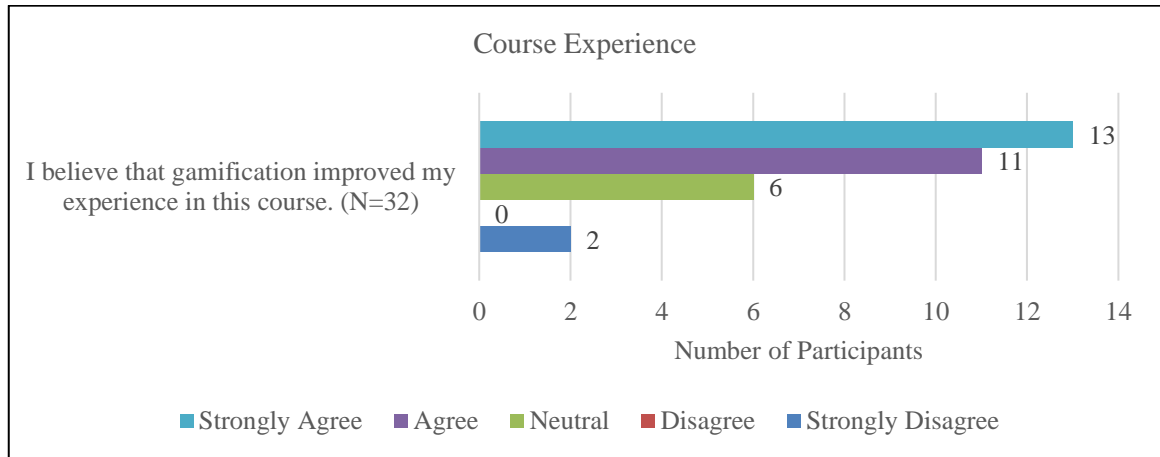
As depicted in Figure 6-12, participants indicated that gamification improved their experience in the course (68.5% agreement, median=4.00, variance=1.193). However, results were accompanied by a high degree of variance. In order to understand this further, the researcher explored BrainHex profiles (Figure 6-13). Results of this crosstabulation indicate that all Seekers and the Socialiser indicate improvement in their experience. Whilst Conquerors and Daredevils also indicated a positive experience, most Daredevils seemed undecided. Achievers and Masterminds' experiences provided the greatest degree of variance in their responses.

In essence, these results suggest that whilst the majority of participants reported an improvement in experience as a result of the gamification, some participants did not experience any improvement. Based on their BrainHex profiles, this is possibly due to the gamification not catering for some goal-oriented Achievers with a longer-term outlook whilst also not catering for some strategic and efficiency-driven Masterminds.

Figure 6-13: BrainHex vs "I believe that gamification improved my experience in this course."
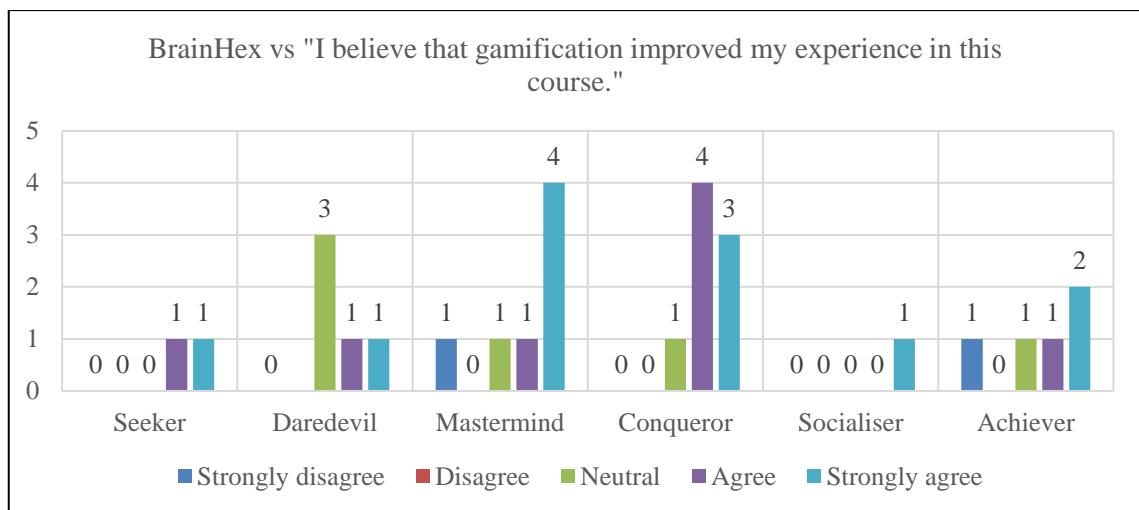
6.4.   Summary of factors influencing participants' experiences

When considering discovery and awareness, participants, whilst holding various conceptualisations of gamification, understood gamification to be a technique used more for learning as opposed to a technique to motivate. From a learning perspective, gamification was experienced to enhance learning, enable knowledge gain and increase competition. Other conceptualisations of gamification included edutainment and entertainment.

In terms of onboarding and introduction, it emerged that participants who attended onboarding adjusted into the game better than those who did not attend onboarding, and vice versa. Participants did however suggest that onboarding be a simple, less text-heavy process which caters to a wider audience. Participants would prefer to learn about the game, rewards and how to earn rewards during onboarding.

In terms of access, whilst the researcher believed that the e-learning platform could be enhanced further, participants rated the platform highly and found it to be user-friendly. Participants also logged onto the platform at varying frequencies with the main objective of remaining abreast of happenings in the gamified course and to update themselves with any posts from peers. It should be noted that there was a degree of tension experienced in terms of logging on alongside participants' other commitments. Computers and laptops emerged as the most common with some participants depending on the LAN. Some participants elected to use mobile devices and experienced some challenges. These challenges were overcome easily by gamers as opposed to non-gamers. Additionally, participants reported that challenges with Internet access affected their ability to engage.

Insofar as scaffolding and experience, participants perceived gamification as being integrated into the course as opposed to being applied onto the course. The researcher attributes this perception to designing a gamified experience with the alignment between learning objectives and gamification. However, results relating to the workload seem to challenge their actual experience.

In terms of game elements, participants experienced badges and leaderboards as most motivational whilst points dropped from an initial ranking of being most motivating to being ranked as moderately motivating. Progress bars and the storyline were ranked as being least motivating.

In terms of specific elements, badges motivated participants the most. They experienced motivation from badges due to specific characteristics and what they signified. Badges also served as an accolade with potential to increase self-confidence. Limited badges were found to motivate, but this varied among profiles. Analysis also indicated that participants required detailed, personalised and real-time feedback whilst not obtaining rewards was frustrating. Participants reported demotivation from

badges when they did not understand criteria for rewards or when they perceived unfairness in scoring.

Participants also reported a largely motivational experience with the leaderboard both on its own and in tandem with points. Leaderboards motivated enhanced performance and hard work. Participants experienced motivation from seeing their work recognised and thus raised the leaderboard to serving inspiration and a means to strategise. Some participants were constantly motivated by the leaderboard whilst others were motivated or demotivated over time. There were instances where leaderboards were reported to be demotivational, particularly when people did not feature on the leaderboard or when they were at the top and did not like being in the limelight.

Points provided a lesser degree of motivation for participants. Whilst some participants utilised it to measure themselves against peers and track progress, others experienced that points did not provide challenge, curiosity and wonder.

Furthermore, participants experienced a low sense of motivation from progress bars with some participants viewing it as unnecessary whilst others viewed it as a tool for strategic planning in the game. There were also participants who utilised the progress bar as a tool to measure their progress in the course.

In terms of the storyline, noticeable tension and variance were reported. Experiences shared in interviews seemed to be in direct contradiction with the end-of-questionnaire results. Whilst some participants indicated that it served as a motivator for academic work and provided purpose, structure and insight into the world of work, others argued that storylines presented complexity, blurriness, uncertainty and overloaded them with information. The influence of these demotivating factors was stronger and resulted in storylines not serving as least motivating.

At this point, it emerged that participants were less motivated by game mechanics, which governed how the game operates, and were more motivated by game dynamics, which provided participants with greater control over their interaction, and possibly performance. Furthermore, they seemed to be motivated by shorter-term rewards (badges, leaderboards and points) and less motivated by longer-term rewards (progress bars and storylines).

In terms of the BrainHex profiles, there were shifts in preferences of game elements among participants after they experienced the gamified course. These shifts were discussed and the top three preferred elements in each BrainHex profile are presented in Table 6-3. The notable shifts in preferences included the drop in motivational ranking of progress bars among Masterminds, Socialisers and Seekers and the drop in the motivational ranking of the storyline among Daredevils and Seekers.

Table 6-3: Preferred game elements at the commencement versus end of the gamified course.

BrainHex	Preferred Game Elements at the Commencement of the Course	Preferred Game Elements at the End of the Course
Mastermind	Points, Progress Bars and Badges	Badges, Points and Leaderboards
Conqueror	Badges, Points, and Leaderboards	Leaderboards, Points and Badges
Daredevil	Storyline, Progress Bars and Badges	Badges, Progress Bars and Leaderboards
Achiever	Points, Leaderboards and Badges	Badges, Points and Leaderboards (all in equal measure)
Socialiser	Leaderboards, Points and Progress Bars	Leaderboards, Points and Badges
Seeker	Leaderboards, Progress Bars and Storyline	Points, Badges and Leaderboards

Detailed motivational rankings of the game elements at the end of the course is presented in terms of the BrainHex profiles in Figure 6-14 (also Table A-7). Values used are weighted scores of the motivational ranking of each element whilst giving consideration to the fact that profiles may comprise a different number of participants.

Figure 6-14: BrainHex versus motivational rankings of game elements at the end of the course

As may be gleaned from Figure 6-14, Daredevils and Socialisers presented clear distinctions between the motivational role of various game elements. Daredevils derived stronger motivation from badges, progress bars and leaderboards. This implies that these elements provide a sense of thrill and suspense which motivates Daredevils. It may be argued that these motivators are catered for when badges are limited, progress bars are running out or when competing for a spot on the leaderboard. Socialisers experienced the greatest motivation from the leaderboard, which suggests direct alignment with their profile.

Seekers derived their strongest motivation from points followed by badges and leaderboards. This suggests that Seekers in a gamified course are motivated by quantifiable rewards whilst deriving some sense of interest and curiosity from these elements. It is possible that this motivation is derived from the sense of wonder presented by the available rewards and when being rewarded. Whilst it might have been argued that moments of wonder might have been brought about by the storyline, this was not experienced.

Masterminds experienced their strongest motivation from badges which indicates a preference for accolades and visual rewards. Furthermore, their preference for points and leaderboards may be attributed to the strategic approaches required in earning these rewards. Conquerors indicated a similar experience however the sense of triumph from leaderboards reigned supreme. They were less motivated by earning accolades and more inclined to winning, possibly through accumulation of as many points as possible.

Achievers experienced, in equal measure, a sense of motivation from badges, leaderboards and points. Whilst they are driven by progress towards achieving a longer-term goal, progress bars provided the least motivation.

6.5. Conclusion

This chapter sought to answer the second research question relating to factors influencing participants' experiences of a gamified e-learning course.

In this chapter, experiences were analysed from the perspectives of the levels of engagement of different participants. Thereafter, factors which influenced their initial onboarding and introductory experience were explored. Additionally, analysis also considered factors like perceptions of game design and experiences with various game elements. These factors were then investigated in the context of participants' expectations and BrainHex profiles.

7.   CHAPTER SEVEN: INFLUENCE OF GAMIFICATION ON MOTIVATION

7.1.   Introduction

In this study, participants reported various factors influencing their experiences with the gamified course. Since these experiences could strongly influence motivation, it was crucial to explore how gamification of e-learning influences students' motivation. As discussed, the results and analysis are presented in three chapters. This chapter explores the third research question (RQ3 below).

To reiterate, the research questions underpinning this study were:

RQ1.   What are students' expectations of a gamified e-learning course?

RQ2.   What factors influence students' experiences of participating in a gamified e-learning course?

RQ3.   How does gamification of e-learning influence students' motivation in a gamified e-learning course?

As discussed, in order to answer the research questions, a number of instruments were utilised before, during and after the gamified course as depicted in Table 7-1.

Table 7-1: Summary of sequence of research activities, instruments and research questions.

	Pre-course	**In-course**	**Post-course**
Research Question	1	2 & 3	2 & 3
Instrument	Initial questionnaire (See Appendix G1)	Interviews (See Appendix H)	Interviews and end-of-course questionnaire (See Appendix G2)

As may be gleaned from the table, this chapter provides analysis of results obtained during interviews and in the end-of-course questionnaire. Furthermore, analysis also incorporates observations of the researcher. As discussed in the research methodology chapter, a five-point Likert scale was adopted in questionnaires where: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree.

In this chapter, analysis is presented based on Self-Determination Theory (SDT) and its underlying constructs: autonomy, relatedness and competence. Thereafter, analysis is presented through the lens of Intrinsic Motivation Inventory (IMI) and its underlying constructs: interest/enjoyment, value/usefulness, effort/investment and tension/pressure. Additionally, analysis is presented on amotivation in this study. The chapter concludes with a summary of key results pertaining to how gamification of e-learning influences students' motivation.

As discussed in Chapter Four, the questions relating to SDT and IMI were adapted from the questionnaire resources provided at www.selfdeterminationtheory.org (Deci and Ryan, 2011).

7.2. Self-Determination Theory

Since Self-determination Theory (SDT) was the key theoretical framework adopted in this study, participants were asked to share their experiences of the gamified course through the lens of SDT. As discussed, in exploring individuals' behaviour in relation to motivation, SDT views human beings as having three basic needs: autonomy, relatedness and competence. These needs, if fulfilled, will result in an individual being intrinsically motivated.

7.2.1. Autonomy

Autonomy may be defined as an individual's need to have control choice and volition over ones' decisions (Deci and Ryan, 2000). Within the context of IMI, autonomy relates to perceived choice which evaluates the sentiments of participants when engaging in an activity voluntarily (Monteiro et al., 2015).

In the end-of-course questionnaire, participants were asked to relate their experiences of progressing through the course in relation to autonomy. It should be restated that the gamified course progressed through the semester with each participant experiencing gamification as a group. Thus, participants were not able to traverse the game at their own pace but were provided with flexibility in terms of which rewards to pursue and how to go about pursuing the available rewards.

To explore autonomy in this study, two questions were posed to participants (Figure 7-1). A Cronbach's alpha value of 0.777 was obtained for autonomy. In order to understand autonomy further, the researcher also explored autonomy in the context of the BrainHex profile. These results are also discussed.

Figure 7-1: Participants' experiences in relation to autonomy.
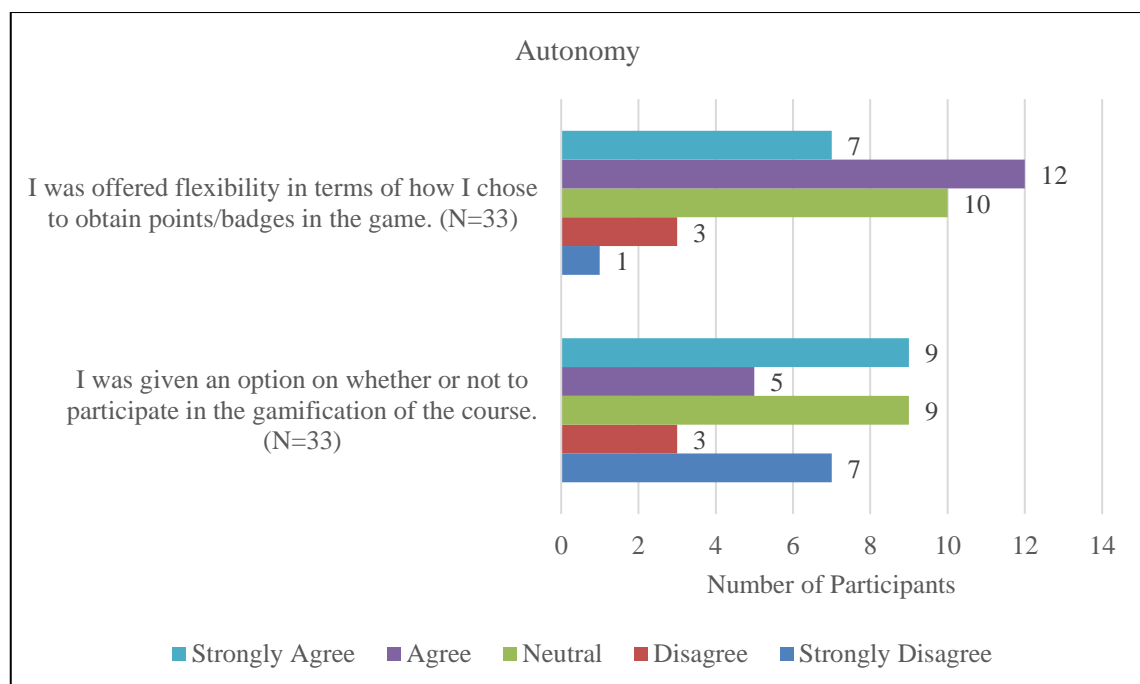
As illustrated in Figure 7-1, participants felt that they were afforded autonomy in progressing through the gamified course, particularly when it came to choices in obtaining rewards like points and badges (50.3% agreement, median=4.00, variance=1.051). However, a high variance is noted.

An analysis of the interview transcripts provides further insight. For instance, an Achiever explained that the gamified course offered them autonomy in how they approached their learning, *"My engagement in the course has increased due to the impact of gamification. There has also been an impact on how I study and learn. With other courses, I learn because I have to, and I have no choice, but this course has laid a foundation on what I would face in the future."* (Interview ID 11). They also drew a contrast between the gamified course and other courses in the programme where they perceived a lack of choice and doing other courses because they have to.

Whilst this course utilised active pedagogies that might have contributed to the positive experience being discussed, the researcher aimed to ensure that participants differentiated between the course and the gamification. However, the commonality between learning objectives and the gamification resulted in this difference not being widely perceived. Nonetheless, this Achiever was able to draw some distinction by viewing the course as beneficial to their future and gamification as playing a role in enhancing their engagement with the course.

Another Achiever offered further insight through a call for more options in terms of rewards to progress in the gamified course. *"I think you should offer more options of getting badges it is frustrating to sit and wonder when you will make it to the top five."* (Interview ID 5). Whilst this participant seemed motivated by obtaining rewards and ranking, the researcher argues that this also indicates the necessity of gamification designed for a diverse audience as this will instil a sense of autonomy. Additionally, this result also supports the call for personalised feedback and support which will guide individual participants towards obtaining rewards.

In terms of BrainHex in relation to their perception of flexibility offered in terms of how they chose to obtain points/badges in the game, almost all profiles tended to experience autonomy in relation to this statement (Figure 7-2). There were some observations warranting discussion. Conquerors showed strong agreement with this statement. When considering their BrainHex profile, they are challenge-oriented players who are motivated by triumph against adversity. Based on this, it would seem that they derived motivation from being afforded flexibility in terms of how to overcome challenges presented to them. Seekers provided a neutral response whilst Masterminds had variance in their responses.

Figure 7-2: BrainHex vs "I was offered flexibility in terms of how I chose to obtain points/badges in the game."

BrainHex vs "I was offered flexibility in terms of how I chose to obtain points/badges in the game."

Legend: Strongly disagree, Disagree, Neutral, Agree, Strongly agree

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Seeker	0	0	2	0	0
Daredevil	0	0	2	2	1
Mastermind	1	1	1	3	2
Conqueror	0	0	2	6	0
Socialiser	0	0	0	0	1
Achiever	0	1	2	0	2
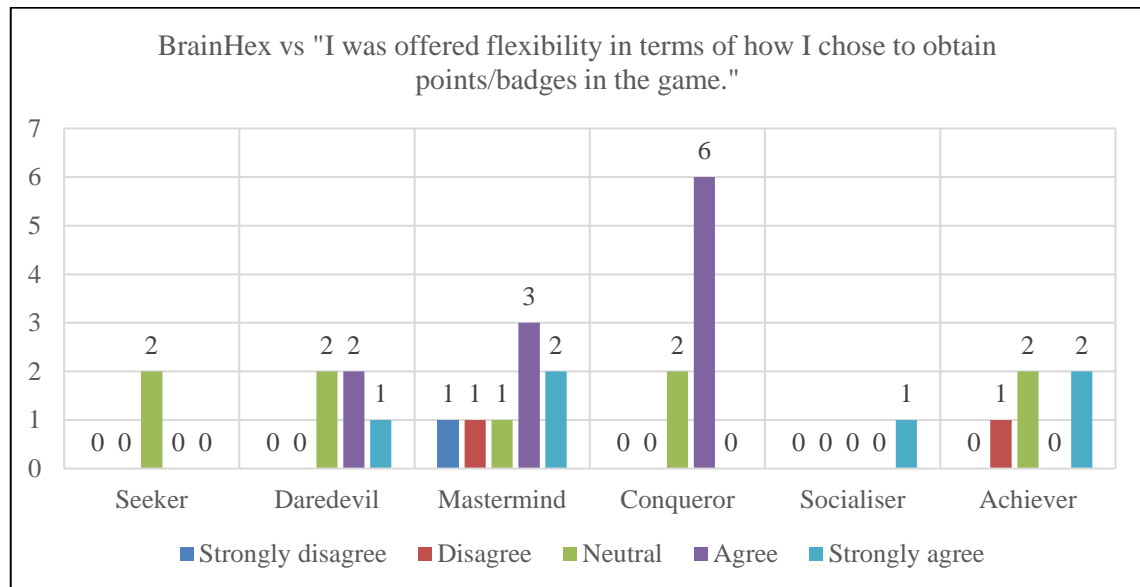
When asked about if they were given an option of whether or not to participate in the gamification of the course (Figure 7-1), students reported a much lesser degree of autonomy (39% agreement, median=3.00, variance=2.216). It should be reiterated that whilst the entire course offering was gamified, students were not prevented from opting to disengage from the gamification and focus on only completing what they perceived to be academic activities. However, since the gamification was designed based on learning objectives, participants could still end up earning rewards even if their focus was solely on academic activities.

Despite the researcher not preventing participants from focusing solely on the academic work, more than half the group felt obligated to engage the gamification of the course. Thus, the researcher sought to understand possible factors behind this. One participant, a Socialiser, suggested that gamification held the role of an add-on to the course which did not influence their motivation, nor did it contribute to how they experienced autonomy, *"Gamification is new, and I have other things that have been motivating me to study hard even before gamification."* (Interview ID 2). The researcher then sought to understand what these "other things" might comprise. This participant further indicated that, *"the nature of the course motivates me as it explores the nature of IT and how IT may change from now."* Thus, it would seem that this student was drawn towards and motivated to engage in this course due to the trending technologies covered, even before gamification was introduced.

It is also worth making the point that gamification might be new to the course and to participants, it has been adopted since the inception of higher education and represents a different approach to rewarding and recognising achievement. Gamification focuses on shorter-term rewards whilst participants were accustomed to the longer-term recognition provided by a traditional degree structure. A metaphor may be drawn between gamification and the traditional degree structure, marks

equate to points, becoming knowledgeable in the IT industry equates to a badge, and performing well in relation to peers equates to performing well academically.

In terms of their perception of choice of whether to participate or not, participants provided varying responses (Figure 7-3) across almost all BrainHex profiles. From the results, it would seem that the highest degree of autonomy was experienced by Masterminds who, by their nature, incline towards actions which afford them autonomy as they are motivated by activities which require them to devise strategy efficiently. Socialisers, Achievers, Conquerors and Daredevils reported varying degrees of autonomy whilst Seekers reported experiencing no sense of autonomy.

In addition to the factors discussed above, the researcher argues that the perception of the demanding workload brought about by gamification coupled with the workload of the course might have also contributed to the sense of decreased autonomy. This is explored later.

Figure 7-3: BrainHex vs "I was given an option on whether or not to participate in the gamification of the course."
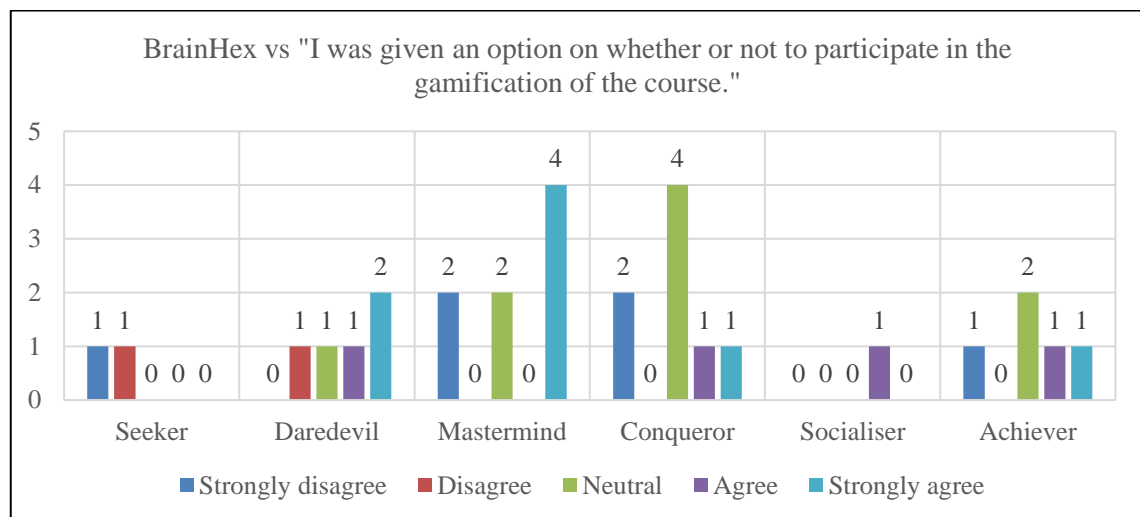
In essence, there was a sense of autonomy experienced (composite median=3.50, variance=1.335). However, a wide degree of variance was present across both items and the composite score. This wide degree of variance indicates that the participants experiences vary significantly from the median value, thereby indicating that a significant number of participants did not necessarily experience a sense of autonomy. Both qualitative and quantitative analysis indicate that autonomy was experienced by participants, albeit at significantly varying degrees. This is important to appreciate that autonomy has implications for intrinsic motivation, sustained engagement and willingness to engage in a gamified course.

7.2.2. Relatedness

Having found that participants experienced autonomy, it was also necessary to explore how participants' relatedness in interacting with the gamified course influenced motivation. Relatedness is defined as an individual's perception of support and likeness received or given to a particular task (Deci and Ryan, 2000). Within the context of IMI, relatedness is the degree of an individual's connectedness to others, particularly in contexts where individuals interact with each other (Monteiro et al., 2015).

To explore relatedness in this study, three questions were posed to participants in the end-of-course questionnaire (Figure 7-4). A Cronbach's alpha value of 0.716 was obtained for these items. In order to understand relatedness further, the researcher explored relatedness in the context of the BrainHex profile.

Figure 7-4: Participants' experiences in relation to relatedness.
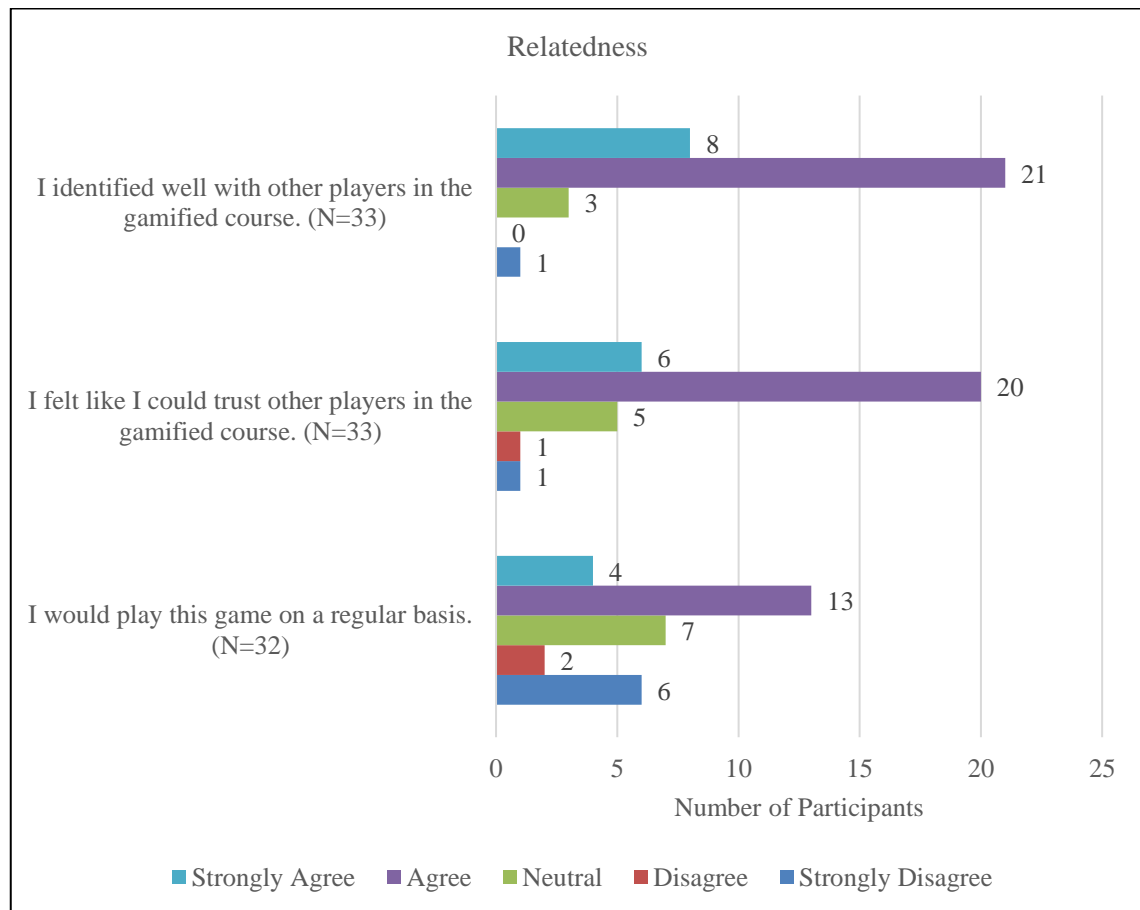
As is illustrated in Figure 7-4, participants indicated a positive degree of relatedness in interacting with the gamified course. When considering how participants identified with peers in the gamified course, they reported a strong sense of relatedness in this regard (82.9% agreement, median=4.00, variance=0.621).

Upon analysis of interview transcripts, it became apparent that participants experienced relatedness with peers for various reasons. From the perspective of rendering support, one Daredevil shared the following insight: *"I like helping others in the course and making sure that they understand. That also motivates me. I do well in class and I do not need the five percent, if I was able to give it to someone that really needs to pass."* (Interview ID 1). If one were to analyse this participant's BrainHex profile, Daredevils are motivated by risk, being on the edge and experiencing a thrill. Hence, it may be argued that the willingness to share rewards is easier for participants who are riskier. Another profile that might follow a similar practice would be Socialisers as such an action would forge relationships. Nonetheless, the researcher holds the view that this experience of relatedness raises a discussion about the influence of gamification in a context where competition occurs, but collaboration is also beneficial. In rewarding participants for a display of soft-skills and corporate value, the researcher argues that a balance may be achieved, and sense of community fostered.

Participants also reported increased motivation in the game since their peers were motivated. In this light, one participant accedes to the notion of being hooked and deriving motivation as others are engaging. *"Playing the game motivates me. The game makes you to desire to keep on going, once you are inside, you are hooked. The fact that people are motivated to engage makes the game more interesting."* (Interview ID 7). A further example that may explain this is that people may join social networking sites based on the fact that their peers are engaging in that space. Another participant, a Conqueror shared a similar view, *"My friends who are also doing the same course give me a lot of motivation, the competition also motivates me."* (Interview ID 9). Whilst this behaviour may be out of character for a Conqueror who is motivated by defeating others in the game, it may also signal that situations which foster relatedness might lead to deviation from their profile.

Additionally, participants reported a positive shift in their motivation due to peers engaging in the gamified course. A Conqueror shared their experience, *"I first posted content because it was an activity that was required then ended up posting because others were posting."* (Interview ID 10). This further reiterates the fact that participants may deviate from their BrainHex profile in terms of relatedness. This shift in motivation is also significant as this participant alluded to having found greater purpose in posting as a result of peers, as opposed to posting solely for the purpose of an activity. To extend this further, the researcher sought to understand whether this shift in motivation was due to peers or gamification. However, this participant viewed gamification and the course being intertwined and did not provide insight into the reasons for this shift.

A Seeker experienced a growing sense of relatedness and wanted to make their presence felt amongst their peers, *"I felt that I had no time for this but, eventually you see that the effect of the gamification thing is actually like a dummy that plays (as though) you are in an organization, a dummy organization, let me put it that way. You feel like, 'I really want to be relevant in this organization, I want my presence to be felt.'"* (Interview ID 12). Whilst this participant was initially reluctant and

uncomfortable in the gamified course, their relatedness in the course increased as they became more acquainted with gamification. Additionally, there is an indication that the storyline played a role in developing this sense of relatedness within this participant to the extent that they wanted to be a part of it.

In terms of BrainHex profiles, when contrasting this item against BrainHex, results indicate that there was a strong sense of identification between different profiles in the gamified course (Figure 7-5). This further strengthens the argument that participants would likely deviate from their BrainHex profile when exposed to situations which encourage relatedness or collaboration.

Figure 7-5: BrainHex vs "I identified well with other players in the gamified course."
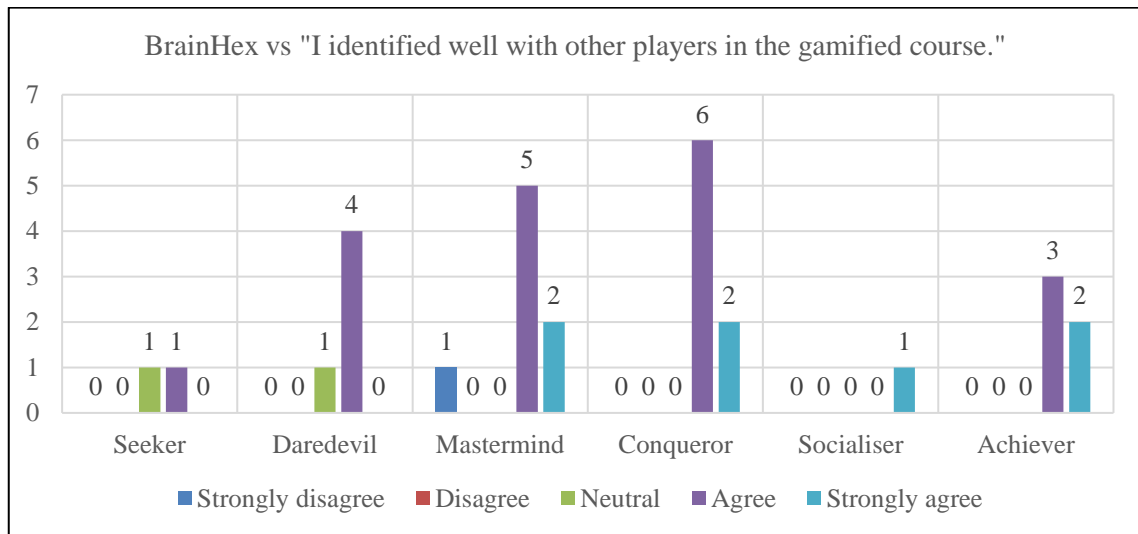
When asked about the role of trust in their experience (Figure 7-4), participants reported a slightly lower level of trust (74.2% agreement, median=4.00, variance=0.735) with some participants providing a neutral reply. This slightly lower degree of trust may be explained by the fact that participants reported an increased level of competitiveness. As a result, they tended to keep their game strategy concealed from peers. Once again, the tension between competition and collaboration arises. Some participants seemed to be motivated by competition whilst others were motivated by personal achievements.

Another dimension which may apply to this result is academic performance. Whilst establishing a sense of community and trust was not a direct objective of the course, group work featured in some of the activities. In the gamified course, participants were afforded the opportunity to elect their own project groups in exchange for 100 points. The nature of the group project being discussed was that the outcome of the group work would directly influence academic performance in the course. Nine participants utilised this opportunity resulting in them being placed in a group of their choice. Essentially, almost a quarter of participants displayed traits which signified decreased trust when it came to tasks influencing academic performance. This suggests that relatedness is more apparent

when the outcome of a gamification endeavour does not influence aspects which participants deem to be more serious in nature. As soon as the stakes increase, relatedness decreases.

In terms of BrainHex profiles, when contrasting this item against BrainHex, results indicate that there was a sense of trust among various profiles in the gamified course (Figure 7-6). Whilst most participants reported a positive experience, there were some instances of neutral reply and one Mastermind who reported a sense of distrust. In terms of motivators, Socialisers by their definition would be most motivated by the existence of trust. Results indicate the same.

Figure 7-6: BrainHex vs "I felt like I could trust other players in the gamified course."
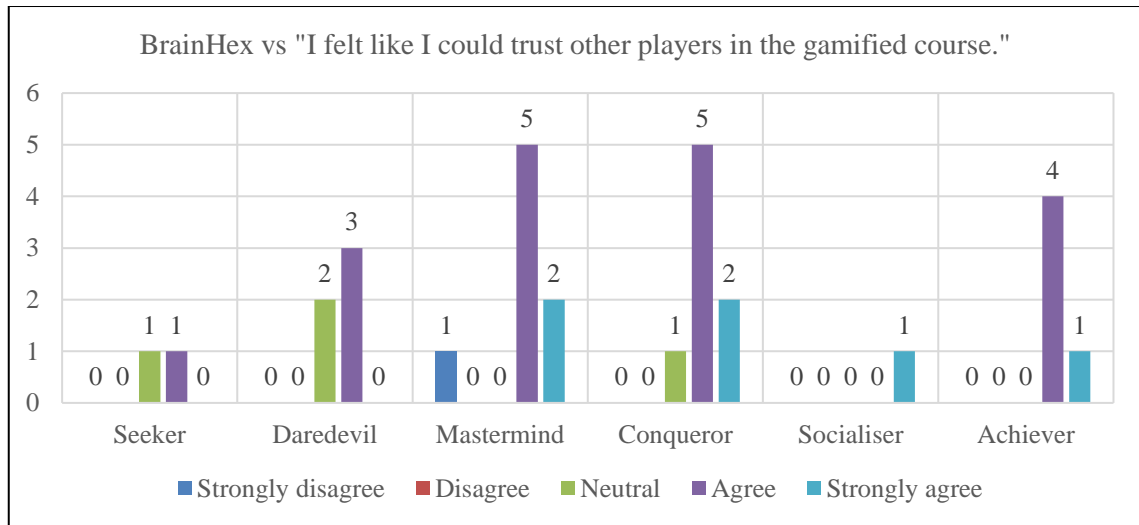
In order to determine participants' relatedness with the gamified course and to understand sustainability, participants were asked if they would play the game again (Figure 7-4). Whilst many participants answered positively, the researcher observed significant variance in participants' responses (74.2% agreement, median=4.00, variance=1.725). Within this, 17.1% of responses strongly disagreed that they would engage the gamified course again. The researcher contends that the increased demands in terms of workload and frustration at not receiving rewards might have also played a contributing role.

In terms of BrainHex, when exploring this item against BrainHex (Figure 7-7), results indicate that variance was observed across Masterminds, Daredevils, and Seekers whilst Conquerors presented a lower degree of variance. On the other hand, Socialisers and Achievers presented the least variance. From this it may be argued that Socialisers may have been motivated by the opportunities to interact and engage with peers whilst Achievers, who are motivated by longer-term goals, viewed the gamified course as a step in their development.

Figure 7-7: BrainHex vs "I would play this game on a regular basis."
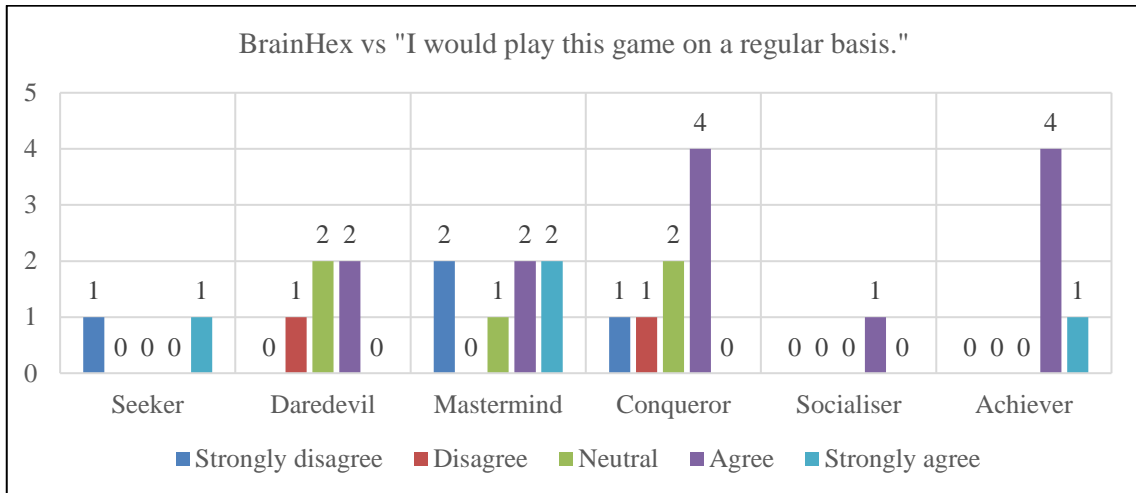
In essence, there was a stronger sense of relatedness experienced by participants (composite median=4.00, variance=0.621). However, one item presented a wide degree of variance. Nonetheless, both quantitative and qualitative results support the notion of identification between participants. Relatedness waned slightly in terms of trust and variance increased in terms of sustainability and willingness to engage the gamified course in the future.

Lastly, since relatedness played a role in developing a sense of community among participants, it remains crucial to ensure that this role is strengthened.

7.2.3. Competence

In addition to exploring autonomy and relatedness, it was essential to explore competence to fully understand self-determination. Competence refers to the perception that one has of their effectiveness in a particular task (Deci and Ryan, 2000).

Participants were asked, in the end-of-course questionnaire, to provide responses to four statements relating to their perceived competence (Figure 7-8). It should be noted that one statement was removed from the analysis due to its inclusion compromising the reliability of the competence construct. This statement related to whether participants felt that they were given adequate time to learn to play the game. Therefore, results and analysis pertaining to the three remaining statements are presented. A Cronbach's alpha value of 0.796 was obtained for these items.

Figure 7-8: Participants' experiences in relation to competence.
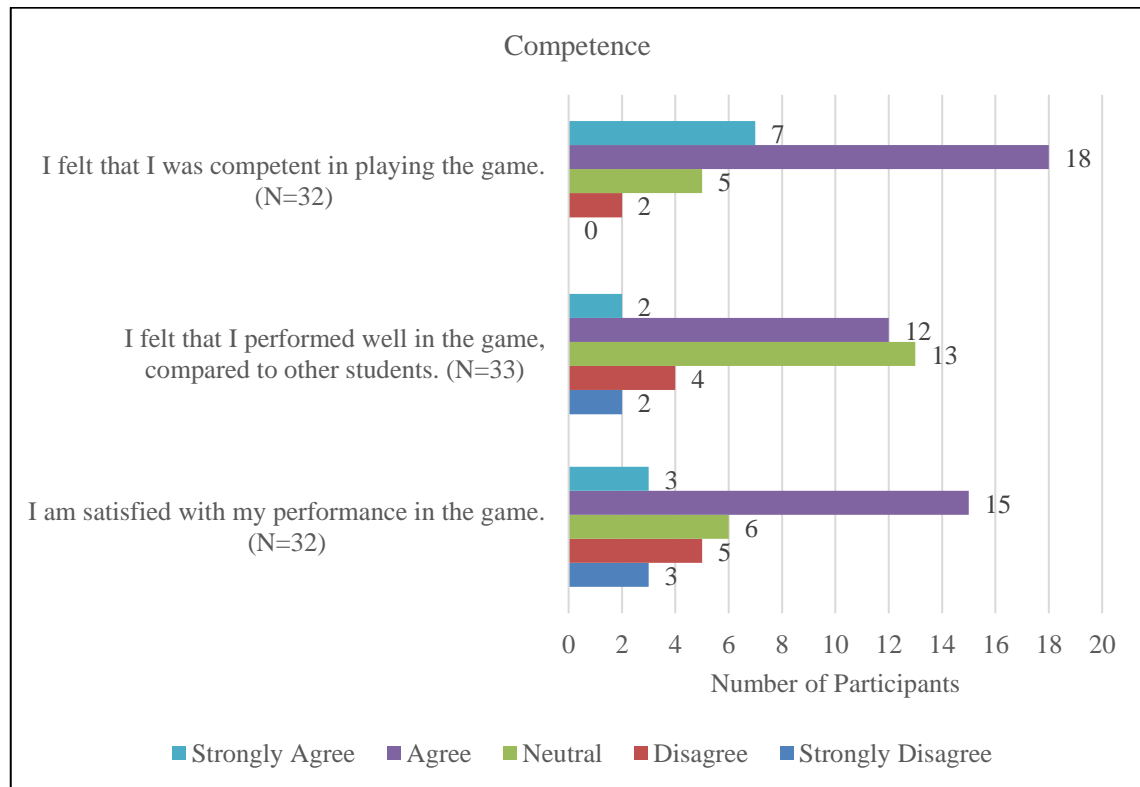
When asked about their level of competence (Figure 7-8), participants indicated a strong degree of competence whilst engaging the gamified course (71.4% agreement, median=4.00, variance=0.641). When contrasting participants' experience of competence against their prior expectations of gamification (83% agreement, median=4.00, variance=0.694), results indicate that participants experiences marginally exceeded their expectations. In order to explore factors behind this sense of competence, the researcher analysed interview transcripts.

The researcher contends this degree of competence was influenced by the potential of gamification to develop an individual's self-confidence through visible rewards. This is supported by the experience of one Achiever, *"I really like the way the course/gamification and has helped me develop self-confidence especially seeing my work rewarded (badges)."* (End-of-course questionnaire ID 7). If one were to consider that Achievers are motivated by achievement of goals, it would seem that recognition of their work assists in this motivational need being fulfilled, whilst also developing a sense of competence.

In keeping with the objectives of the ISTN731 course, participants would expect to leave the course being relevant and confident in their discipline. A Seeker suggested that their experience of the gamified course developed their sense of competence as an upcoming IT professional, *"It built my relevance and confidence in the field of Information Communications Technology."* (End-of-course questionnaire ID 35). Since Seekers are motivated by activities which pique their interest and curiosity, this finding suggests that they were motivated by developing in their field and measured

competence from this perspective. Therefore, it may be argued that real-world relevance of a gamified endeavour develops a sense of competence.

This may be extended to academic work. A trend that emerged was that participants entered the gamified course with an academic objective which gamification played a motivational role in helping them achieve. This was experienced by an Achiever said, "*My motivating factor in this course is to get a good mark ... I want to try and achieve something like a cum laude, so I can make a positive impact on myself. The game is well defined, I understand it very well. Having an understanding of the game and how it works gives me an advantage.*" (Interview ID 1). Gamifying learning for Achievers emerges as beneficial since they are goal-oriented towards longer-term achievements (in this case achieving a qualification with excellent results). At the same time, they display preference for activities that contribute to their goals, each of which gamification may reward.

This sentiment was echoed by another Seeker who was motivated by academic achievement, "*I would say the first factor would be that when I got to UKZN I wanted to graduate with cum laude. Gamification motivates me to work hard so I can achieve higher marks.*" (Interview ID 12). It should be stated that the role of gamification in this study was to motivate participants to learn, in the context of e-learning. Additionally, a recurring theme here is that academic performance is central. Thus, gamification related to academic objectives seems to motivate.

In the context of BrainHex, when contrasting this item against BrainHex, results indicate that there was a strong sense of competence between different profiles in the gamified course (Figure 7-9). It is also observed that a neutral reply was the lowest measure of competence provided by participants across all profiles.

Figure 7-9: BrainHex vs "I felt that I was competent in playing the game."
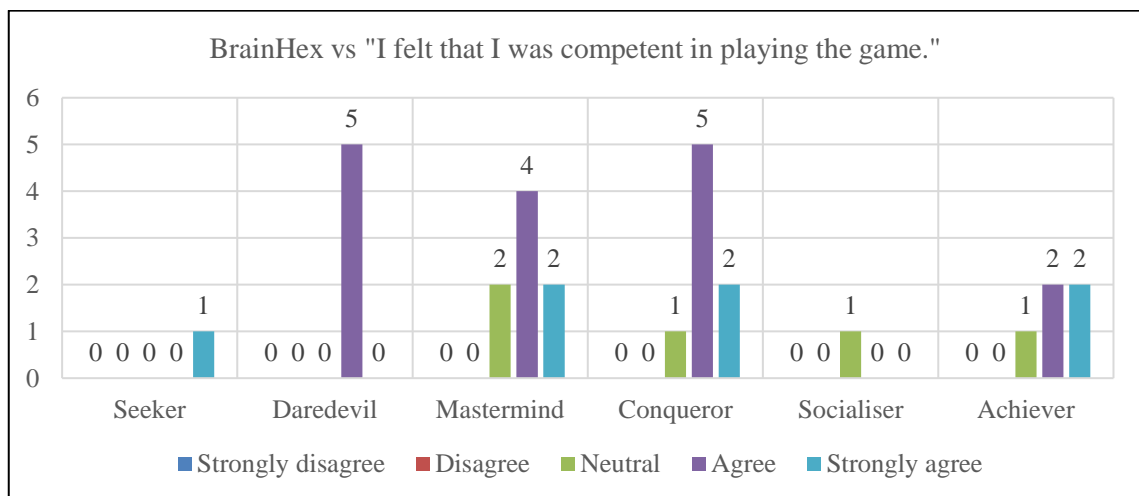
When asked to compare their competence to other participants, the picture shifted slightly. Participants reported uncertainty in terms of their competence in relation to others (40% agreement, 37.1% neutral, median=3.00, variance=0.939). The researcher argues that this insight was shared

because participants believed that did not perform as well as in the game as their peers. Also, from the perspective of community, it might have been the case that participants were reluctant to rank themselves above others due to a strong sense of relatedness and identification with others in the game. When considering that leaderboards were the second-most motivational game element, it seems as though participants were reluctant to rank themselves but preferred that they were ranked by the researcher or game master.

Whilst gamification aims to motivate behaviour, this uncertainty may be interpreted negatively in that whilst it motivates, it does not necessarily instil a sense of competence in participants due to the competition that is created. On the other hand, this uncertainty may be interpreted positively in that gamification encourages participants to continuously assess their level of competence, based on rewards received, and motivates them to strive towards developing a sense of competence. This is also suggested by the reflections of an Achiever, *"If I knew that we were going to receive badges I would have worked harder."* (Interview ID 5). Similarly, a Seeker also shared a similar experience of the leaderboard, *"The leaderboard is sort of encouraging and has motivated me to work harder."* (Interview ID 12).

To extend this further, when exploring this item against BrainHex profiles (Figure 7-10), results indicate that Achievers felt the least degree of competence when compared to peers. Achievers, Socialisers, and Masterminds displayed uncertainty in terms of competence. In keeping with their BrainHex profile and being motivated by triumph over competition, Conquerors experienced the strongest degree of competence. Daredevils, perhaps due to a thrill of competing against peers, also experienced a sense of competence.

Figure 7-10: BrainHex vs "I felt that I performed well in the game, compared to other students."
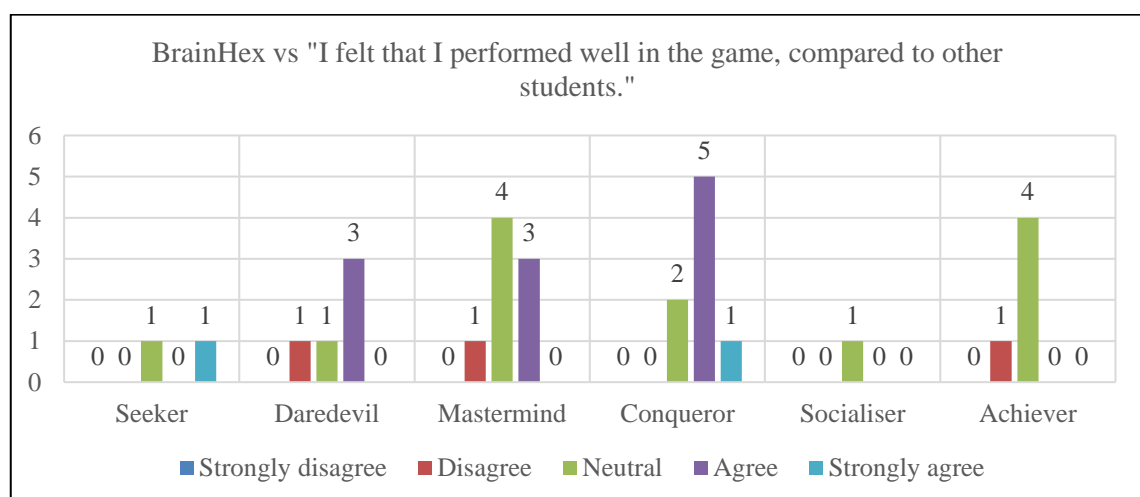
Despite this uncertainty, participants reported being satisfied with their performance in the gamified course (22.9% disagreement, median=4.00, variance=0.1319). This result further supports the observation that participants were reluctant to rate their performance against peers. In terms of

BrainHex (Figure 7-11), only Conquerors and Daredevils were strongly dissatisfied with their performance in the gamified course. When analysing the characteristics of their profiles, this may be due to Conquerors not winning against peers in the game whilst Daredevils not receiving the thrill and suspense that they expected. Achievers also expressed a sense of dissatisfaction, possibly since not all Achievers obtained rewards in the game. Masterminds notably provided a neutral response to this statement, possibly indicating that either the game did not demand strategic thinking or their efforts at strategy were not as successful as planned.

Figure 7-11: BrainHex vs "I am satisfied with my performance in the game."
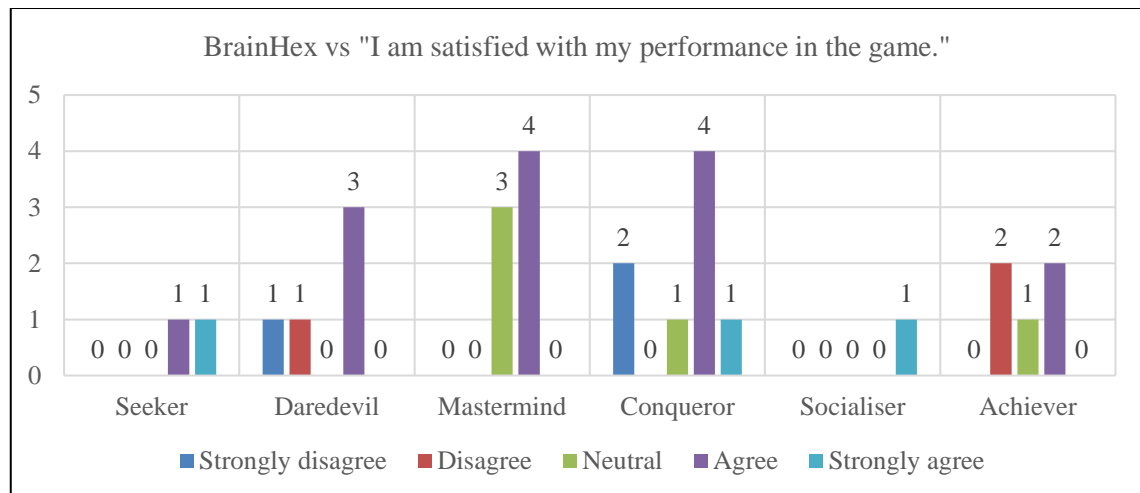
As indicated in the analysis, there was a sense of competence experienced by participants (composite median=4.00, variance=0.624). Despite this, participants' competence in relation to peers was uncertain. It also emerged that concepts relating to community and relatedness emerged in the analysis of competence.

7.2.3.1. Influence of scoring and rewards systems on competence

Since results indicated that participants were uncertain about their performance in the gamified course, the researcher sought to further understand the influence of the scoring and rewards system on motivation, particularly from the perspective of competence.

When analysing participants' insights, it emerged that participants reported experiencing a sense of demotivation due to uncertainty around scoring or not obtaining rewards. One participant suggested that this uncertainty was as a result of work not being rewarded despite expectations of a reward, *"I do not understand it and I am not sure if it is fair. It can be fair but not perfectly fair. The criteria for awarding badges might not be accommodating to other people's work."* (Interview ID 4). Due to this, a sense of tension seemed to emerge.

Another participant shared a similar experience whereby not fully understanding the allocation of points served as a demotivator and resulted in a diminished sense of competence, *"I feel great about*

the storyline but sometimes it demotivates me because I do not understand how you allocate points. I sometimes work so hard and get fewer points which make me question how you allocate points." (Interview ID 7). The researcher argues that these experiences signify the potential of continuous feedback for sustained motivation and increased competence.

Additionally, in the gamified course, the researcher focused on giving feedback when assigning rewards and recognition to participants as they met objectives. However, it is evident that, in order to instil a sense of competence, feedback needs to accommodate all participants, including those who partially meet objectives and do not earn rewards. This is supported by the suggestion of an Achiever, *"I don't know but I think it was fair, but I would have loved to know why I couldn't get a particular badge, I would have loved some feedback that is more tailored to me concerning the badges."* (Interview ID 11). The need for mentoring and personalisation is extended, by a Conqueror, who suggests personalising the experience for students to enhance performance, *"Maybe the game should reward with more realistic rewards like mark to ensure every individual compete at their best."* (End of Course Questionnaire 28). Whilst this might have yielded benefit, within the context of this research, personalised rewards were not feasible. However, this suggestion again raises the tension associated with competition versus co-operation. It would seem that participants are motivated by competition but would derive greater motivation and a greater sense of competence if every individual engaging the gamified course were given the opportunity to participate at their best. This talks to a spirit where the community thrives if the needs of individual members of the community are seen to. Participants seemed to support this spirit as it prevailed widely, even among participants like the Conqueror mentioned above. Another participant, a Daredevil, whilst seemingly demotivated, also echoed the view relating to supporting even those who were not performing as highly, *"I think the system is biased. You don't give acknowledgements to people on the bottom."* (Interview ID 1).

Another Mastermind suggested that detailed, real-time feedback is crucial in providing a sense of competence, *"With gamification you cannot predict what is wrong or correct. I am unsure of the objectives of gamification. What's worse is that we do not get feedback. There is no explanation as to why we get certain marks. If there was, it would have been easier to improve because you would know what to improve. Sometimes I get it sometimes I do not. I do not understand the scoring mechanism, so I cannot say whether it is fair or unfair."* (Interview ID 6).

Since participants experienced a sense of demotivation at not being rewarded, the researcher then analysed what might constitute activities for which participants felt that they should be rewarded. An Achiever highlighted the fact that other participants post good content and were deserving of rewards, *"At times, I feel that the scoring is unfair. ... You find that some people post good content that deserves limited badges but don't get them."* (Interview ID 5). This experience suggests that

gamification must reward a wide array of activities, including effort towards achievement, and not just achievement.

Another theme related to participants not being rewarded was that participants analysed the rewards being obtained by their peers to gauge their level of competence against what was required. In doing so, participants analysed the academic work of others to ascertain the quality. As a result of this analysis, a Conqueror shared an experience where they felt that rewards allocated were not necessarily deserved, *"I felt as if some people were undeservingly rewarded and would look through some peoples work and could feel that it wasn't worth the badges they were being given however there were some that I felt were deserving."* (Interview ID 10). Whilst this action might have been motivated by the nature of a Conqueror to triumph over others, it motivated them to engage and analyse the work of colleagues.

Despite the presence of experiences associated with not being rewarded, there was one participant, also a Conqueror, who reported a motivational experience with the scoring in the game, *"The scoring mechanism is explained and without remembering the badges and the weight they carry I think the scoring is fair."* (Interview ID 3). It should be noted that participant was at the top of the leaderboard at the time of the interview and was in a position of triumph. Whilst this result indicates that a stronger position on the leaderboard might result in positive perceptions of the scoring mechanisms, it also implies that possessing a strong sense of competence due to being rewarded results in a positive perception of the game. Therefore, it is necessary to ensure that rewards within a gamification endeavour seek to reward more than just achievement of objectives and is structured in a manner that rewards effort and engagement.

At the end of the course, participants were asked to rate their experience of the scoring mechanism and rewards system used in the course. They rated the scoring mechanism as "good" (71.4% positive rating, median=4.00, variance=0.871) and rated the rewards mechanism in a similar manner (68.3% positive rating, median=4.00, variance=0.985). However, the researcher believes that sentiments towards the rewards and scoring mechanism were in a constant state of flux during the course. Hence, different experiences were shared about scoring and rewards based on participants' experiences at different parts of the course. However, as the course progressed, they became more accustomed to gamification and the scoring mechanism. This supported by the fact that four interviewees from the seven who shared negative experiences about scoring and rewards seemed to change their perception. They rated both the scoring and rewards systems positively at the end of the course (Interviewee ID 4, 5, 7 and 10).

Ultimately, results indicate that competence is developed by being rewarded for achieving and expending effort, and through receiving mentorship and feedback in a gamified course.

7.2.4. Summary – Motivational influence of gamification from the perspective of SDT

In terms of autonomy, participants felt that they were afforded autonomy in progressing through the gamified course (composite median=3.50, variance=1.335). When it came to flexibility in obtaining rewards like points and badges, participants reported a stronger, but varied level of autonomy. Participants also signalled a call for more options in terms of rewards whilst autonomy was also experienced in how participants approached their learning. Additionally, it was observed that that many participants did not differentiate between the game and course, which had positive and negative outcomes. Results also indicated that there was a decrease in autonomy in relation to whether participants perceived choice in whether they could participate in the gamified course. Given that the course and gamification were viewed as one, this result is not unexpected. There also seemed to be a sense of that most participants felt obliged to engage with the gamified course, with the perceived novelty of gamification possibly contributing to this.

As far as relatedness was concerned, participants indicated a strong sense of relatedness with the gamified course (composite median=4.00, variance=0.621). Participants identified with peers in the gamified course for various reasons including supporting peers, deriving motivation through engaging with motivated peers, engaging on the gamified platform, and being comfortable to make their presence felt. Similarly, participants strongly perceived that they could trust others in the gamified course. As a measure of relatedness and sustainability, participants also indicated that they would be willing to play the game on a regular basis. However, significant variance was observed here which may be attributed to perceptions around workload. Nonetheless, analysis seemed to indicate that the spirit of community was present, to the extent that it overshadowed expected behaviour from the various BrainHex profiles, particularly when certain profiles were expected to value competition more than collaboration and community.

In terms of competence, analysis indicated that a moderate sense of competence was experienced by participants (composite median=4.00, variance=0.624). In terms of feeling competent in engaging the gamified course, most participants experienced competence since gamification increased their self-confidence, provided relevance to their discipline, and helped motivated them to achieve academically. Whilst many participants were satisfied with the performance in the game, they displayed a degree of uncertainty and reluctance when asked about their performance in relation to other students. When probing competence from the perspective of scoring and rewards, some participants reported experiencing a degree of demotivation due to not earning their rewards, not understanding the scoring mechanisms and not receiving real-time feedback. Additionally, participants expected effort to be rewarded, and not just achievement. Thus, it would seem that competence is increased by rewarding effort and providing mentorship and feedback.

In terms of BrainHex profiles, degrees of motivation varied among participants (Figure 7-12). Seekers experienced the least degree of autonomy whilst experiencing the strongest degree of competence. Furthermore, Daredevils, Masterminds and Conquerors experienced moderate levels of motivation in terms of autonomy, relatedness and competence. Socialisers experienced the strongest degree of autonomy and a strong degree relatedness. Furthermore, Achievers reported the lower degree of competence and a stronger degree of relatedness.

Therefore, any gamification endeavour which motivates harnessing autonomy will motivate Socialisers whilst harnessing relatedness will motivate Socialisers, Achievers, Conquerors and, to a lesser degree, Masterminds. Furthermore, harnessing competence will motivate Seekers, and to lesser degree Conquerors and Socialisers. The researcher contends that this further signifies the importance of considering gamer profiles in gamification design.

It should be noted that this figure is based on weighted scores of the motivational ranking of each construct within SDT whilst giving consideration to the fact that profiles may comprise a different number of participants.

Figure 7-12: BrainHex vs SDT
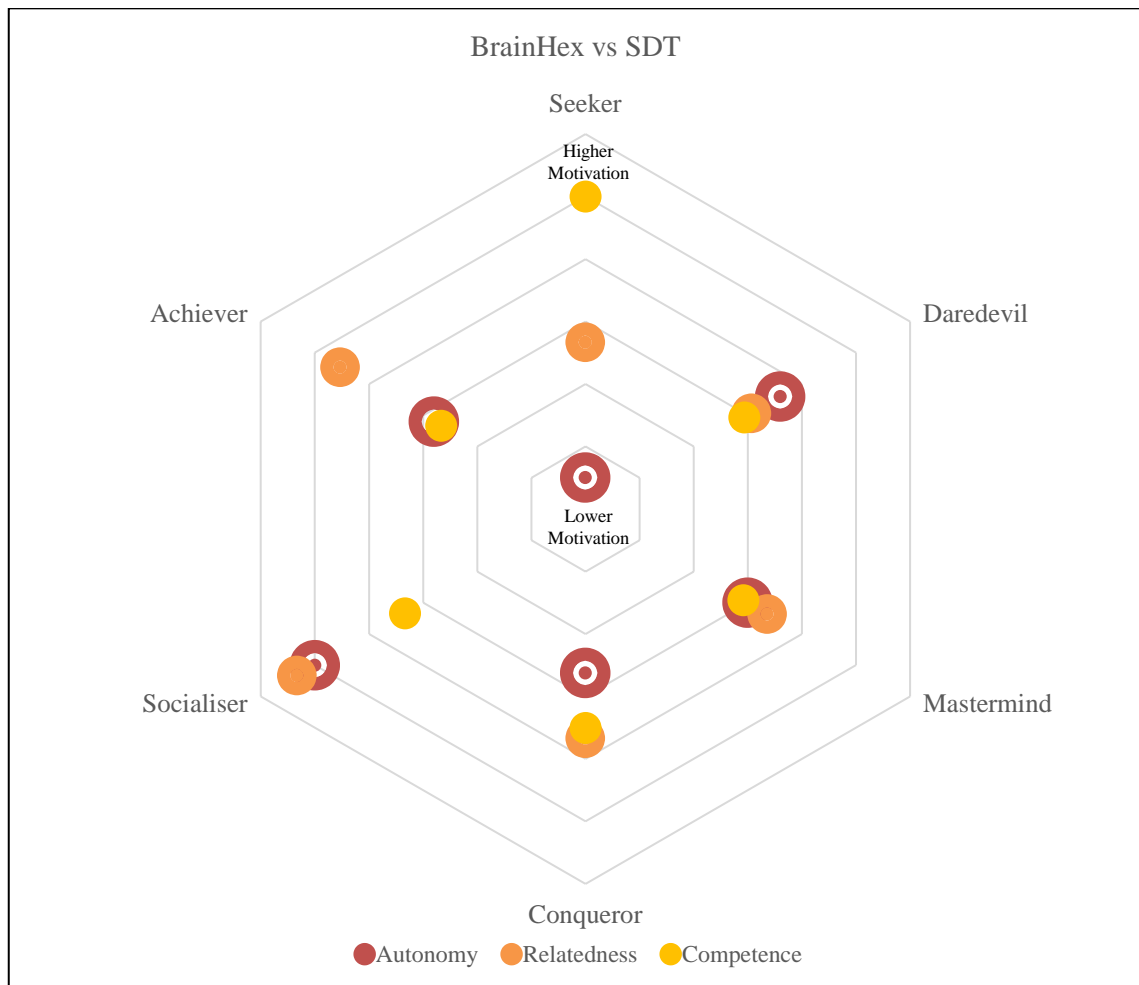
7.3. Intrinsic Motivation Inventory

Since students were found to have experienced autonomy, relatedness and competence in the gamified course to varying extents, it became necessary to further explore the extent to which they were intrinsically motivated. Therefore, students were also asked to respond to statements in relation to motivational drivers based on the IMI.

As discussed, IMI is a multidimensional tool, with its foundation in SDT, which allows for measurement of participants' subjective experiences of an activity (Monteiro et al., 2015). Variable of measurement are distributed across several subscales, including interest/enjoyment, value/usefulness, effort/investment and tension/pressure. Additional subscales in IMI include perceived competence (competence), relatedness and perceived choice (autonomy) (Monteiro et al., 2015). Results relating to autonomy, relatedness and competence have already been presented and analysed.

7.3.1. Interest/Enjoyment

As the most direct measure of intrinsic motivation in IMI, interest aims to measure the inherent pleasure or satisfaction derived from completing a specific activity (Monteiro et al., 2015). The value of a sense of interest was expressed by an Achiever, *"It depends on what I am doing, if I am interested in something I work harder."* (Interview ID 5).

To determine interest and enjoyment, participants were asked to respond to three statements in the end of course questionnaire relating specifically to interest and enjoyment. A fourth item (denoted by a *) from relating to whether the course should be applied to more courses was included in this analysis due its ability to measure enjoyment. For this construct comprising four items (Figure 7-13), a Cronbach's alpha score of 0.843 was obtained.

Figure 7-13: Participants' experiences in relation to interest/enjoyment
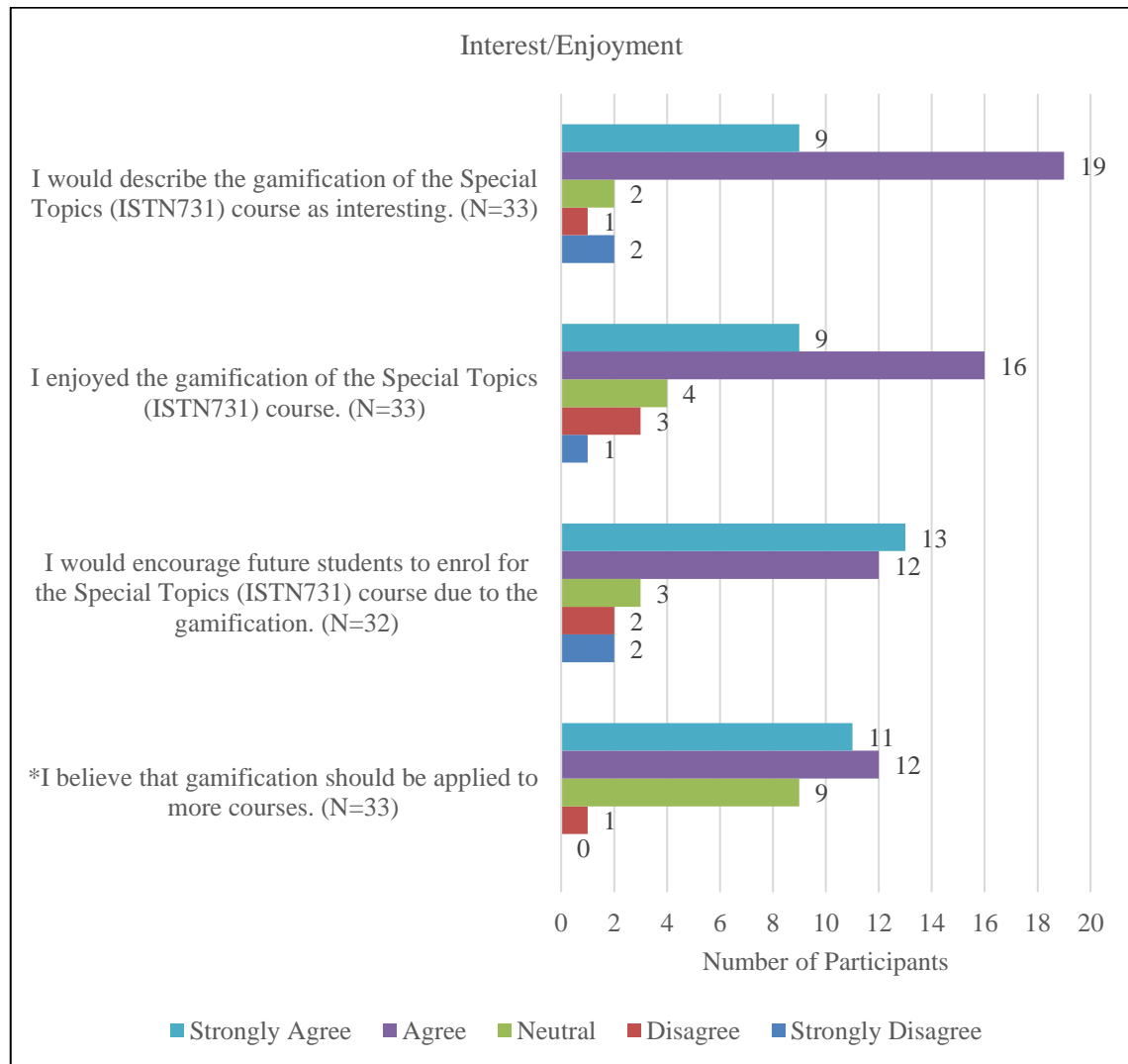
As depicted in Figure 7-13, participants reported their experience of gamification as interesting (80% agreement, median=4.00, variance=1.030). Since the variance was significant here, it was necessary to explore the nature of the sense of interest that participants experienced.

When seeking insight into possible reasons as to why participants perceived the gamified course to be interesting, the researcher turned to interview transcripts. The theme of community and relatedness reappears in the experience of one participant who experienced an increase in their interest in the course since their peers were motivated to engage, *"The fact that people are motivated to engage makes the game more interesting."* (Interview ID 7).

A similar experience was reported by a Conqueror, *"I treat all my courses the same, but this course has caught my interest more than other modules as a result of gamification and the relevance of the course."* (Interview ID 8). The researcher highlights the complementary relationship between the motivational influence of the course due to its relevance and that of gamification. Whilst participants reported being motivated by the relevance of the course to their intended career, this finding also

suggests that the motivation to engage and participate in the course came from game elements. Rather than being viewed in isolation, courses and gamification should bear alignment in such a manner that motivation in the longer-term is driven by industry relevance whilst motivation in the shorter-term is driven by gamification. Additionally, the researcher argues that gamification provides academics with opportunities to harness metaphors and situations which participants might be exposed to in the future.

Furthermore, this Conqueror also suggested that gamification, industry relevance of the course and the constructivist approach to learning piqued their interest and encouraged them to reflect on their learning, *"I treat all my courses the same, but this course has caught my interest more than other modules as a result of gamification and the relevance of the course. I would say its 50/50 between gamification and relevance. It has changed my learning experience because there are no text books I just have to play the game."* (Interview ID 8).

Despite describing the integration of gamification as interesting, some participants balanced the situation and displayed a sense of caution. This was evidenced by the experience of another Conqueror who suggested that whilst competition is beneficial, a sense of community is essential, *"The game bring emotion out the way it is so competitive. But again, if you are not performing well, you can easily lose interest."* (End-of-course questionnaire ID 28).

An additional dimension, which supports the case for gamification designed to accommodate the interests of individual participants, was introduced by one participant, *"I developed a lack of interest in the course because I am more interested in science; my priorities are different from what the course is offering."* (Interview ID 4). Through this statement, it becomes apparent that this participant might have joined the gamified course with a level of interest which dwindled as the course progressed. This is supported by analysis of this participant's initial questionnaire responses. Whilst there might be benefits offered by gamification tailored to the individual, such an approach may be constrained by available resources.

Since it emerged that participants experienced varying levels of interest, the researcher sought to explore if and how this changed over time. One participant indicated, at the commencement of the course, that they found the concept of gamification *"quite interesting"* (Initial questionnaire ID 32). After experiencing gamification, this participant stated the gamified course was *"quite interesting and motivating."* (End-of-course questionnaire ID 32). The theme of sustained interest may also be explored through the lens of tension which is discussed later.

In terms of BrainHex profiles, results indicate that almost all BrainHex profiles deemed the gamification of course to be interesting (Figure 7-14). The exceptions here include the Achiever and Mastermind profiles thus indicating that the gamification did not cater to their respective needs of engaging in shorter-term activities relating to achievement of goals and did not require a significant

problem solving of strategising skills. Also, in discussions presented thus far, Conquerors experienced a noticeable degree of interest. Analysis of interest against BrainHex profiles (Figure 7-14) supports this since Conquerors provided only positive responses in terms of interest.

Figure 7-14: BrainHex vs "I would describe the gamification of the Special Topics (ISTN731) course as interesting."
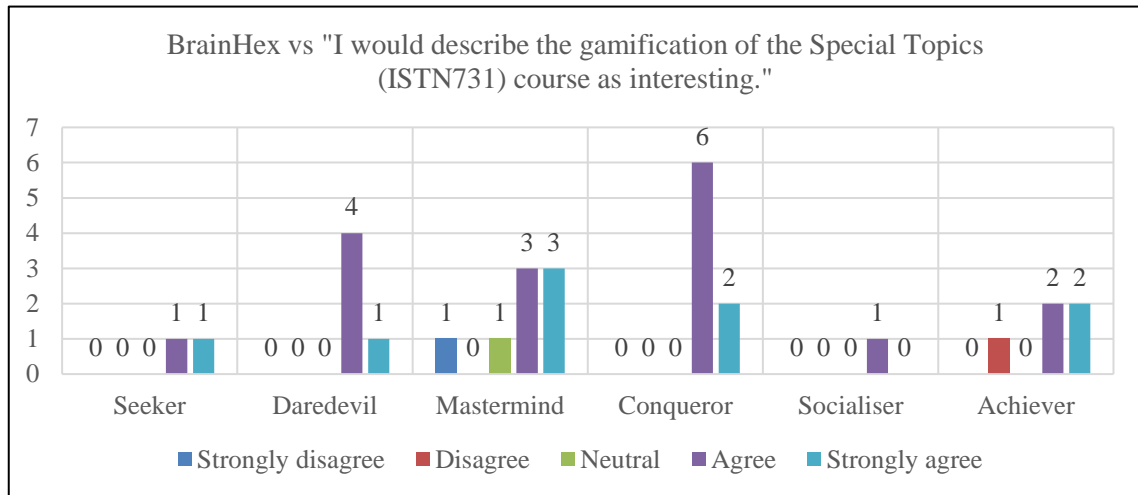
As illustrated in Figure 7-13, Participants also reported that the experience of the gamification was enjoyable (71.4% agreement, median=4.00, variance=1.047). As was present in the case of interest, a high degree of variance is also observed here.

When analysing possible factors behind this experience, it emerged that the enjoyment resulted from the integration of gamification and from specific game elements. This has been discussed in the analysis presented thus far. One Daredevil expressed the view that the storyline presented a sense of enjoyment, *"It is motivational. I play a lot of games in general and they have no fun, no storyline. You need a storyline to enjoy something."* (Interview ID 1). When considering that Daredevils are motivated by being on the edge and experiencing a thrill, this result suggests that storylines provide a sense of thrill and suspense.

When considering enjoyment in terms of BrainHex (Figure 7-15), many profiles, including Seekers, exhibited a sense of enjoyment. However, the Socialiser provided a neutral response which implies that the gamified course did not fulfil their need for engagement and relationships. This finding tends to contradict the earlier finding where this Seeker did indicate experiencing a strong sense of relatedness. Hence, it is possible that this Seeker obtained relatedness in aspects of the course other than social engagement. This further contributes to the theme that, within an academic context, participants will deviate from their BrainHex profile. In a similar manner as was observed in regard to interest, Masterminds and Achievers provided varying responses in terms of enjoyment.

When considering that participants expressed excitement at the commencement of the course (68% agreement, median=4.00, variance=0.751), their experience of enjoyment expressed here signals that this this expectation has been met.

Figure 7-15: BrainHex vs "I enjoyed the gamification of the Special Topics (ISTN731) course."
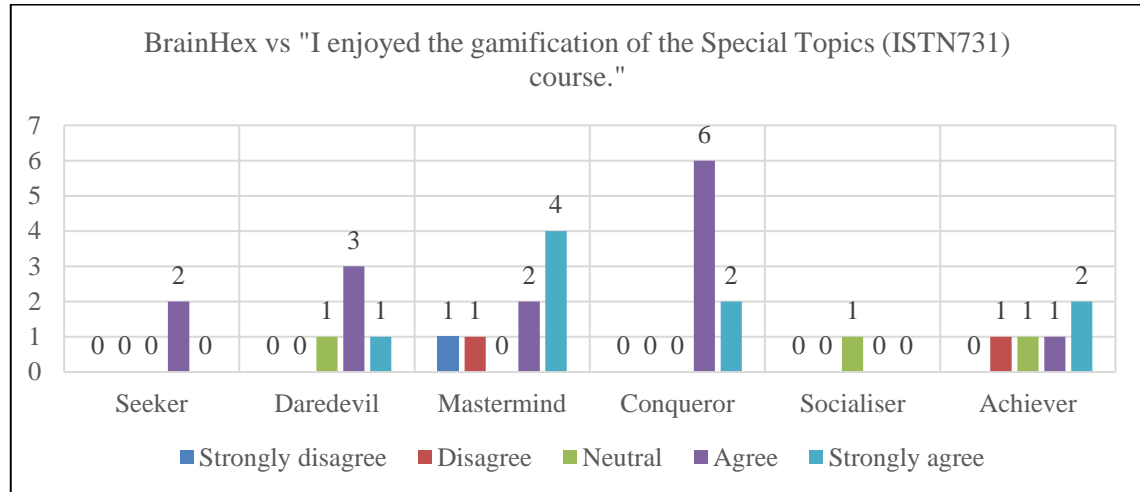
When participants were asked if they would encourage future students to enrol in the course on account of gamification being applied (Figure 7-13), they responded positively (71.4% agreement, median=400, variance=1.218) albeit with significant variance. The level of agreement suggests that gamification effectively served a motivational role since individuals tend to be reluctant to recommend something unless they are sure of its effectiveness. Since a strong sense of community was present in the group, this is likely the case.

In order to understand how various BrainHex profiles differ in their willingness to encourage future students to enrol in the gamified course on account of gamification (Figure 7-16). Conquerors, the Seeker, the Socialisers and Achievers indicated that they would encourage others to register for the course. Within this, only one Achiever provided a neutral response. Masterminds seemed less likely to offer this encouragement which was in line with their reported experience of interest and enjoyment presented. Whilst most Daredevils would encourage future participants to enrol in the gamified course, there was one Daredevil (End-of-course questionnaire ID 21) who provided a negative response. This participant did not provide reasons for this. However, they also reported not being satisfied with their performance in the course and experiencing a degree of tension.

Figure 7-16: BrainHex vs "I would encourage future students to enrol for the Special Topics (ISTN731) course due to the gamification."
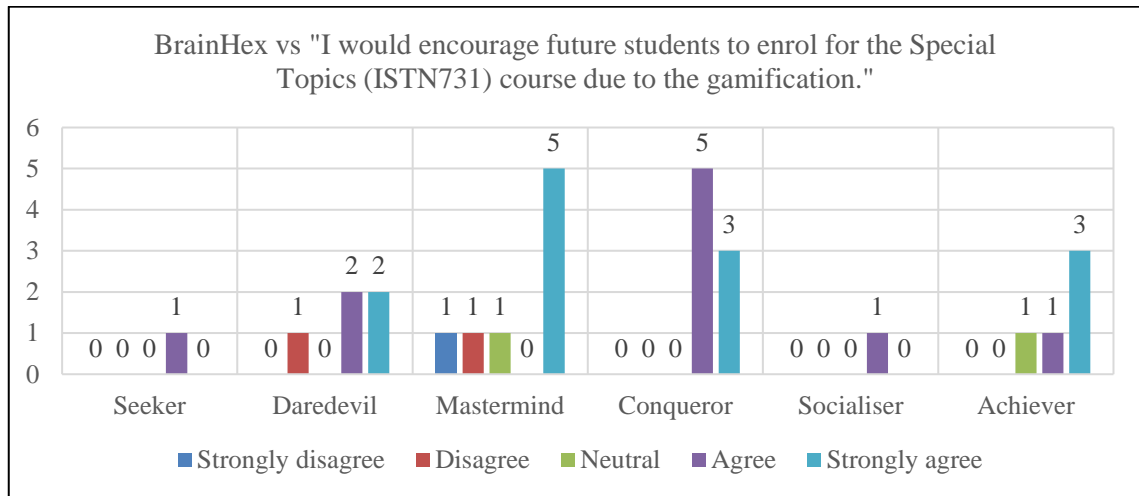
As indicated in Figure 7-13, many participants agreed with the statement that gamification should be applied to more courses (65.7% agreement, median=4.00, variance=0.750). When turning to the optional comments provided in the end-of-course questionnaire, a Mastermind suggested that gamification be encouraged in more modules in the Honours programme, *"should be encouraged in most of the Honours course."* (End-of-course questionnaire ID 22). This is substantiated by the view shared by an Achiever, *"I wish at least 50% of IST Honours modules can switch to gamification – it's awesome."* (End-of-course questionnaire ID 8).

These sentiments were not only held by Achievers and Masterminds. When analysing this item against BrainHex responses (Figure 7-17), a positive sentiment is shared across all profiles except Daredevils. This suggests that gamification in an academic setting might not yield the required level of thrill and suspense which motivates Daredevils. This warrants further exploration and is discussed later through the lens of tension.

Figure 7-17: BrainHex vs "I believe that gamification should be applied to more courses."
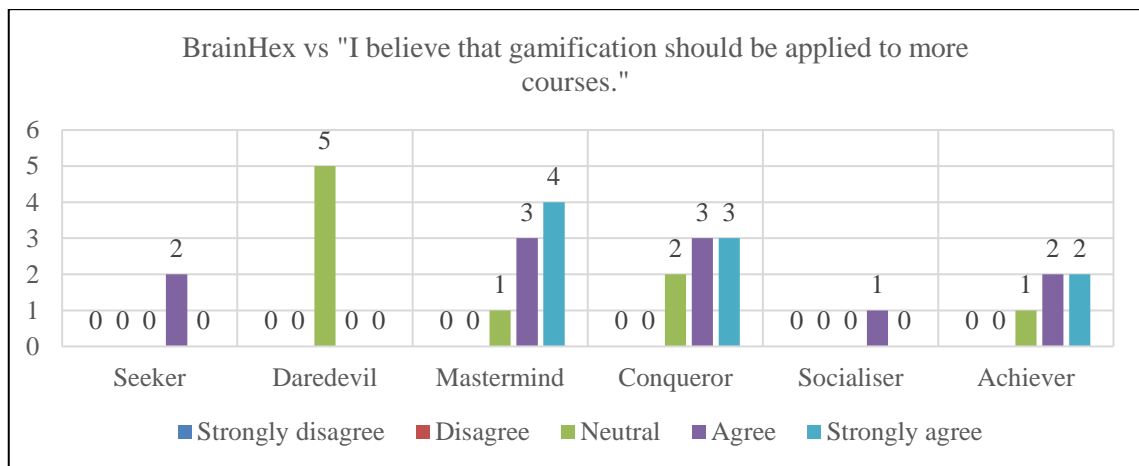
As indicated in the analysis, there was a sense that gamification provided a sense of interest and enjoyment (composite median=4.00, variance=0.704). However, a wide degree of variance was observed when analysing in some items (the exception being the item which explored applying gamification to more courses).

Analysis of BrainHex profiles across the other items indicates that Masterminds and Achievers contributed to this variance as they experienced a lesser degree of interest/enjoyment across most items in this construct. Despite this, quantitative and qualitative results support the notion that both interest and enjoyment was present in the gamified course. Ultimately, relatedness and a spirit of community also appeared to feature widely.

7.3.2. Value/Usefulness

The role of value/usefulness in IMI embraces the idea that individuals internalise and develop more self-regulatory activities when they consider an experience useful or valuable (Monteiro et al., 2015).

To determine value and usefulness, participants were asked to respond to six statements in the end of course questionnaire relating specifically to value and usefulness. An additional item (denoted by *) was added relating to the effectiveness for gamification for learning. Therefore, this construct comprised seven items (Figure 7-18), with a Cronbach's alpha score of 0.843.

As the analysis of value and usefulness is presented, expectations relating to certain items are discussed. As these items are presented, comparisons will be made.

Figure 7-18: Value/Usefulness
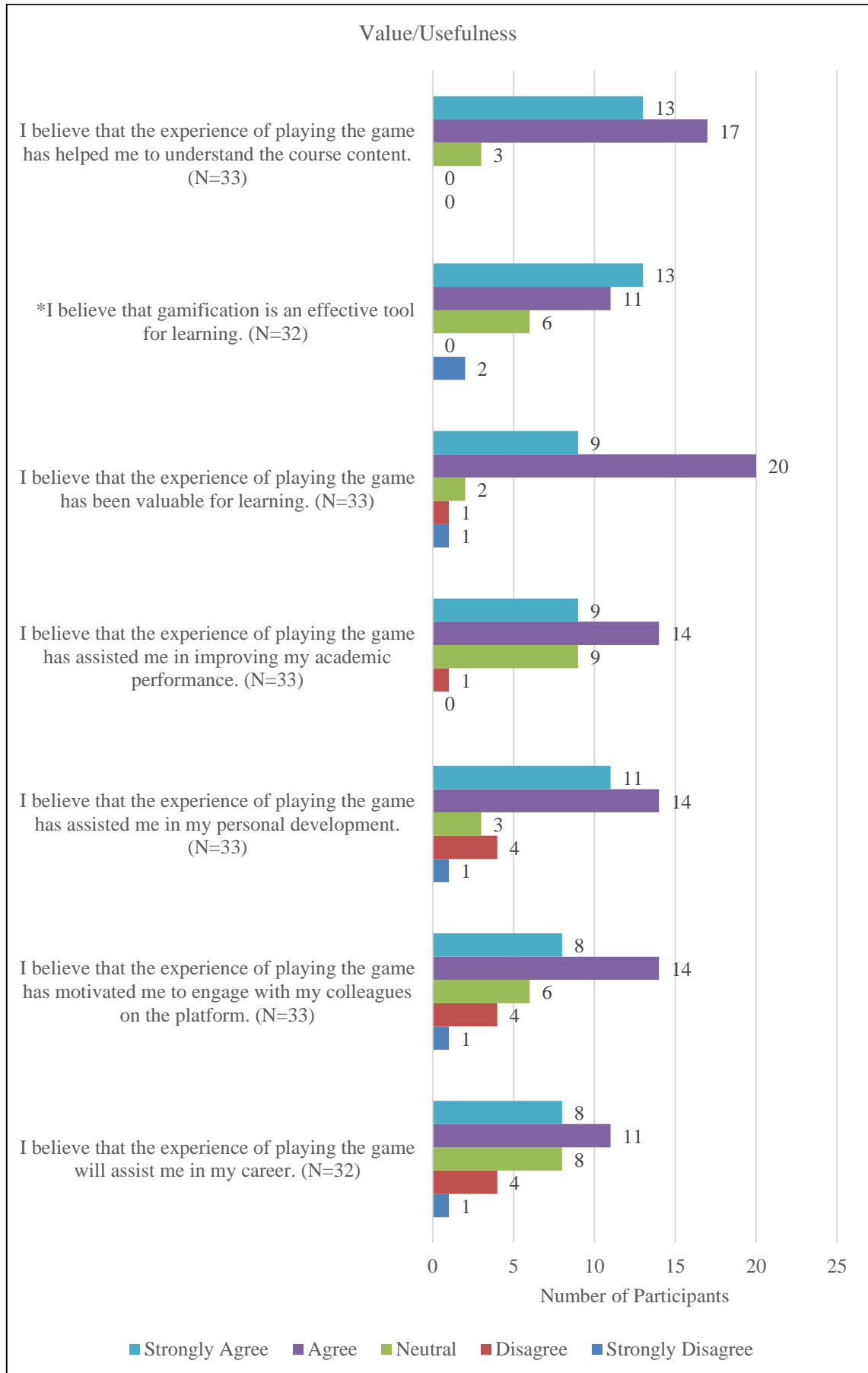
As can be gleaned from Figure 7-18, participants reported a predominantly positive view of the value of gamification. Within this, it emerged that participants found gamification to be of greater value for academic activities. Given that gamification was being integrated into an academic course, this result is not unforeseen.

When considering the academic value of gamification, participants believed that the greatest degree of value provided by gamification was that it enhanced understanding of course content (85.7% agreement, median=4.00, variance=0.405). This result is substantiated by an experience shared in the end of course questionnaire, *"The gamification is good for students in order to complete while understanding their academic work."* (End-of-course questionnaire ID 15). Other than course content, another participant, an Achiever, extended course content to include research skills and obtaining of knowledge relevant to the course, *"It helped me to improve on my research and also add my knowledge to the course."* (End-of-course questionnaire ID 33).

In terms of BrainHex, this was a theme supported across all profiles, with a few neutral responses (Figure 7-19).

Figure 7-19: BrainHex vs "I believe that the experience of playing the game has helped me to understand the course content."
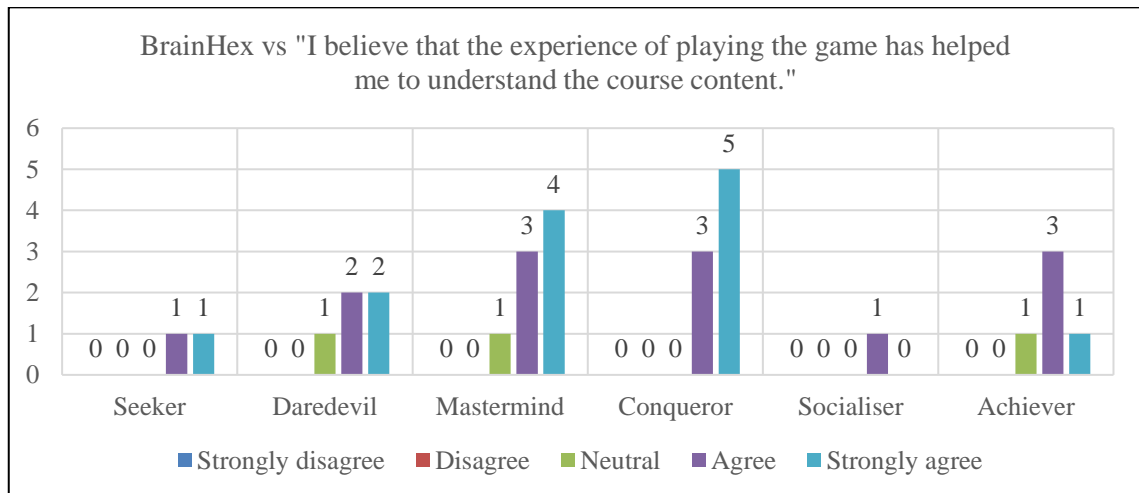
Continuing with the academic theme, participants indicated, in Figure 7-18, that gamification was valuable for learning (82.7% agreement, median=4.00, variance=0.746). In another part of the end-of-course questionnaire, the researcher asked a closely related question regarding whether participants perceived gamification as an effective tool for learning (82.9% agreement, median=4.00, variance=0.752). Other than obtaining similar results for these two questions, analysis of qualitative results also indicate that participants perceived that gamification enhanced e-learning and the course (Interview ID 1 and End-of-course questionnaire ID 2, 22 and 28).

In exploring possible reasons for these views, the researcher turned to the transcript of the interview with an Achiever who provided insight into the fact that integrating gamification motivated them to develop academically through the motivational influence of the badges, *"I would say it is effective. I would say that I have been very challenged with my academic writing skills which really affected my performance in the game. I couldn't get some badges because my articulation was not proper. Gamification has pushed me out of my comfort zone to improve my academic writing."* (Interview ID 5). Thus, it would seem that participants were willing to be pushed beyond their comfort zone when this push was within the context of gamification.

The researcher analysed further to determine if other factors contributed to participants' reflections on the effectiveness of gamification. The Daredevil identified the relationship between participants age, the motivational influence of games and learning, *"I feel that gamification is effective because the younger generation likes playing games so why not make education and learning a game. Making education a game motivates you to learn."* (Interview ID 1). This participant further highlighted the suitability of integrating gamification for learning in the context of university students, *"I see gamification as something that is generational because the younger generation relates to it and the medium in which it is brought. I feel that older people would be less interested in gamification."* (Interview ID 1).

Considering the challenge of a perceived lack of feedback discussed earlier, a Socialiser perceived value in gamification allowing them to track their academic performance and position in the gamified course, *"I think it is effective because it tracks your performance; you are able to know where you are."* (Interview ID 2). It would seem from here that the introduction shorter-term activities coupled with frequent feedback was valuable. In previous iterations of the ISTN731 course, the feedback cycle was wider with students receiving feedback for assessments but not receiving feedback for individual learning activities. Hence the value for students is that gamification closes the feedback cycle also provides opportunity for improvement before assessments.

Whilst participants provided similar responses to these two items, there were some variances. A Spearman's rank correlation test was conducted to determine the degree of association between these two items. A Spearman's rho (r_s) of 0.379 was obtained with p(one-tailed) < 0.05. This indicates a positive medium correlation existed between these two items.

Another dimension worth exploring is the comparison between participants expectations at the commencement of the course and experience at the end of the course. In the initial questionnaire, they expected that gamification would motivate them to learn (91% agreement, median=4.00, variance=0.526) but did not expect that applying gamification to e-learning would be useful (91% disagreement, median=2.00, variance=0.057). When exploring these against their experiences presented earlier, whilst gamification was strongly expected to motivate learning, it did not fully

meet this expectation. On the other hand, their expectation that gamification would not be useful for e-learning was strongly challenged by their experiences.

When exploring the perceived value of gamification for learning, (Figure 7-20), all profiles perceived value for learning. However, there were certain exceptions where one Achiever and two Masterminds did not perceive value.

Figure 7-20: BrainHex vs "I believe that the experience of playing the game has been valuable for learning."
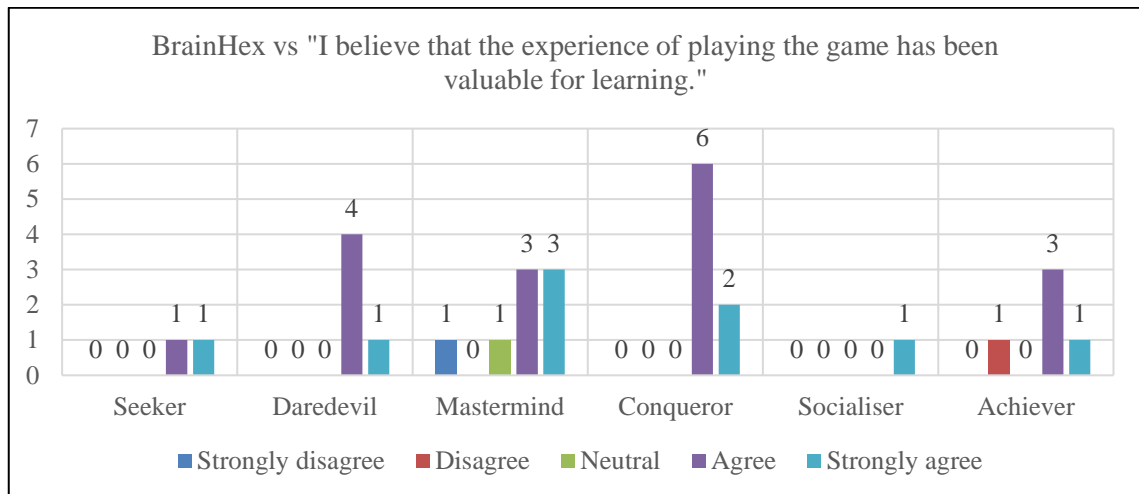
Similarly, when exploring the effectiveness of gamification for learning in relation to BrainHex profiles (Figure 7-21), all profiles perceived effectiveness for learning. However, there were instances of a Daredevil, Conqueror and Achiever providing neutral responses whilst one Mastermind strongly disagreed. When contrasting responses relating to value for learning against those relating to usefulness for learning, Seekers provided similar responses to both questions, slight differences were observed among Socialisers, Daredevils and Conquerors. Masterminds and Achievers provided varying responses.

Figure 7-21: BrainHex vs "I believe that gamification is an effective tool for learning."
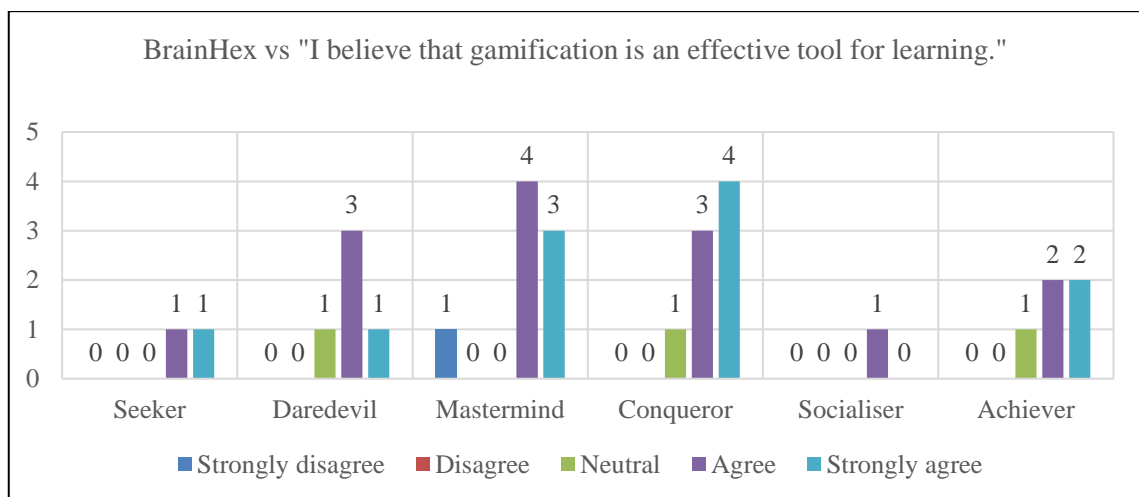
Another aspect contributing to the theme of academic value was the contribution of gamification to enhancing participants' academic performance. Participants indicated, as illustrated in Figure 7-18, that gamification enhanced academic performance (65.7% agreement, median=4.00, variance=0.684). In the initial questionnaire, participants expected that gamification would enhance academic performance (71% agreement, median=4.00, variance=0.588). When contrasting expectations against experiences, results seem to indicate that this expectation has not been met for some participants.

However, qualitative results challenge this. Analysis of interview transcripts indicated that gamification motivated participants to invest greater effort into their academic work. In this light, one Daredevil shared the following experience, *"It is a good thing because it makes learning more interesting. Gamification is more involving (because) it makes you work; unlike when someone gives you an assignment (where) you don't research, you just do the assignment and submit. Gamification is a goal driven exercise."* (Interview ID 1). This experience was shared by a Conqueror who extended this influence towards the larger group, *"I think gamification is effective, it appeals to us, if you are in the LAN you feel a different atmosphere. It is motivational. I think the course itself has this content to teach you and the gamification motivates you to learn. I think if gamification wasn't there my marks would have been slightly low. The whole concept pushes me a little percent extra to try and do better."* (Interview ID 3). The spirit of community reappears. However, these results strongly argue that gamification brings about value as motivates students to invest more effort into their academic endeavours. Whilst value was brought in academic work, another Conqueror indicated, at the end of the course, that gamification combined encouragement to work, competition and fun, *"It was fun and competitive and motived me to do my work."* (End of course questionnaire ID 31). If one were to analyse the Conqueror profile, a distinct characteristic of a Conqueror is that they direct any sense of anger towards their effort. However, Conquerors in this study did not seem to experience a sense of anger.

Turning to BrainHex profiles (Figure 7-22), it emerges that the gamification helped students to perceive improved academic performance across all profiles. This ties in with the construct of competence discussed under analysis of self-determination theory and it can be argued that results of these nature may positively influence students' confidence. However, there was a degree of uncertainty among some Masterminds, Daredevils and Conquerors.

Figure 7-22: BrainHex vs "I believe that the experience of playing the game has assisted me in improving my academic performance."
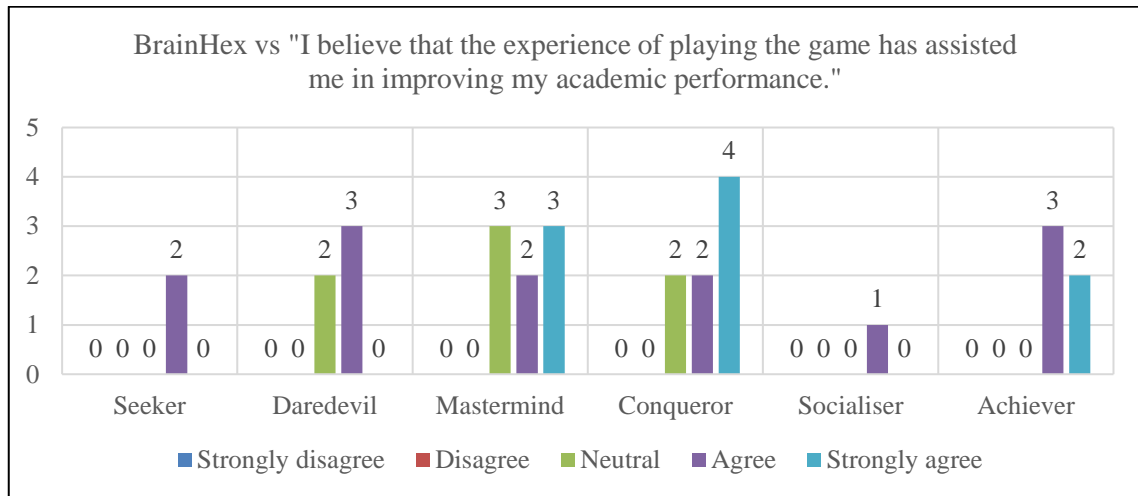
Whilst not moving too far away from the academic theme, results indicate (Figure 7-18) that participants also found gamification beneficial in their personal development (71.4% agreement, median=4.00, variance=1.210). When turning to qualitative results, the theme of personal development still presented links into academic activities, but focus is placed on how participants developed as individuals.

As students make meaning of new information and increase the depth of their learning, reflection on their learning is crucial (Xie, Ke, and Sharma, 2008). This degree of development appeared through the analysis. Gamification, in the experience of a Conqueror, was reported to have encouraged self-directed learning and guided this participant to take control of their own learning. In addition, this participant seemed to emerge from the gamified course with tools required to pursue embark in this direction. *"This gamification and points has opened another door for me, is has given me an opportunity for self-learning. Gamification has not made any difference to how I learn; it has only made a difference on the Internet searches making me realize that I need to spend more time on the Internet. I think gamification would positively influence my mark."* (Interview ID 9). There is a degree of tension observed in that this participant seems to be uncertain of which aspects of their personal development is influenced by gamification. Another participant supported this view and also reported a change in their perspective on how they are learning, *"I think gamification is effective to most people but not to me … Gamification has changed my perspective on how learning can be done, and I think there has been a change in my work, but it is not much."* (Interview ID 4).

Since experiences around personal development relate predominantly to learning, it is worth highlighting that participants expected, at the commencement of the course, that gamification would enhance their learning abilities (91% agreement, median=4.00, variance=0.504). Whilst this does not relate directly to personal development, it may be argued that this expectation was partially met.

As depicted in Figure 7-23, with the exception of Masterminds and Conquerors, almost all profiles indicated that gamification added value in that it assisted in their personal development.

Figure 7-23: BrainHex vs "I believe that the experience of playing the game has assisted me in my personal development."
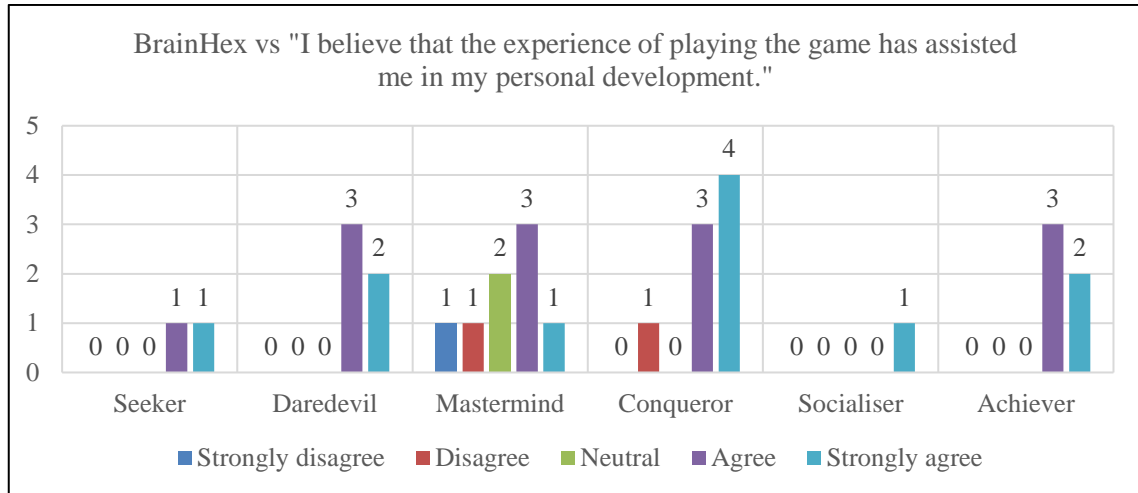
As discussed in the literature review, one of the predominant challenges with e-learning is a lack of engagement. Therefore, it was crucial to understand whether gamification motivated participants to engage on the gamified platform. At the commencement of the course participants expected that gamification would motivate them to engage with colleagues (62% agreement, median=4.00, variance=0.746). As depicted in Figure 6-18, participants shared their experience that gamification added value in the course through motivating them to engage (82.7% agreement, median=4.00, variance= 1.142). Thus, it would seem that their earlier expectation has been met and exceeded.

Turning to qualitative results, one Mastermind reported that gamification encouraged them to participate more in the gamified course, *"I would say gamification is effective to learning (in that) it makes you want to participate more on the course."* (Interview ID 6). In acknowledging the motivation to participate in the gamified course, one Seeker also highlighted the influence of gamification on collaboration, *"I think there is a link between collaborative learning and the game ... It encourages collaboration which is relevant to the real world unlike when you are just left alone to do research."* (Interview ID 12). Looking longer-term, possibly beyond just engaging in this gamified course, this participant also suggested that the connected nature of society gave relevance to gamification. They further suggested that this relevance was their catalyst for engagement in this course, *"The world is heading towards globalization where information is shared so gamification is very relevant ... Gamification has made me engage more with the course."* (Interview ID 12).

As discussed in the literature, one of the factors contributing to a lack of engagement in e-learning was a perceived lack of relevance in interactions on the part of students. In the context of gamification, a particular interviewee reported being motivated to engage as a result of gamification

and experiencing alignment between their engagement in the course and the progress in the game, *"I think gamification is effective, it allows me to engage better. Gamification plays a big role in my engagement with the course. When I engage I get to climb the ladder to the CEO position."* (Interview ID 7). Whilst this indicates that gamification contributes to solving the challenge of a lack of engagement in e-learning, this participant further implied that gamification encouraged them to foreground relevance in their learning and subsequent interactions, *"It has made a difference to how I study and learn because I have to find content based on the game."* (Interview ID 7).

Another dimension which emerged was the collaborative influence of gamification motivating participants to stand out from others in the crowd and make themselves heard. One such participant was an Achiever who was motivated by differentiating themselves from others, *"(Gamification) brings that competitive environment that makes you want to stand out from the crowd. My engagement in the course has increased due to the impact of gamification"* (Interview ID 11).

In terms of BrainHex, Socialisers and Conquerors displayed strong agreement with this statement (Figure 7-24). Furthermore, Seekers and all but one Achiever also agreed that gamification motivated engagement. Daredevils were seemingly undecided whilst Conquerors and Masterminds varied in their responses. Whilst the spirit of community and a sense of collaboration was present, these results imply that gamification did not initiate this spirit. Contextually, the group had been studying together for at least six months and probably experienced the sense of relatedness that was displayed. Thus, it is possible that gamification simply motivated people to engage existing relationships. Furthermore, it is also possible that participants were engaging offline as well.

Figure 7-24: BrainHex vs "I believe that the experience of playing the game has motivated me to engage with my colleagues on the platform."
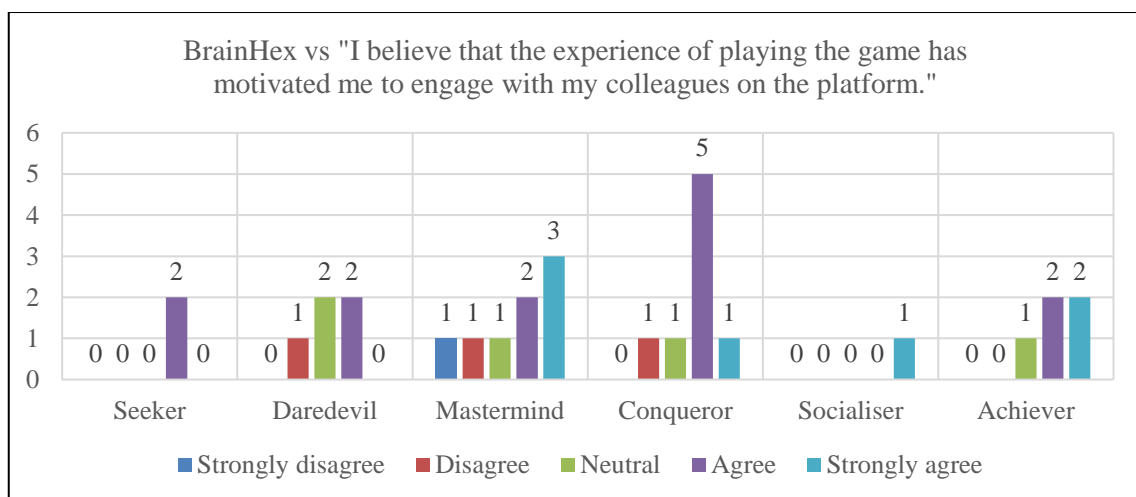
As a longer-term measure of the value of gamification, participants were asked if they believed that their experience would guide them in their intended career. As illustrated in Figure 7-18, participants responded positively to this statement, but a high degree of variance was observed (54.3% agreement,

median=4.00, variance= 1.201). This indicates that motivation to participate were varied in the nature.

A positive outlook was supported by the sentiments of an Achiever who viewed the course as giving insight into what they can expect in the future, *"This course has laid a foundation on what I would face in the future."* (Interview ID 11). Whilst this illustrates the characteristic of Achievers to be goal-oriented and motivation by long-term achievements, it also suggests that providing hints of what might occur also motivates Achievers. Since Daredevils are motivated by interest, curiosity and a sense of wonder, it is possible that they would also be motivated by such experiences.

As discussed, another recurring challenge facing e-learning is high attrition due to commitments outside the course demanding a student's time. A Daredevil expressed the view that gamification motivated excellence and time-management, *"You don't just do sloppy work, but you perform on time which is similar to what you do in the work environment where it is required that you do the work on time."* (Interview ID 1).

To understand what might have contributed to variance in this item, the researcher explored BrainHex profiles (Figure 7-25). Whilst Seekers, Achievers and Socialisers deemed that their experience would assist them in their career, Masterminds and Conquerors signalled a sense of uncertainty. Additionally, Daredevils and Masterminds disagreed, possibly since these profiles are motivated by shorter-term rewards as compared to Achievers.

Figure 7-25: BrainHex vs "I believe that the experience of playing the game will assist me in my career."
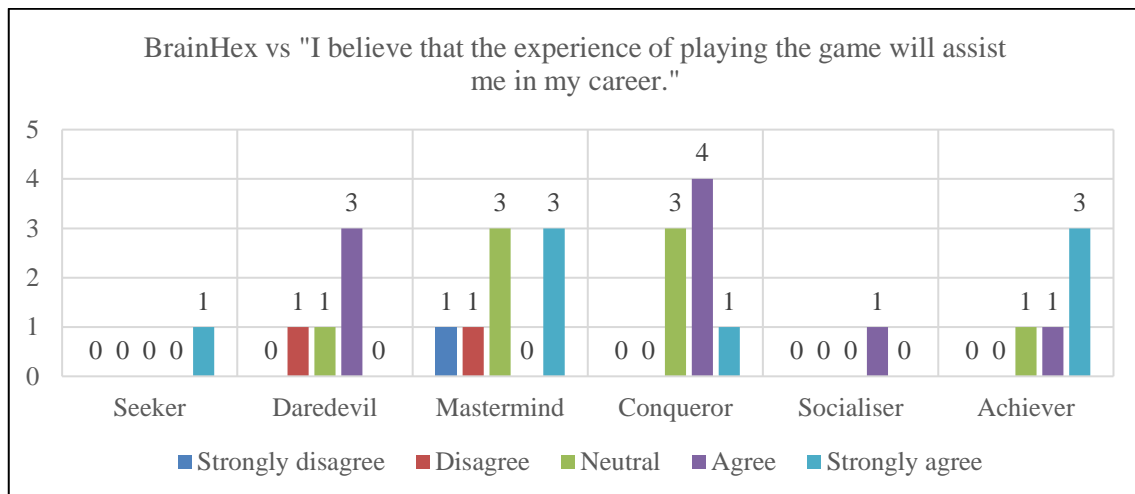
As indicated in the analysis, there was a sense that gamification provided value and proved to be useful (composite median=4.00, variance=0.527). However, a wide degree of variance was observed when analysing the items in this construct not related to academic activities (like engagement and value in intended career). Conversely, it can be concluded that participants experienced strong value in gamification when integrated into academic work, which is the focus and context of this study. Analysis of BrainHex profiles across the other items indicates that Masterminds, Daredevils and

Conquerors varied in their responses as they experienced some uncertainty and, in some cases, less value and usefulness from gamification. Nonetheless, results indicated that broad value and usefulness was perceived in the gamified course.

As the researcher shifts focus away from usefulness towards effort, the experience of a Conqueror may serve to bridge the gap, *"My friends are aware of the course and the gamified aspects of it at the beginning they did not understand the aspects of gamification and they once advised me to quit the course because gamification does not make sense. Some IT lectures also advised me to quit the course."* (Interview ID 9). As discussed, it is possible that this Partially Engaged participant approached friends and academics due to feeling a sense of demotivation. However, this result also raises questions on how to extract value for learning. Whilst this has been determined to be the case, the researcher highlights a tension emerging between value obtained and effort required, particularly when a new approach is being adopted.

This tension might have emerged as a result of advice provided to this participant by peers and academics. Despite this advice, they continued with and completed the gamified course. The researcher attributes this to the fact that this participant's BrainHex profile indicated that they would be motivated by winning despite adversity. However, this result introduces questions on the tenacity of participants in gamified courses with demanding workloads, particularly when seeking counsel from academics outside the gamified course.

7.3.3. Effort/Investment

Effort considers different motivation-specific contexts of individuals and explores their investment capacities in a specific task (Monteiro et al., 2015). This construct evaluates an individuals' investment in their capacities in what they are doing (Monteiro et al., 2015). As was presented in earlier analysis, participants' experiences of the gamified course and their sense of competence indicated that rewards were not sufficiently allocated for effort, but rather for achievement only.

As discussed, gamification of e-learning requires significant investment from academic and staff. Almost as a complementary measure, this construct explores the effort and investment that participants believe they have put into the gamified course.

Up until this point, focus has been placed on participants experiences of effort required for the course. It is crucial to determine level of effort and investment that participants perceived was required for the gamification. As such, participants were asked to respond to five statements in the end of course questionnaire (Figure 7-26). Based on these five items, a Cronbach's alpha score of 0.661 was obtained. A lower Cronbach's alpha score indicates a lesser degree of internal reliability among the items in the effort construct. However, given the mixed methods approach adopted in this study, the researcher believes that the qualitative results reinforce the quantitative results.

Figure 7-26: Effort/Investment
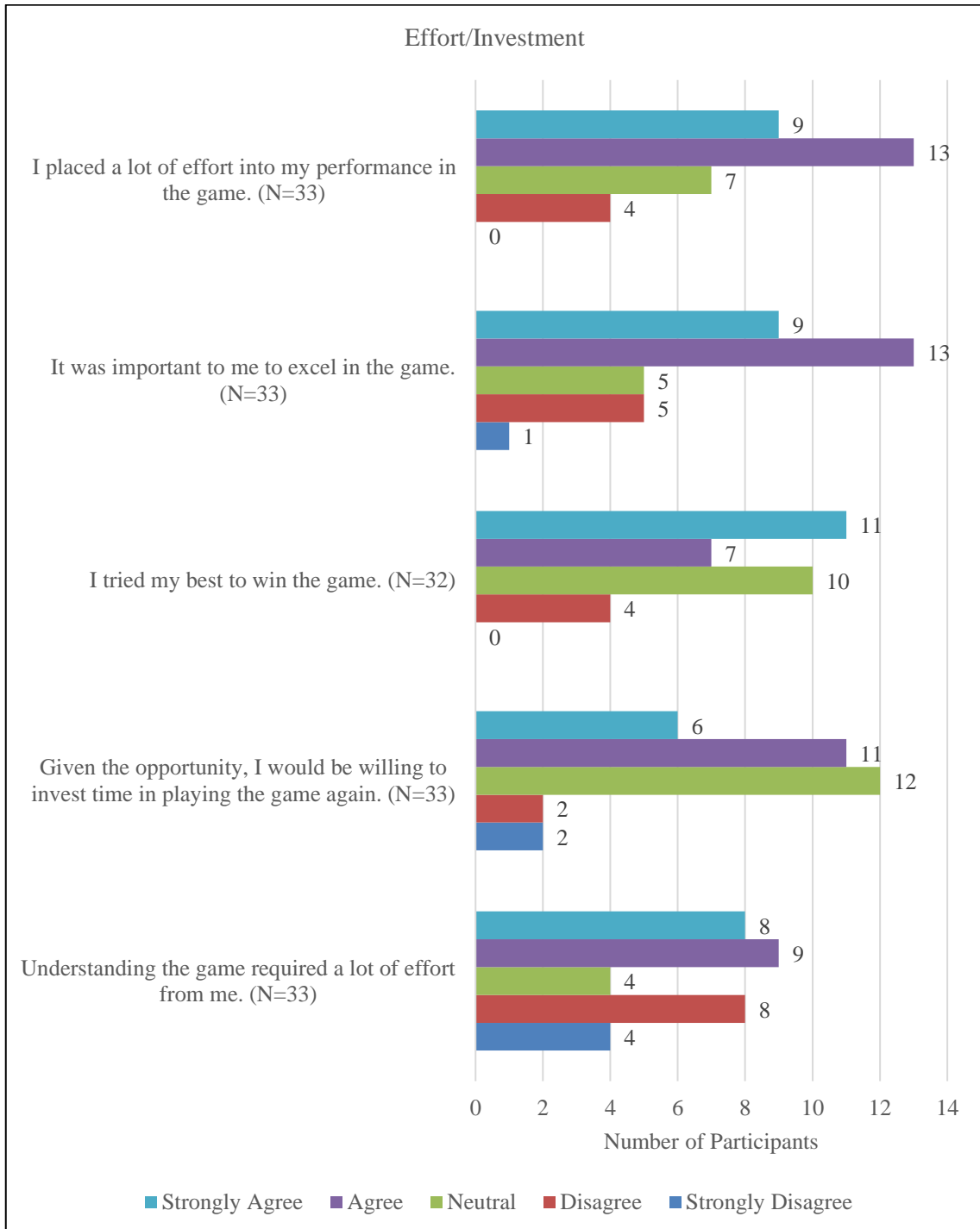
As illustrated in Figure 7-26, participants indicated that there was a high level of effort required in terms of their performance in the game (56.8% agreement, median=4.00, variance=0.966). The researcher argues that these results reiterate the need for simplicity in gamification design to prevent unnecessary levels of effort inhibiting motivation. Furthermore, this result also indicates the importance of adequate onboarding to ensure that participants navigate the course smoothly.

To explore the extent of effort required, the researcher turned to interview transcripts. A Daredevil described the level of effort that they deemed to be necessary whilst indicating how they handled

activities in the gamified course, *"I just try and look at what you want and what the course requires and when I have a basis of what you want and what the work requires, I look at what I can do extra. When you say, I should put pictures, I do not just put pictures. I go on YouTube and find relevant videos which relate to what we are discussing ... I do not believe in just doing work and just leaving it like that. I make sure that it is checked clearly and that it is of high quality."* (Interview ID 1). From here, it would seem that this participant was highly motivated to place effort in academic activities rather than the gamification.

On the other hand, an Achiever explained the extent of effort required to engage with the gamification and earn rewards in a context which demands greater academic engagement, *"Gamification at an honours level is hard work; maybe if it was at third level everyone would get badges for logging in and something like that but at honours level you have to work for everything. ... I had to put an extra effort to move towards number 19 and if I skip another task I would be behind."* (Interview ID 5).

From the two experiences cited above, there seems to be a level of distinction emerging between the academic aspect of the course and the gamification. Whilst this is apparent among these two participants, earlier analysis indicates that many participants did not make this distinction. As discussed, this has positive and negative implications for gamification. Since both the course and the gamification were linked to common objectives, pursuit of game rewards would have resulted in pursuit of learning objectives and vice versa. This is supported by the fact that the winner in the gamification obtained the highest mark for the course.

In terms of BrainHex (Figure 7-27), the greatest degree of effort was perceived to be observed by Conquerors followed by Masterminds, Achievers, Daredevils and Seekers. Some Daredevils, Masterminds, a Socialiser and a Seeker provided neutral responses which hints that they may have been uncertain about their efforts. Additionally, a Mastermind, a Conqueror and an Achiever indicated that they did not dedicate as much effort into the gamification.

Figure 7-27: BrainHex vs "I placed a lot of effort into my performance in the game."
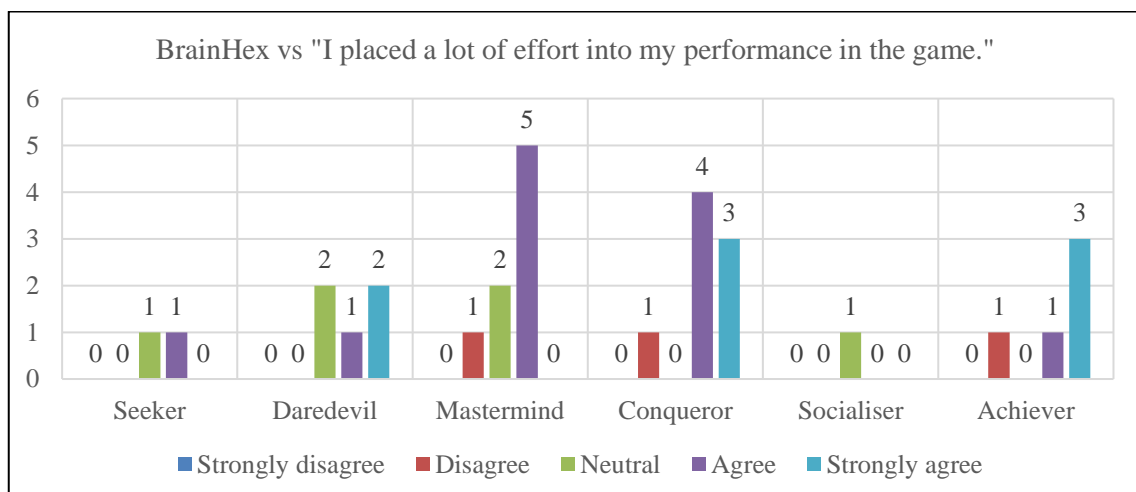
As illustrated in Figure 7-26, participants viewed excelling in game, and by implication the course, as important (62.8% agreement, median=4.00, variance=1.267).

In order to understand this further, the researcher explored these results in the context of BrainHex (Figure 7-28). As depicted, all Achievers considered it important to excel in the game. This indicates that the longer-term achievement of positive performance in the game and the smaller activities contributing to such performance motivated Achievers. Similarly, results indicate that the Socialiser also attached significance to excelling in the game. In keeping with their profile, Masterminds and Conquerors also attached importance to excelling in the game. However, some participants deviated slightly. Seekers also attached a degree of importance at obtaining excellence. Lastly, keeping in mind the profile of Daredevils, results indicate that importance was not attached to excelling in the game, possibly due to the gamified course not providing the level of thrill and suspense necessary to motivate them.

Figure 7-28: BrainHex vs "It was important to me to excel in the game."
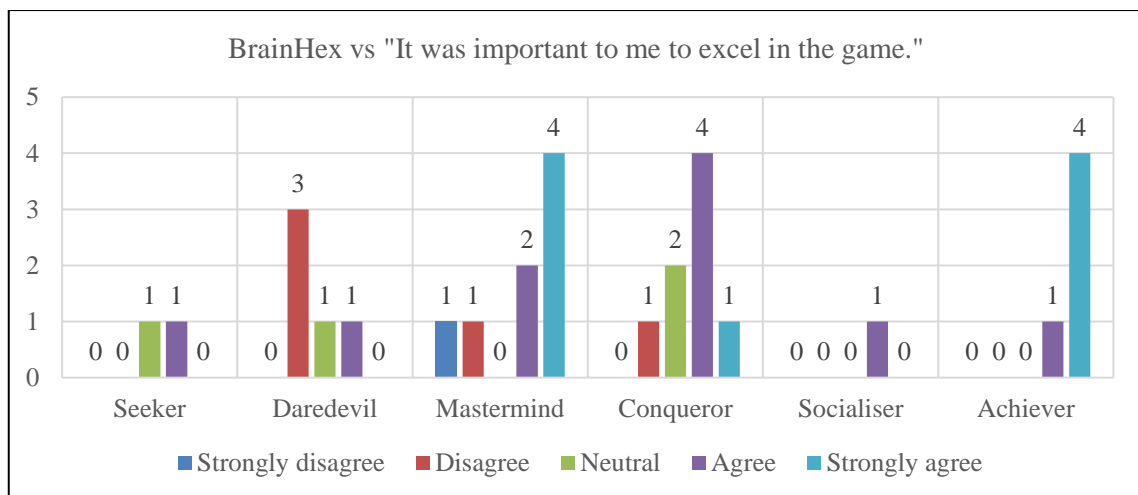
Whilst excelling was desired by many participants, the researcher then sought to understand which participants might have tried to win in the gamification. As indicated in Figure 7-26, some participants tried their best to win in the game (51.4% agreement, median=4.00, variance=1.144). The most noticeable shift here is that a lower proportion of participants pursued a win as opposed to excellence. Whilst this indicates that a sense of reality prevailed that everyone cannot win, it also signalled some sort of a shift away from the spirit of community.

To explore the sense of reality, the researcher observed the sentiments of a Conqueror who, upon realisation that they would not win within the game, experienced less tension. However, it seems as though this participant was motivated to give their best in the game. Said this participant, *"I am more relaxed now because I know I will not be the CEO since there are only three activities left. Looking at the progress bar, I can already see that I won't make it. I know my chances now, I just have to relax and do what I can do. I just want to be on the top 5."* (Interview ID 9). Based on this, it is

evident that the nature of receiving and analysing feedback resulted in this Conqueror deviating from the need to triumph over everyone else. However, this participant has not deviated significantly from their profile as they still have their heights set on triumphing over most of the other participants in the group.

In terms of BrainHex (Figure 7-29), Achievers and Seekers indicated that they passionately attempted to win. This indicates that Achievers are also motivated by triumphing over peers in a similar manner to Conquerors. Whilst Seekers are not typically motivated by winning, it is possible that the sense of curiosity and wonder experienced by this participant led to them wanting to uncover the sensation of winning. Midway through the spectrum, Daredevils and the Socialiser provided predominantly uncertain responses. Masterminds and Conquerors provided varying responses to this statement. It should be noted that this question was posed at the end of the course and responses might be influenced by the fact that participants are providing responses with a sense of regret at not winning.

Figure 7-29: BrainHex vs "I tried my best to win the game."
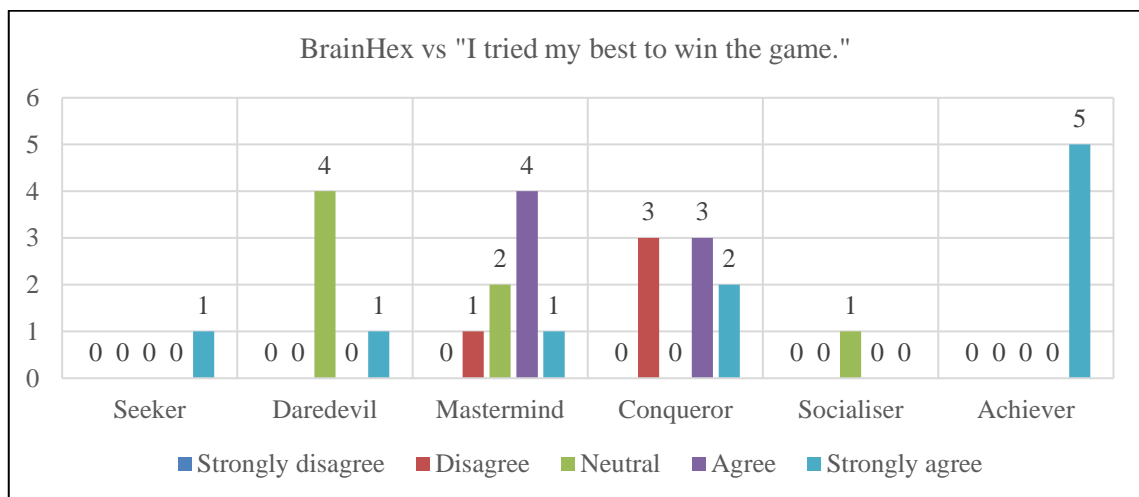
As a measure of the sustainability of gamification, participants were asked if they would be willing to invest time in playing the game again. As depicted in Figure 7-26, some participants replied positively with many providing a neutral response (48.1% agreement, median=4.00, variance=1.133).

Various factors could have contributed to this result. These include not wanting to play the same game twice, frustration at not being rewarded for their effort or their perception around workload in the gamified course. Nevertheless, this result raises the question of the longer-term sustainability of gamification. However, when analysing other similar findings discussed, it is likely that participants would be willing to engage in another instance of gamification and gamified e-learning.

In terms of BrainHex, Achievers and Socialisers indicated willingness to engage the gamification again (Figure 7-30). The goal-oriented approach motivated by a longer-term outlook is clearly visible

through their willingness to engage the gamification again. Seekers were uncertain whilst Daredevils, Conquerors and Masterminds provided varying responses.

Figure 7-30: BrainHex vs "Given the opportunity, I would be willing to invest time in playing the game again."
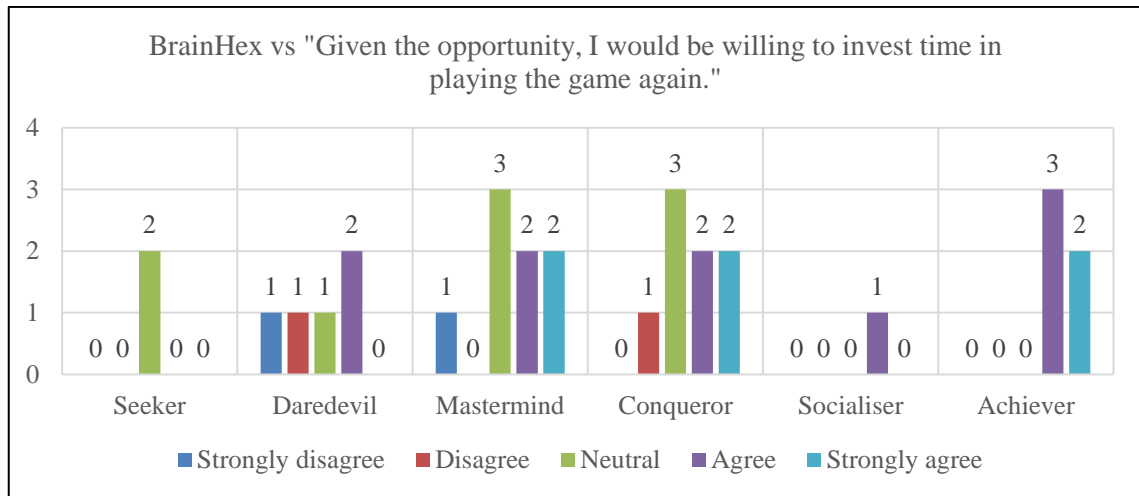
The last item exploring effort and investment explores the level of effort that was required at the outset. As depicted in Figure 7-26, participants indicated varying degrees of effort required to understand the game, but tended toward indicating a high degree of effort was required (48.6% agreement, median=4.00, variance=1.955).

This suggests that onboarding was not adequate for a large proportion of participants. As discussed, onboarding was done face-to-face, and a game guide was provided. Based on these findings, it becomes necessary to explore other techniques for onboarding participants in a gamified course.

In terms of BrainHex (Figure 7-31), Achievers and Socialisers indicated that a high level of effort was required. Other profiles provided varied responses with the greatest variance presented by Conquerors.

Figure 7-31: BrainHex vs "Understanding the game required a lot of effort from me."
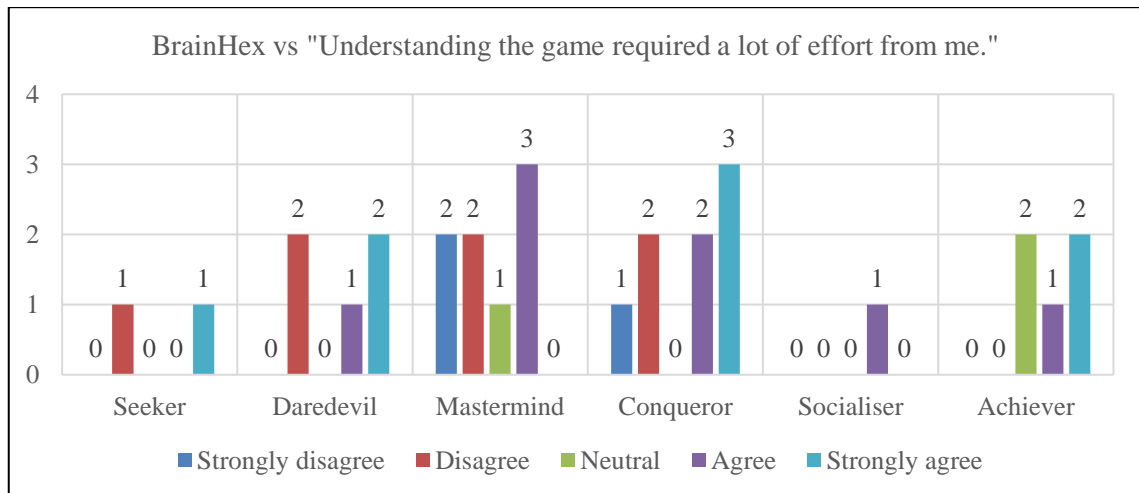
In essence, analysis indicates that a considerable degree of effort was required from participants to engage with the gamified course (composite median=4.00, variance=1.047). Whilst most of the efforts were positive around excellence, winning and performance, participant also varied in responses relating to understanding and engaging the gamified course again. In terms of BrainHex profiles, Socialisers and Achievers suggested that effort influenced them the most whilst other profiles varied in their responses to items. Despite this, it is necessary to state that whilst participants reported uncertainty or that effort was required, they continued to engage the gamified course, though with some tension.

7.3.3.1.   Influence of workload on effort

At this point, a discussion on the experiences of the workload in the gamified course is presented since workload relates directly to effort and emerged as a commonly recurring theme. Whilst many participants discussed their experiences in terms of workloads, there seemed to exist confusion between whether this was as a result of the gamification or the course.

As discussed, participants were invited to attend interviews after each of three topics in the ISTN731 course. This approach was adopted to allow the researcher to understand how students' motivation in terms of workload fluctuated through the course. Analysis is presented chronologically.

Earlier in the course, participants shared experiences of the workload in the course. One, a Socialiser, shared an experience that whilst gamification was good for the ISTN731 course, it was seizing time from other modules, *"The gamification of the course is time consuming, this is a good thing for the course itself, but it is not good for the entire Honours programme. You always find something interesting on gamification which may cause you to stop working on other modules and focus on gamification."* (Interview ID 2). This participant also discussed the implications of the greater workload brought about by gamification, *"If the workload was less people would interact more."* Whilst interaction and collaboration were important to this Socialiser, they indicated that additional demands of a gamified course and seemed to find it a necessary inconvenience.

The researcher contends that the course provided the additional workload in that activities required students to dedicate time and engage. The role of gamification here was to motivate students to complete the activities. Hence, their frustration was arguably misdirected at the gamification instead of the course. Whilst this poses challenges for the sustainability of gamification, the fact that participants still engaged signifies the overarching motivational influence of gamification. Perhaps, in keeping with the BrainHex profile, the frustration experienced here might be due to others not socialising on the gamified platform to the extent to which Socialisers would have expected.

Another interviewee, who was a Conqueror, shared an experience of the increased demands of a gamified course as being motivational whilst adding some extra workload, *"I think the deadlines are*

definitely a motivation for the course. I meet the deadlines to get the points and to keep up with the workload. I am highly motivated by the gamification aspect. I wouldn't use the word burden but would say that gamification does add a little bit extra to the workload." (Interview ID 3). In terms of gamification adding the extra workload, this is possibly due to the fact that each week, the game presented participants with deadlines to meet in order to achieve rewards. This motivational drive experienced by this participant is in alignment with their BrainHex profile as Conquerors strive on overcoming a difficulty. Whilst this participant shared this positive somewhat-resilient experience earlier in the course, it seemed to wane slightly in the end-of-course questionnaire where this participant stated, *"Sometimes the deadlines were tight, especially given our commitments in other courses."* (End-of-course questionnaire ID 25). Whilst these pressures were associated with the workload in the ISTN731 course and other courses, these pressures seemed to flow over into the gamification.

Midway through the course, participants shared their experiences of the workload. As the course progressed, the workload began to intensify across the academic programme, thus demanding more effort from participants, *"Gamification and e-learning is good if the audience has more time to do the work, now we have a research to do and other modules. I wouldn't say that the game is time consuming."* (Interview ID 9). Another participant indicated that this increased workload across the programme resulted in less time to engage on the gamified platform. One Mastermind shared a similar experience, *"I access the programme once a day because there are so many other things to do. The workload is excessive on its own. I do not face challenges with sourcing the content; I just lack the time to make it more conversable."* (Interview ID 6).

On the other hand, there were participants, like this Conqueror, who seemed to be more comfortable with the increased workload: *"I do not find the gamification aspects as an extra weight or burden."* (Interview ID 8). Another participant seemed to experience tension in that they found the workload time consuming but seemed to be in a position to manage it, *"I would say it is time-consuming, but it doesn't affect my academic schedule. I am able to balance my workload with the gamification and I am comfortable with the platform."* (Interview ID 7).

Towards the end of the course, three interviewees shared their experiences of the workload and they seemed to have adjusted to the demands of a gamified course. One Conqueror seemed to display this, *"Gamification does not affect my academic schedule. To some extent gamification does become a burden to my work; it sometimes put pressure on me to try and get on the leaderboard or get points."* (Interview ID 10). It seems as though this participant converted the pressure being experienced into a motivator. Additionally, the burden being discussed here seemed to be related to the burden to excel in the game. The nature of the burden being discussed here was not course-related but led to the participant engaging the course material.

When analysing how participants might have adjusted, an Achiever indicated that advanced planning was essential, *"There are no cost implications and it did not affect my academic schedule. I would plan in advance knowing that at this particular time I have to focus on a particular course. I do not find gamification to be a burden; instead it has encouraged me to learn."* (Interview ID 11). Whilst strategising and planning is more the motivational driver of a mastermind, the goal-oriented nature of Achievers supports this result.

There was one participant, the Socialiser, who did not adjust to the game initially but ended the course performing well. When the researcher probed further, this participant shared the following experience, *"I would say the game aspect was not motivating at the beginning of the course since I am a family woman with three children and a husband, I did not have time to play games, I just wanted to go straight to the core. I do not give more than necessary/demanded time, so I do not find it time consuming."* (Interview ID 12). Whilst it would seem that this participant did not perceive a distinction between the course and the gamification, they explained that they focused on the academic work relating to the course. The fact that this participant ended the course motivated by their strong performance highlights importance of striving for alignment between game and learning objectives.

In the end-of-course questionnaire, three participants opted to share their experiences in relation to the workload. Participants had varying experiences. One participant, an Achiever, shared a positive experience which encouraged engagement with peers, *"It was a fun course and there a lot work I was able to communicate with my fellow colleagues and chat to other team members."* (End-of-course questionnaire ID 33). Two participants shared experiences of feeling pressure due to factors outside the course. Said one participant, *"Nearing the end with all the other deadlines that we had it did become a little challenging to complete the tasks on time."* (End-of-course questionnaire ID). A similar experience was shared by a participant who, despite the intense workload, reported being motivated by their experience of the rewards mechanism as fair. Additionally, this participant attributed the workload to factors outside the course, *"I felt that the workload was too much, but I realised that the assigning of badges and points was very fair. This helped me to try and do my best even though I felt like the work was unmanageable at some point, where we had other tests and assignments."* (End-of-course questionnaire ID 4).

When considering integrating versus applying gamification to the course (as discussed using the example of icing on a cake being application versus icing in between layers in a cake being integration), a different picture emerges when it comes to workload. Participants seem to perceive gamification as adding additional work on top of their existing workload rather than serving to motivate them to complete activities that they would otherwise complete. Whilst many participants suggested that they were spending additional time on the game, the reality is that they were completing academic course-related activities. Whilst this is the desired outcome, these results signal that gamification in the context of high-workload courses and programmes must draw a

differentiation between the course-related and game-related activities. The correct balance is crucial to ensure the right level of motivation and tension.

7.3.4. Tension/Pressure

Developed as a negative measure of intrinsic motivation, tension explores whether individuals experience pressure to succeed at a given task (Monteiro et al., 2015). Whilst tension can be a constructive emotion in learning and competition, caution should be extended that it may also result in disconnection from a task.

To determine tension and pressure, participants were asked to respond to three statements in the end-of-course questionnaire. However, the researcher removed a statement which asked participants if they felt relaxed while playing the game as its inclusion compromised the reliability of the construct. Therefore, participants' responses from two statements were utilised in the analysis (Figure 7-32). Based on these two items, a Cronbach's alpha score of 0.870 was obtained.

Figure 7-32: Tension/Pressure
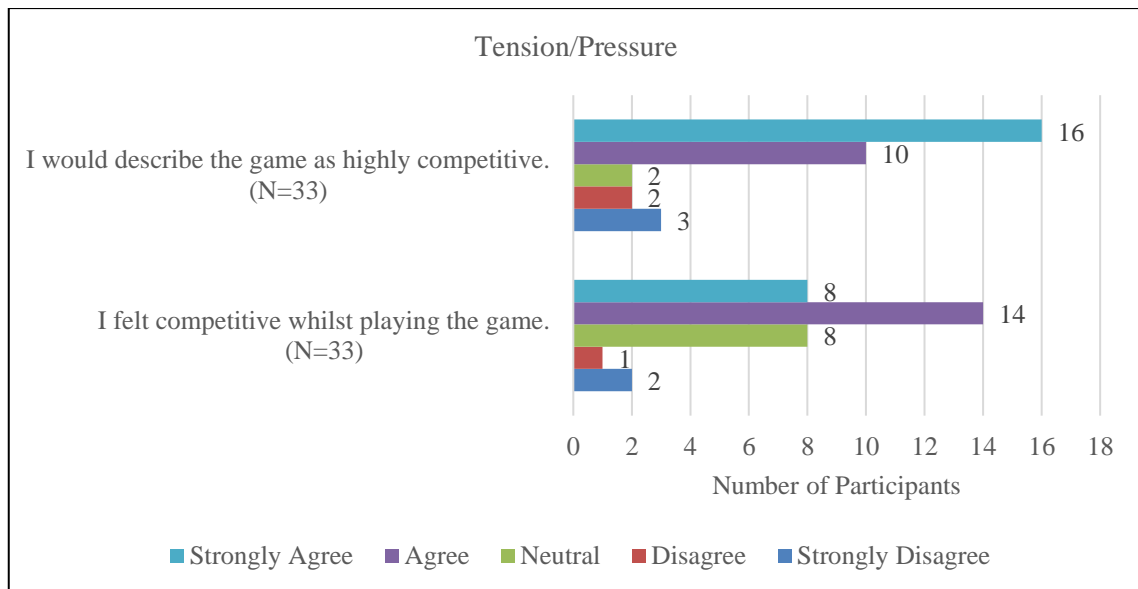
As illustrated in Figure 7-32, participants described the game as highly competitive (74.3% agreement, median=4.00, variance=1.655). However, there was a higher degree of variance of in these results.

The researcher explored interview transcripts for further insights into the influence of tension on motivation. A Mastermind reflected on the emotional tension introduced by gamification which encouraged competitiveness, *"The game bring emotion out the way it is so competitive."* (End-of-course questionnaire ID 18). However, due to this degree of tension, this participant also voiced a sense of caution, *"But again, if you are not performing well, you can easily lose interest."* A suggestion is made here that whilst competition piques one's emotions, this influence may turn out

to be negative based on their perceived performance and competence in the game. When considering this against that backdrop of the demotivated experiences of participants who did not obtain rewards, it would seem that a fine line exists between success and failure of gamification in terms of the tension.

In terms of BrainHex, the perception of the game being highly competitive was experienced across all profiles to varying degrees whilst Daredevils and Masterminds provided varying responses (Figure 7-33).

Figure 7-33: BrainHex vs "I would describe the game as highly competitive."
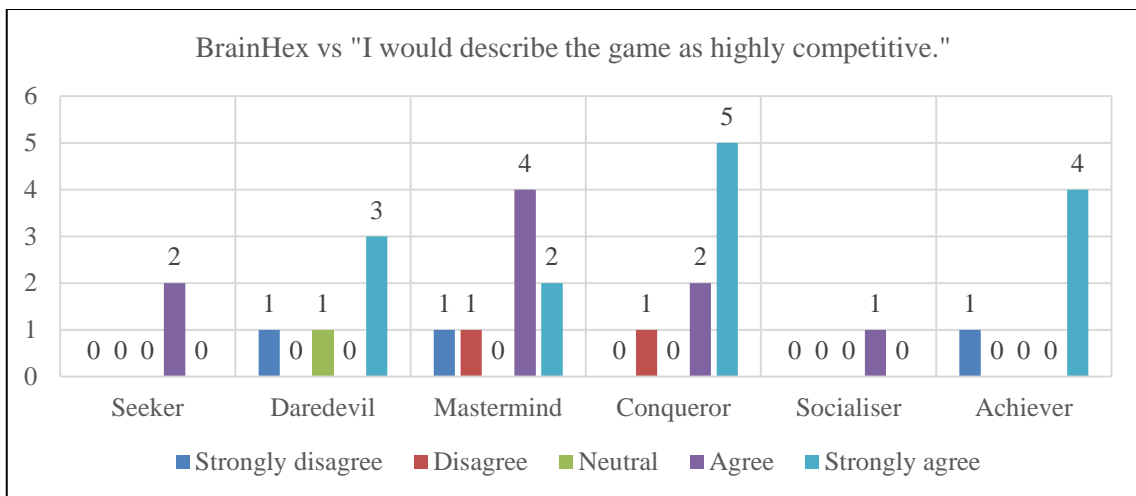
Moving away from students' perceptions of the competitiveness in the gamified course, the researcher also sought to understand the level of competitiveness experienced by participants themselves. As illustrated in Figure 7-32, participants reported experiencing a sense of competitiveness whilst playing the game (62.9% agreement, median=4.00, variance=1.127).

A Conqueror encapsulated participants level of competitiveness through a suggestion that participants were experiencing a sense of being divided as a group, *"At this stage the gamification is still nice, but our minds are divided within ourselves."* (Interview ID 9). This comment suggests that the tension being experienced within the individual is challenging the spirit of community observed among participants. Despite competitiveness being encouraged by the game elements being utilised, a debate emerges on the disruptive nature of the tension being experienced. If one were to analyse the language used by this Conqueror, who would be motivated by triumph against peers, they describe gamification as being "nice" whilst remaining seemingly undecided. In their choice of words, this tension is visible.

In order to understand the nature of the variance in terms of competitiveness experienced by participants, the researcher analysed participants' BrainHex profiles (Figure 7-34). A wide degree of variance and a predominant neutral response was observed among Daredevils. Whilst Daredevils are motivated by thrill, suspense and being on the edge, results indicate that they did not experience a

strong sense of competitiveness and tension. Since the gamified course followed a corporate storyline and gamification was being applied to an academic activity, the storyline did not present thrill and suspense as dominant traits. However, limited badges and shifting deadlines were utilised which, as discussed earlier, seemed to demotivate some participants. Similarly, Masterminds, who are motivated by solving difficult puzzles, strategising and driving efficiency, also presented a wide degree of variance. These results suggest that perhaps the gamified course provided a sufficient level of competitiveness to most Masterminds but perhaps did not cater for all. Socialisers also provided a neutral response whilst Achievers and Seekers reported experiencing a predominantly positive level of competitiveness.

Figure 7-34: BrainHex vs "I felt competitive whilst playing the game."
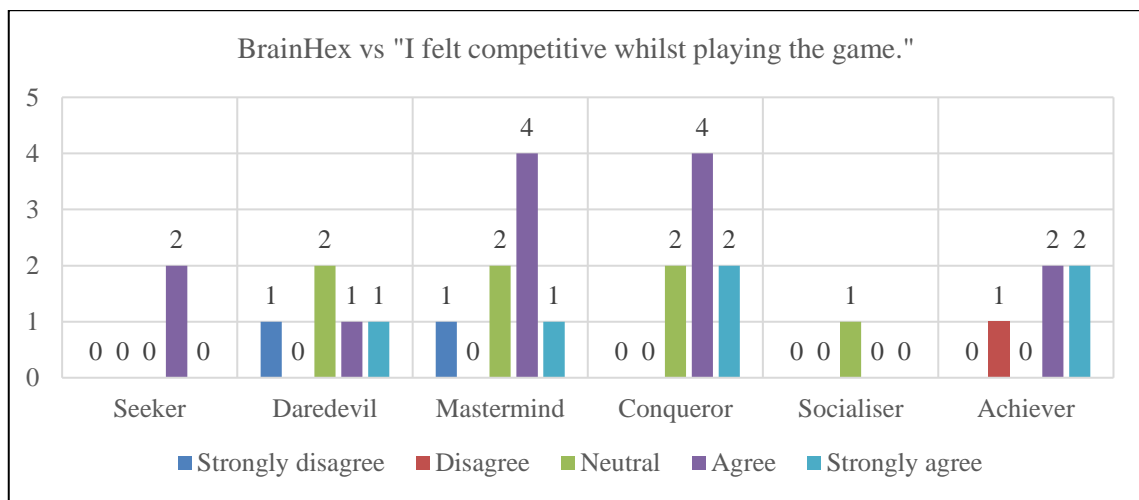
In terms of the tension construct, as illustrated in Figure 7-32, it is without doubt that tension was experienced (composite median=4.00, variance=1.091). Whilst tension may be seen as a positive emotion by some, it emerged that tension contributed negatively to motivation. In seeking a solution for the sense of tension experienced, one Conqueror offered insight to overcome the tension and maintain a moderate sense of competitiveness, *"Gamification is effective for learning, but it should be applied as a short-term intervention, not something that should be permanent because people get used to it."* (Interview ID 10). A number of factors are discussed here. The most predominant is fatigue as a result of gamification being a factor contributing to the tension experienced. This is supported through analysis of the login patterns of participants (depicted in Figure 5-17) which illustrate that the number of sessions dropped towards the end of the course. Hence it is apparent that the length of the gamification contributed to the tension experienced.

7.3.5. Summary – Motivational influence of gamification from the perspective of IMI

From the perspective of interest/enjoyment, participants experienced interest and enjoyment from gamification (composite median=4.00, variance=0.704). Upon analysis, it emerged that experiencing a sense of community resulted in increased interest and thus enhanced motivation. In terms of interest, analysis suggest that interest in the gamified course increased when participants' peers were

motivated, by gamification, to engage. Furthermore, participants derived interest from the industry relevance of the gamification and the course. This also resulted in participants comparing the gamified course to other courses in the programme. Analysis suggests that industry relevance was a longer-term motivator whilst gamification motivated in the short term. Participants also attributed increased interest to the constructivist pedagogy and, cautiously, to a sense of competition. Since results indicate that interest was not at a constant level throughout the course, questions of sustainability emerged. Additionally, analysis suggests that gamification tailored to individuals may also positively influence interest.

In a similar manner, participants experienced a sense of enjoyment from gamification being integrated into the course. Enjoyment was also derived through experiencing the storyline, collaboration with peers, and the stimulating manner of learning. Participants also indicated that they would encourage future students to enrol in the course because of the presence of gamification.

As far as value/usefulness, participants experienced gamification as being valuable (composite median=4.00, variance=0.527). However, this sense of value centred around academic work. The greatest value-contribution of gamification was towards enhancing understanding of course content. Gamification also encouraged participants to improving their skills relating to research, writing and knowledge acquisition. In positioning gamification as being valuable and effective for learning, participants indicated that it incorporates game elements familiar to them whilst challenging them to reassess and reflect on how they learn. Participants also reflected on the value of gamification in tracking their progress in both the game and the course. Furthermore, participants indicated that they derived value from gamification since it motivated increased efforts towards their academic work by creating a fun atmosphere which was conducive to investing in their academic work. Participants also noted personal development in terms of gamification motivating self-directed learning. Whilst the course itself strongly encouraged self-directed learning, it seems that gamification nudged students in that direction. Similarly, participants were also motivated by engagement with peers with participants realising the value of collaborative learning and engaging with relevance in mind. Whilst there was variance, participants believed that gamification provided exposure to what they might encounter in their careers.

In terms of effort/investment, participants reported that the game required significant effort (composite median=4.00, variance=1.047). Within this, they indicated that there was a high level of effort required in terms of understanding the game which suggests that onboarding needs to be explored and other techniques should be tested. Similarly, participants indicated a high level of effort required in their game performance. There also seemed to emerge a tension in the experience of some participants in that academic activities served as a stronger motivator than gamification. However, it also emerged that gamification also motivated participants to strive to achieve and engage academically. In that light, participants also deemed it important to excel in the game. Since the game

was tied to learning objectives, this implied importance being associated with excelling in the course. Keeping with the theme of pursuing excellence, participants also indicated, albeit to a lesser degree, that they tried to win the game and triumph over peers. Whilst not everyone could have won and despite participants experiencing a rather considerable level of effort required, they indicated willingness to play the game again, though to a much lesser extent.

In relation to effort, participants reported experiencing the workload in the gamified course as being demanding as result of gamification and other commitments in the wider Honours programme. Within these results, there emerged a tension in terms of whether the workload was due to gamification or the course itself. Results seem to suggest that most participants did not perceive a difference between the gamification and the course, probably due to the perception of gamification being integrated into the course. As the workload in other courses began to intensify, participants reported spending less time on the gamified course whilst others reported adjusting their routines to continue engaging the gamified course. This occurred to an extent that some participants sought motivation from the pressure. This was evidenced by the statement of one Conqueror, *"I will miss this module, it was so unique and (a) good experience, even though there was too much work :)"* (End-of-course questionnaire 4).

Pressure influenced participants motivation coupled with the presence of a significant degree of tension (composite median=4.00, variance=1.091). Whilst participants described the game as highly competitive, a high degree of variance accompanied this response. This variance may be attributed to a strong sense of emotional tension which participants suggested might only work for those performing well in the game. In terms of themselves, participants also indicated experiencing a sense of competitiveness. Again, a high degree of variance was observed. This may be explained by participants expression of their sense of community being challenged as gamification left some people divided in their view on gamification. Whilst they acknowledged that gamification was effective for learning and introducing a sense of competitiveness, an argument was presented that gamification only as a short-term intervention might yield greater benefit.

In terms of BrainHex profiles, degrees of motivation varied among participants (Figure 7-35). Notably, Daredevils and Masterminds displayed a lesser degree of intrinsic motivation whilst Conquerors, Seekers and Achievers reported a stronger degree of intrinsic motivation. As far as individual constructs, Socialisers experience a strong degree of value but a low degree of tension.

It should be noted that this figure is based on weighted scores of the motivational ranking of each construct within SDT whilst giving consideration to the fact that profiles may comprise a different number of participants.

Figure 7-35: BrainHex vs IMI

BrainHex vs IMI
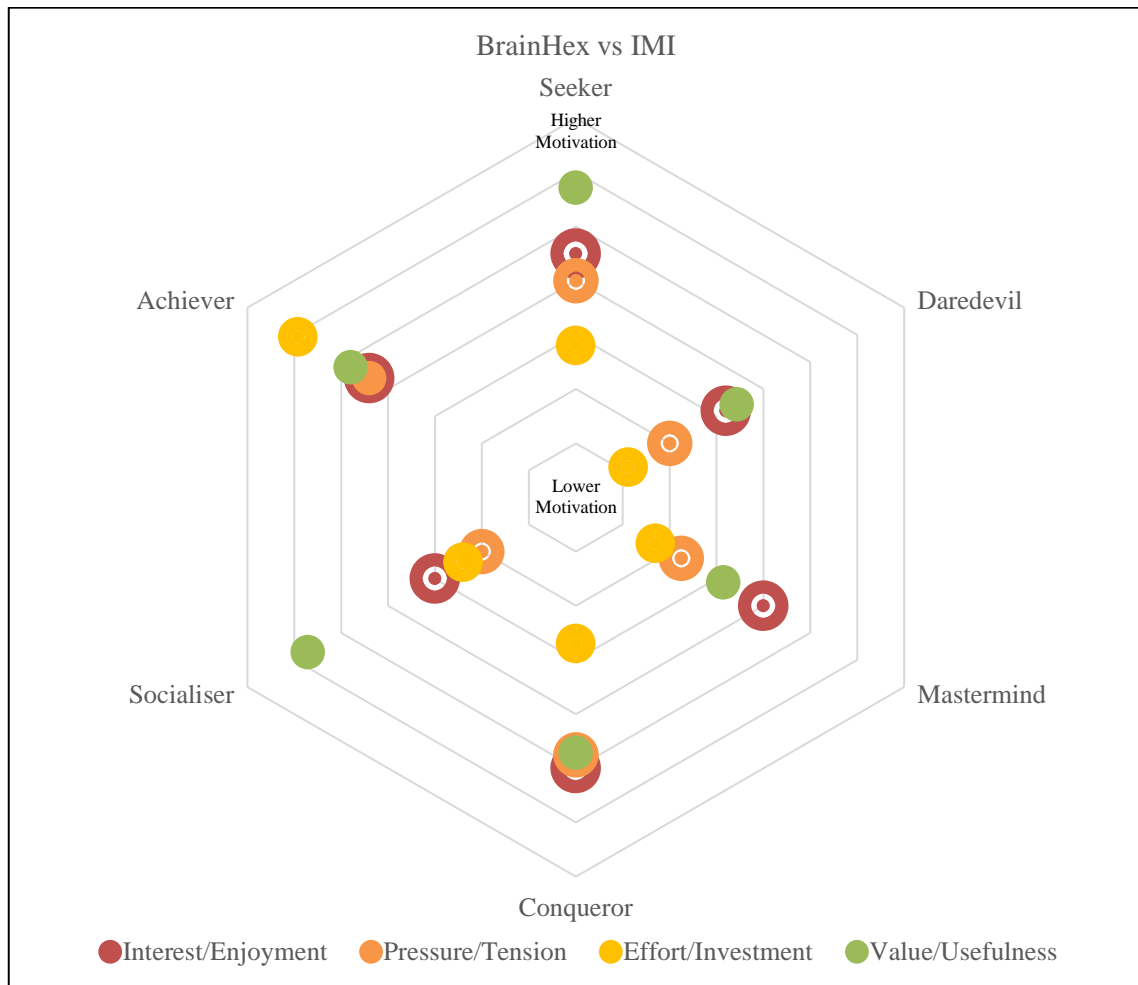
7.4. Amotivation

As discussed, an additional dimension of motivation warranting discussion is the concept of amotivation (a lack of motivation), which Deci and Ryan (2000) identify on the continuum of self-determination. Whilst participants indicated that they were motivated by gamification, there were instances where a strong sense of demotivation was experienced. If unconsidered, amotivation could result.

Other than the factors already discussed, the researcher presents two categories of demotivated participants which emerged. Participants falling into these categories may not experience the motivational influence of gamification. Whilst these discussions include reference to the BrainHex profiles of participants who fell into these categories, the researcher argues that players may fall into these categories based on certain experiences and circumstances, regardless of their BrainHex profile.

7.4.1. Fallen-through

Participants who the researcher classifies as having fallen-through have previously experienced motivation as a result of obtaining rewards, recognition or rank in the gamified course. Once these rewards, recognition and rank were no longer obtained, a sense of demotivation and despondency prevailed.

Experiences shared by these participants indicated a sense of loss on the part of the participant. One Conqueror fell into this category due to this sense of loss, *"I was once very motivated by the badges but lost the motivation when I worked so hard but didn't get a badge."* (Interview ID 8). In addition to sharing this view during the course, this participant also shared this experience at the end of the course, *"I think rewards for people who work hard should be included. There were some cases in which I myself put a lot of effort into my work but was given no recognition. This is something demotivating."* (End of course questionnaire ID 26). This result suggests that a possible intervention to ensure that participants do not fall through is to award effort made towards an objective rather than awarding only achievement of the objective itself. Gamification rewarding effort introduces a clear distinction between how marks can motivate versus how gamification can motivate. For instance, marks are rigid and formal in nature whilst gamification rewards offer flexibility and does not demand a similar level of formalness.

A further example may be found in the experience of a Conqueror who dropped from a position in the top 3 and did not understand why they some missed badges, *"At first I was on the top 3 and then dropped but I was still on the top 10, since I was getting less recommendation to my work, so I started putting less effort. Being out of the top 10 motivated me to work hard and get back to the top 10. I felt as if some people were undeservingly rewarded and would look through some peoples work and could feel that it wasn't worth the badges they were being given however there were some that I felt were deserving. The fact that there was once a time where I did not do well in the course sort of demotivated me however gamification has encouraged me to look for content."* (Interview ID 10). This view was also shared by another respondent, *"The gamification was great, although for some activities, I did not understand how I missed some of the badges."* (End of course questionnaire ID 17).

As the game designer, wat is easier to re-engage these participants and motivate them to engage in the gamified course. Re-engagement techniques included guidance, mentoring, easy-win badges and points. Once participants had been re-engaged, their level of motivation was increased once again.

7.4.2. Fallen-off

Participants who the researcher classifies as having fallen-off have also previously experienced motivation as a result of obtaining rewards, recognition or rank in the gamified course. However, due to some external factors, these participants stopped engaging in the game for an extended period of time, such that achieving reward, recognition and rank were no longer possible.

Since the progress of the gamification was tied to the academic structure course, catching up in the gamification after an absence was not possible. Upon returning to the gamified course, these participants realise that they had fallen behind, both in the game and academically. Upon realising this, a deep and almost disabling sense of demotivation prevailed. These participants never obtained missed rewards as the gamification had progressed. Whilst participants might have perceived falling off as a negative outcome, gamification alerted them to the fact that they also fallen behind in the course. They were able to go back and catch up on academic work. It is argued that without gamification, these participants would not have grasped the extent to which they have fallen behind academically.

One Mastermind offered insights which explained this, *"I wasn't on campus for two weeks and I think sometimes my lack of understanding on what is required by the course has made me land on number 25 on the leaderboard ... With gamification, you cannot predict what is wrong or correct."* (Interview ID 6). Additionally, this fallen off participant also experienced a sense of uncertainty with gamification which might have also played a demotivational role.

Another participant who was present on campus, but did not engage the gamified course for two weeks due to factors external to the course, also shared an experience of falling off, *"Basically, the way I understand the game from an academic side I can just say it is a way to keep us focused but as for me, it no longer works. I think I didn't do my work on time, so I dropped. The work I did in the past two weeks was sub-standard due to time constraints. Anything else would have been my fault; I failed to manage my time or to organize myself."* (Interview ID 4).

As the game designer, it was difficult to re-engage these participants and motivate them to engage in the gamified course. Possible re-engagement techniques grounded in gamification, though not feasible in this study, include guidance, individual mentoring, easy-win badges and points. Additionally, the researcher believes that a separate instance of gamification, possibly through an alternative storyline tailored to students who do fall off, would play a role in re-engaging fallen-off participants. However, such an approach might prove to be demanding in terms of resources.

7.5. Summary of the influence of gamification of e-learning on motivation

Based on the analysis, participants experienced a moderate but significant degree of self-determination, based on SDT, in the gamified course (composite median=3.75, variance= 0.363). However, they reported a stronger degree of intrinsic motivation, based on IMI, (composite median=3.94, variance=0.439). Whilst SDT and IMI are related and complementary, this indicates that a sense of value, interest, effort and managing tension may serve a greater motivational role for participants as compared to designing gamification solely considering autonomy, relatedness and competence.

Ultimately, gamification positively influenced motivation in the gamified course (composite median=3.88, variance= 0.360). This was despite some aspects of participants' experiences which negatively influenced their motivation. One of the critical gamification debates is whether or not gamification intrinsically or extrinsically motivates, with some quarters suggesting that gamification only serves to extrinsically motivate behaviour. Whilst intrinsic motivation is undoubtedly preferred, arbitrarily awarding students or focusing solely on self-determination will yield in extrinsic motivation. However, this study found that placing focus on both self-determination and intrinsic motivation shifted gamification closer to intrinsically motivating participants.

7.6. Conclusion

This chapter sought to answer the third research question relating to the influence of gamification on motivation in a gamified e-learning course. In answering this research question, analysis was presented through the lenses of Self-Determination Theory and Intrinsic Motivation Inventory, whilst acknowledging the presence of amotivation.

8. CHAPTER EIGHT: DISCUSSION

8.1. Introduction

As discussed, this study sought to explore and understand the motivational influence of gamification. However, the results of this study cannot exist in isolation and it is essential to situate these results in the context of existing literature.

As identified in the literature review, there is an increasing body of multidisciplinary research in the field of gamification in education. Furthermore, avenues exist in literature where further research is warranted to address unanswered questions. These unanswered questions relate to the influence of gamification on motivation in e-learning, the motivational influence of specific game elements, the characteristics or player profiles of individuals and its influence on their experience with gamification, and deeper insights into the various contexts in which gamification may be applied (Nacke and Deterding, 2016).

This chapter considers key results obtained in this study within the context of existing literature with the aim of providing some visibility into unexplored avenues. To achieve this, emerging themes relating to the research questions of this study are discussed against the backdrop of relevant literature discussing the literature review.

8.2. Key themes identified in the analysis

In order to provide context to the discussion, the researcher provides a synthesis of the key themes which emerged during thematic analysis.

In terms of expectations, participants had prior experience with e-learning and held high expectations of e-learning for this research project and gamification. Additionally, they were optimistic of the potential of gamification to enhance e-learning. Furthermore, they expected that points, badges and leaderboards would be most motivational whilst expecting rewards for knowledge mastery, relevance and research ability.

Reflecting on participants' experiences, whilst their expectations of gamification were largely met, there was a slight shift in terms of preferences for elements and rewards. Furthermore, tension emerged when participants were uncertain about rewards, did not receive anticipated rewards, or perceived increased workloads which they attributed to the gamification. This in turn affected some participants sense of competence. In terms of game elements, preference for elements which afforded greater autonomy to participants appeared. In addition, whilst competition was arguably motivational, a trend of preference for collaboration was distinct. This was also a recurring theme in terms of relatedness, enjoyment and tension. Moreover, participants accepted being ranked but displayed aversion to rank themselves or be explicitly ranked against peers. It was also clear that player profiles played a central role in participants' experience of gamification and specific game

elements. In terms of support, it is worth stating that required facilities and necessary technical support was made available to support the gamification endeavour.

Reflecting in terms of SDT, there emerged preference for greater autonomy which could be brought about by a more personalised experience and flexibility in terms of rewards. In relation to relatedness, a number of themes emerged. This included the recurring debate between competition and collaboration. In essence, a strong sense of community emerged. Whilst some competitive activities resulted in participants working together, it did sometimes demotivate others. Also, participants considered their peers, engaged with others with relevance in mind and pursued some rewards collaboratively, as a result of gamification. When considering competence, it emerged that engaging with gamification provided an increased sense of competence, confidence and self-esteem as a result of being rewarded. It is worth mentioning that not being rewarded had the opposite effect. Additionally, it emerged that providing real-time, relevant and personalised feedback increased competence. Furthermore, it emerged that integrating gamification in a manner that recognition was directly linked to learning objectives was motivational whilst also prompting students to reflect on their learning. The theme of the academic context holding crucial overarching influence on motivation emerged several times.

In terms of IMI, participants interest was piqued as a result of gamification. However, this fluctuated based on participants experiences in the game. Furthermore, a sense of community also serving a critical role in promoting enjoyment. Additionally, it emerged that innovative pedagogies also resulted in an increased sense of interest. In terms of value, it emerged that gamification was useful for e-learning with the most value being derived since gamification e-learning motivates participants to take control of and reflect on their learning. Another theme relating to usefulness was that an appropriate storyline which extends beyond the endeavour motivates participants. In terms of effort, workload for students was a predominant theme which could affect motivation in gamification. The question of workload as a result of gamification for academics emerges. Considering tension, some aspects relating to scoring and workload have been discussed. Additionally, a sense of fatigue seemed to emerge over the length of the gamification endeavour. Despite this, a sense prevailed that participants would be willing to have gamification in other courses in the programme.

These findings in relation to literature, and the implications thereof are explored.

8.3. Expectations of a gamified course

The benefits of understanding prior expectations has been discussed earlier in this dissertation. This section discusses the first research question, "What are students' expectations of a gamified e-learning course?" Discussions are presented from the perspectives of expectations of gamification, game elements and rewards.

8.3.1. Expectations of gamification

Participants in this study reported prior experience with e-learning but minimal prior experience with gamified e-learning. Wiggins (2016) also found minimal prior experience with gamification, albeit to a lower degree. Whilst almost all participants in this study did not have prior experience with gamification, only 57% of their participants were unfamiliar with gamification.

Nonetheless, participants in this study held high expectations of gamification to the extent that they displayed optimism. In a similar manner, Siemon and Eckardt (2017) found that their students were willing to embark on a new gamified experience with expectations of increasing learning efficiency and a fun experience. However, their students' willingness was subject to workload not increasing. The value of understand students' expectations is supported by Hamari and Koivisto (2013) who found that attitude positively influenced continued use intention as well as participants' intention to recommend service to others.

Another dimension emerging in terms of expectations was curiosity and excitement. In this study, whilst not all participants in this study were gamers, they displayed a sense of curiosity and excitement at embarking on a gamified course. A sense of curiosity also prevailed in a study by da Rocha Seixas, Gomes, and de Melo Filho (2016).

8.3.2. Expectations of game elements

In terms of expectations from game elements, participants in this study initially expected strongest motivation from points followed by badges, leaderboards, progress bars and storylines. A similar study by O'Donovan et al. (2013) found differing motivational drivers. Rankings of elements in both studies are included in Table 8-1.

Table 8-1: Varying participants expected motivational ranking of game elements

Game element ranking in this study	Game element ranking in study by O'Donovan et al (2013)
1st - Points 2nd - Badges 3rd - Leaderboards 4th - Progress Bars 5th - Storylines	1st - Badges 2nd - Progress Bars 3rd - Leaderboards 4th – Storylines

The researcher suggests that these differences may be explained by BrainHex profiles differing between participants across both studies. In this study, the most predominant BrainHex profiles were Mastermind and Conqueror followed by Daredevil, Achiever, Seeker and Socialiser. There were no participants fitting the Survivor player type in this study. On the other hand, O'Donovan et al. (2013) found that the Seeker was most predominant followed by Survivor, Daredevil, Mastermind, Conqueror, Socialiser and Achiever. As such, it follows that the two groups of participants were

motivated in different ways. Therefore, taking into consideration motivators and preferences of students is proven to be essential.

As discussed, BrainHex profiles have also been used in a prior gamification study towards developing a player model for adaptive gamification (Monterrat et al., 2015). In this study, it was concluded that BrainHex was an effective tool to understand how participants' respond to gamification. Furthermore, BrainHex played a central role towards the development of their model

In terms of personalised gamification, Orji et al. (2013) found that the BrainHex player types and player typologies provide a suitable basis to develop personalised gamification. However, their work does not specifically discuss all profiles. Similarly, Lankes et al. (2015) aimed to understand the suitability of the Seeker and Mastermind profiles to design persuasive games. They found that utilising profiles was promising for developing effective persuasive and personalised gamification.

Aside from BrainHex, the use of profiles is substantiated in other studies which also found that students were motivated by different motivators and game elements (Buckley and Doyle, 2016; Hanus and Fox, 2015).

It should be noted that the academic context seemed to overshadow some instances of BrainHex profiles since some participants deviated from the behaviour expected from their profile. One example of this was when Conquerors displayed a strong sense of a relatedness and indicated concern when peers were not being awarded. This was analysed to be in direct contrast to the characteristics of Conquerors typically being motivated by triumph over peers. Other examples are discussed in the analysis. This finding supports the point raised in the literature review that gamer profiles are not mutually exclusive.

8.3.3. Expectations of rewards

Since gamification was being applied in an academic context, it corresponded that participants would approach gamification from the perspective of performance and learning.

In this study, there were expectations among participants that recognition be given for activities which display their own merit like knowledge mastery, relevance of interactions and the ability to conduct research. At the same time, they held lower expectations of being recognised for engaging with or competing against colleagues through activities like interacting socially or working with speed. Such expectations of academic recognition from gamification also resonated among participants in a study by O'Donovan et al. (2013) where expectations centred around mastery of knowledge and, to a much lesser extent, research ability. However, participants in their study expected to be awarded recognition for social interactions and working with speed to a greater extent than was prevalent in this study.

Other than the academic context dominating students' expectations, it also emerged in a study by Fabricatore and López (2014) that students obtained greater motivation from being rewarded for higher-order tasks like problem solving and mastery rather than lower-order tasks like memorisation and recall. In essence, it emerges that the academic context, with focus on learning at a higher level, dominates students' expectations of gamification.

8.4. Factors influencing experiences in a gamified course

Once expectations were understood and the gamified course commenced, the researcher shifted focus to understand factors influencing participants' experiences. This was in line with the second research question, "What factors influence students' experiences of participating in a gamified e-learning course?"

In this study, participants reported varying experiences with gamification. Furthermore, participants who participated in interviews were categorised on a continuum ranging from disengaged to engaged, due to various factors.

Varying experiences of gamification emerge in literature. Literature also present evidence of varying experiences of gamifying education. Selected citations are presented in Table 8-2 and factors influencing experiences in this study and in literature are thematically discussed thereafter.

Table 8-2: Negative, mixed and positive experiences of gamification

	Related Literature
Negative Experiences	Berkling and Thomas (2013), and Hanus and Fox (2015)
Mixed Experiences	Domínguez et al. (2013)
Positive Experiences	Adukaite and Cantoni (2016), Banfield and Wilkerson (2014), Buckley and Doyle (2016), da Rocha Seixas et al. (2016), de-Marcos et al. (2014), Fotaris et al. (2016), Iosup and Epema (2014), Olsson et al. (2015), Suh et al. (2016), Tan and Hew (2016), and Thomas and Berkling (2013)

Discussions are presented from the perspectives of participants' understanding and experience of gamification, experiences of earning rewards, facilities and accessibility, and game elements.

8.4.1. Understanding of gamification

In terms of participants' understanding of gamification, gamification was understood from various perspectives including learning, entertainment, engagement or motivation. They viewed gamification as a tool to primarily enhance learning or serve to add a sense of entertainment, with a secondary objective being to motivate behaviour.

Existing literature supports gamification as a tool to support learning. Buckley and Doyle (2016) and da Rocha Seixas et al. (2016) argue that the significance of gamification based on learning objectives

cannot be ignored. However, Hanus and Fox (2015) disagree since they found that gamification aligned with objectives yielded negative results and that academic focus served as a stronger motivation, which gamification could negatively affect. Whilst these results further establish the influence of the academic context, the researcher argues that this result cautions that gamification might demotivate under certain circumstances. However, it does not detract from the value of gamification for learning and motivation.

This is supported by another emerging theme which suggests that if gamification is aligned to learning objectives, students would be willing to have it introduced into other modules in the programme. This was the case in this study and was also found by Fotaris et al. (2016).

Another result found in this study was that participants perceived gamification and the course as having been designed in tandem despite the fact that the course had preceded this study. The researcher attributes this to alignment of gamification with learning objectives. This has not been widely explored in literature.

8.4.2. Experiences of earning rewards

In terms of earning rewards influencing participants' experiences, those who understood gamification seemed to possess a sense of confidence which was enhanced when their work was rewarded. In the same light, participants who attended onboarding sessions reported a positive experience in the game whilst those who were unable to attend onboarding sessions reported a negative experience.

A related factor was that some participants experienced frustration at not earning rewards. In some situations, participants felt that they were not receiving rewards for their partial effort towards an objective whilst others experienced frustration when they did not understand the scoring. A similar experience of uncertainty around scoring prevailed in earlier studies (Domínguez et al., 2013; Fischer et al., 2016). Like participants in this study, students in earlier studies requested clarity and transparency in scoring and rewards systems.

In seeking a solution for this, the researcher cites a study by Siemon and Eckardt (2017) where the onboarding approach was similar to the one used in this study. Students were onboarded in-person and also using text-heavy resources. They found that this method also presented challenges for their students and argue that interactive tools to onboard students might yield success and overcome challenges (Siemon and Eckardt, 2017). The researcher suggests that multimedia and social media may be harnessed to make onboarding more effective.

8.4.3. Facilities and accessibility

Other factors influencing experiences was in relation to facilities and accessibility to the gamified course. Existing literature suggests that students face barriers in terms of Internet access and functioning technology (Adukaite and Cantoni, 2016; Amriani et al., 2013). In this study, participants reported that they were supported in terms of facilities like LANs which were provided to engage with the gamified course. However, some participants experienced challenges with Internet access when off-campus. This discussion contends that a seamless technology experience is essential in delivering gamification.

In terms of frequency of use, whilst O'Donovan et al. (2013) encountered some students who did not participate actively, Katsigiannakis and Karagiannidis (2017) found that gamification resulted in increased frequency of use of their platform by students. Alongside this, the researcher argues that increased frequency of use is only sustainable when technology is accessible and functioning. It should also be reiterated that participants in this study hold technology majors and reported proficiency with technology. Outside this study, institutions and academics serve technologically diverse student populations across many qualifications. Therefore, there is a need to ensure that the necessary technical support is provided for effective and sustainable gamification.

From the perspective of delivering gamification, whilst the Docebo platform offered the most in terms of game elements at the time, there were certain features that were not very intuitive. For example, when students logged onto the platform, the available badges and the current leaderboard for a specific activity or timeframe were not immediately visible. To overcome this limitation, the researcher designed banners depicting these elements and placed these on the course homepage. In addition, the platform was not mobile-friendly which made it difficult to deliver gamification from any device except a PC. Furthermore, the researcher sought to use a platform similar to social media sites that students are frequently engaging. Whilst, the platform used offered functions like posting, commenting and liking posts, it did not offer notifications nor the ability to send email alerts or instant messages to other users. This did not provide an integrated experience and resulted in the researcher having to provision a channel of communication outside the platform for activities and communication. These limitations were necessary to overcome since students participating in a study by Domínguez et al. (2013) who indicated that design and technical challenges with the gamified platforms and some plugins resulted in decreased motivation.

8.4.4. Game elements

In relation to game elements, participants reported positive experiences with elements which seemed to afford greater autonomy like badges, leaderboards and points. However, even within these elements, there were reports of negative experiences. The researcher attributes this to some participants' game preferences not being aligned to specific elements. Furthermore, results suggest

that elements which offer less autonomy, like progress bars and the storyline, were reported to not have a positive influence on experience. However, upon analysis, there also emerged varying views on the storyline. The emergence of varying experiences of game elements has been observed in past studies across literature (Dicheva and Dichev, 2015; Dicheva et al., 2015; Hamari et al., 2014).

Whilst these results were presented in reviews of existing literature, there is an emerging trend of exploring the experiences of various game elements in single studies. Seaborn and Fels (2015) found mixed but largely positive experiences of various game elements whilst Chang and Wei (2016), in analysing 40 elements, observed enhanced engagement and experiences from certain elements. These included virtual goods, redeemable points, team leaderboards (which is worth exploring to foster collaborative competition), trophies and badges, peer grading, peer emoticon feedback (which is similar to likes), skill points. The ten most favourable elements accounted for more than 50% of engagement among all elements analysed.

Another factor which emerged was that there is value of integrating various elements into gamified learning as it provides students with points of reference to understand their progression in the course (Tan and Hew, 2016). This ties in with the researcher's view that gamification shortens and makes explicit the existing metaphor prevalent in higher education which involves completing challenges (courses), progressing through levels (years) and earning a badge of honour (degree).

At this point, it is necessary to discuss each of the elements analysed in this study in terms of available literature. Discussions are presented in order of elements' motivational ranking of elements at the end of this study.

8.4.4.1. Badges

Badges were ranked as most motivational in this study. Similar results were observed in literature reviewed by Dicheva and Dichev (2015) and during a study conducted by Katsigiannakis and Karagiannidis (2017).

Badges were found to be motivational as they were accompanied by a sense of curiosity and novelty whilst providing students with clarity, feedback and opportunities towards attainment of goals (Hamari, 2017). The level of motivation prevailed to the extent that participants in a study by da Rocha Seixas et al. (2016) asked for badges. The novelty of badges is echoed by Chang and Wei (2016) who found trophies and badges to be most motivating of elements used in their study, with students seeking to acquire as many as possible. As found in this study, badges may be offered in different forms (ordinary and limited). Along this line, suggestions are offered that badges should also take the form of activity badges and milestone badges whilst encompassing levels and featuring detailed descriptions (Chang and Wei, 2016).

In alignment with some participants in this study not being motivated by badges, Olsson et al. (2015) observed a sense of indifference towards badges whilst O'Donovan et al. (2013) observed lower ranking of badges since they seemed to only serve to visually motivate students. Demotivation was also observed by Hanus and Fox (2015) who found badges to be ineffective and harmed motivation. Other than a difference in students across these studies, the researcher attributes this contradiction to varying perceptions of badges ranging from strongly motivational to gimmicky. This raises questions about whether badges only serve as an extrinsic motivator to complete an activity.

Nonetheless, the motivational influence of badges and their contribution to students' experience is widely accepted. The researcher argues that the sense of a badge being viewed as an accolade combined with the sense of feedback and clarity led badges to be motivational to students. However, caution must be extended that badges must be mapped to learning objectives in order to not be perceived as gimmicky and remain motivational.

8.4.4.2.   Points

In this study, points were deemed to hold an equal motivational role to participants as badges. Exploration of literature presents similar findings, with some variations. A theme that emerged in this study and in existing literature was that points contribute to participants' personal development and academic achievement.

In terms of personal development, Chang and Wei (2016) found that redeemable points supported personal achievement motivation. Whilst redeemable points were only used in this study when participants exchanged points for project groups, it still afforded participants an opportunity in terms of their personal achievement.

An additional outcome of redeemable points in this study was that allowing students to select their own project groups in exchange for points enabled them to influence their likelihood of academic achievement. This aligned with results obtained by Tan and Hew (2016) who found that points motivated students to the extent that points influenced their academic decisions on group project selection and which activities groups undertook. At an individual level, participants in this study indicated motivation from points whilst literature suggests that points are deemed to be most motivational when awarded for assignments (Chapman and Rich, 2017).

A moderate level of motivation was observed from points in literature reviewed by Dicheva and Dichev (2015) who observed that points were superseded by badges and leaderboards. Similarly, O'Donovan et al. (2013) found that points were not strongly motivational.

In a nutshell, the researcher contends that whilst points offer a quantifiable means of measuring personal development and academic achievement, their influence on participants' experiences must extend beyond simply numbers accumulating on a leaderboard. The researcher argues that in order

to motivate, higher-order activities should attract a higher number of points and vice versa. Similarly, points should be utilised as a tool to encourage collaboration among students.

8.4.4.3.   Leaderboards

In this study, leaderboards were third-most motivating among participants, in relation to the other five elements analysed. Existing literature suggests varying experiences. As alluded to in the previous section, leaderboards were found to be motivating in past research (Dicheva and Dichev, 2015; O'Donovan et al., 2013).

Tensions emerge in terms of leaderboards relating to competition versus collaboration. Similarly, tension exists between ranking participants among their peers versus against their peers. Existing research provides avenues to overcome this tension. Chang and Wei (2016) explored the influence of team leaderboards. These leaderboards shifted students away from traditional leaderboards which focused predominantly on individual achievement. Benefits of team leaderboards include fostering collaboration and relatedness alongside enabling measurement of progress both against and among peers. Furthermore, team leaderboards help students to determine their achievement of learning performance and goals. In a similar manner, Tan and Hew (2016) found that groups in their study were motivated to achieve the top spot on the leaderboard and experienced motivation when this was achieved.

Whilst this overcomes some of the tension, there is also evidence that mixed experiences of leaderboards do prevail (Chapman and Rich, 2017; Fotaris et al., 2016). A sense of contradiction emerges when considering that recognition on a leaderboard may provide a sense of achievement for some whilst intimidating others (Fotaris et al., 2016). This was observed in this study.

Perhaps the strongest experience of demotivation was observed by Hanus and Fox (2015) who argue that leaderboards and comparing students against each other fails to provide a sense of satisfaction and empowerment, thereby harming motivation.

In essence, leaderboards do motivate students but there is a prevailing tension between collaboration and competition. As academics, there is a need to motivate students in the context of e-learning coupled with a responsibility to build a cohesive and inclusive learning space. The researcher believes that realistic outlook towards the tension between collaboration and competition is essential to gamify learning. Therefore, it is imperative that collaborative competition is encouraged by academics.

8.4.4.4.   Progress bars

At second-least motivating, progress bars provided mixed experiences for participants.

Some participants experienced value from progress bars as a tool to measure their progress in the course or to inform their strategy in the gamification. In a similar manner, students in another study used progress bars to guide their learning and unlock new activities (Tan and Hew, 2016). This is further supported by Olsson et al. (2015) who determined that that progress bars provide students with an overview of a course and progress whilst enabling academics to detect problems with engagement early on. However, the progress bar in this study did not allow academics to track progress. Rather, the platform featured a tracking tool which indicated which activities participants had completed but results of this feature were not explored in this study.

On the other hand, some participants in this study viewed progress bars as unnecessary, which contributed to its lower ranking. A similar lower ranking was found by O'Donovan et al. (2013).

In essence, whilst progress bars can motivate, participants in this study did not perceive progress bars as positively contributing to their experience. The researcher attributes this to the fact that participants were not granted autonomy in terms of progress bars. In this study, participants could elect to pursue certain badges carrying a certain title and number of points. The decision on whether or not to pursue each badge was left to the student. However, progress through the game was not in the control of the student and the progress bar illustrated the progress through the gamified course, which everyone traversed at the same pace. Since some participants reported demotivation with the workload, it is possible that this influenced their rating of the tool which illustrated the progress of the game.

This signals the need for individualised or personalised gamification which allows students to experience a gamified course at their own pace whilst traversing their own path in the game, feasibility must be considered.

8.4.4.5.   Storylines

In this study, storylines, whilst ranked as least motivating in questionnaires, also provided mixed experiences when analysed comprehensively. Storylines provided motivation for academic work, purpose and relevance for participants in this study. However, they also presented complexity and uncertainty.

This mix was also prevalent in literature. Storylines positively influenced experiences in a previous study by Tan and Hew (2016) where the sense of role-playing provided by storylines motivated students. On the other hand, O'Donovan et al. (2013) adopted a university-based storyline in their study and found that it did not significantly influence experience.

The researcher contends that the storyline was reported to be least motivational and not positively influencing students because, like progress bars, they did not offer autonomy to students. Rather, the storyline offered a context or scenario which guided participants' experiences whilst motivation in this study was derived from game elements which provided autonomy, competence, competition, engagement and recognition.

8.4.5. Effectively integrating elements provide positive experiences

As can be gleaned from the discussion, experiences vary across all game elements. This possibly transcends beyond the five game elements analysed and discussed. Thus, the researcher argues that understanding the varying experiences provided by each game element is crucial in designing effective gamification. Therefore, the researcher proposes that decisions on which elements to select should be informed by objectives and needs of participants. Within this, the researcher proposes consideration of the motivational needs of participants.

To this end, Seaborn and Fels (2015) suggest that a relationship exists between various game elements and autonomy, relatedness and competence. They suggest that a sense of autonomy may be derived from profiles, avatars and privacy, interface and notification control. They further posit that a sense of relatedness may be fostered through groups, messages, blogs, social networks and chats. Lastly, they recommend that a sense of competence be developed through positive feedback, challenge, progression, points, levels and leaderboards.

In this study, it was found that autonomy was not directly derived from any of the elements described above, with the possible exception of profiles. This suggests that game elements themselves do not provide autonomy, but experiencing gamification holistically provides autonomy. Furthermore, a sense of relatedness may be fostered by badges, points and the leaderboard whilst competence may be developed by rewarding participants through badges and the leaderboard. Furthermore, the researcher reasons that prevailing player profiles also govern which elements would be motivational. As such, this would differ in each instance of gamified e-learning.

8.5. Influence of gamification of e-learning on motivation

After the researcher understood factors influencing participants' experiences, it became necessary to explore the influence of gamification of e-learning on students' motivation. This aligned to the third research question, "How does gamification of e-learning influence students' motivation in a gamified e-learning course?"

This research question explored how gamification influences motivation through the lenses of the theoretical frameworks underpinning this study: Self-Determination Theory and Intrinsic Motivation Inventory.

8.5.1. Self-Determination Theory

As discussed, at the core of Self-Determination Theory (SDT) lies the three basic human needs: autonomy, relatedness and competence. In this study, relatedness and competence were found to have a strong positive influence on motivation whilst autonomy was motivational to a lesser degree.

The following subsections will further discuss the influence of gamification on motivation from the perspectives of each of these human needs.

8.5.1.1. Autonomy, choice in approaching rewards, freedom to choose to participate.

As discussed, in this study, autonomy was motivational to a moderate degree. Expanding this further, it was found that participants reported a strong but varied level of autonomy in terms of flexibility to pursue rewards. This is supported by a finding by Suh et al. (2016) who found that obtaining rewards and gaining an opportunity for self-expression increases autonomy. This might take the form of user profiles as was used by O'Donovan et al. (2013). In this study, user profiles were made available and participants were encouraged to customise their profiles at onboarding. However, not many participants opted to customise their profile or use a profile picture

The theme that integrating various elements into a gamified endeavour will result in increased autonomy is alluded to by Hanus and Fox (2015) who argue that not offering flexibility in gamification will hinder autonomy. However, in their study, they did not explicitly offer choice and badges were mandatory.

The necessity of considering autonomy in gamification design prevails in literature. In a study undertaken by O'Donovan et al. (2013), students were offered autonomy in terms of when they could pursue quizzes, which this led to many students completing quizzes right at the end of the course. However, the researcher believes that some students who might have initially intended to pursue quizzes would have waited until the end of the course, even without gamification. Nevertheless, the researcher argues that gamification might have resulted in an increased number of students willingly engaging the quizzes. Affording students autonomy in their learning is further supported by da Rocha Seixas et al. (2016). Additionally, Fabricatore and López (2014) argue that gamification, with autonomy playing a central role in its design, prompts students to make decisions about their own learning and assessment approaches.

Whilst autonomy is beneficial and supported in literature, there are still calls for greater autonomy. Hanus and Fox (2015) suggest that more autonomy needs to be afforded in gamified learning whilst arguing that gamification designed to personal preferences will foster a deeper sense of autonomy.

As discussed, autonomy may be derived through elements like user profiles, avatars and options to control their privacy, user interfaces and notifications (Seaborn and Fels, 2015). In essence, whilst

gamification offered students in this study autonomy in terms of game elements, it is essential to also offer autonomy in terms of their learning and user experience.

8.5.1.2. Relatedness, engagement, collaboration and competition

In this study, relatedness played a significant role in participants' experiences and in influencing motivation. This result is supported by literature which suggests that gamification inculcates a sense of relatedness among participants.

Relatedness may motivate students to collaborate with peers to earn rewards (da Rocha Seixas et al., 2016) whilst it may also result in collusion between participants to earn rewards (O'Donovan et al., 2013). Instances of working collaboratively to earn rewards were also observed in this study. As discussed in the gamification project chapter, during the gamified course, transferable extensions were awarded to some participants. One participant elected to share their extension with a colleague and was awarded a soft-skills badge which resulted in them climbing to the top of the leaderboard. During interviews, this participant indicated that whilst the availability of a soft-skills badge was not explicitly stated for sharing an extension, they were inclined to believe that sharing their extension will yield in some reward. Conversely, the participant who dropped from first place at that point voiced a sense of regret at not sharing their extension.

Furthermore, previous research indicates that gamification increases interaction between participants whilst enhancing engagement with a course (Buckley and Doyle, 2016; Katsigiannakis and Karagiannidis, 2017; Siemon and Eckardt, 2017). In this study, there were many instances of participants being motivated to interact and engage their peers as a result of gamification. Additionally, relatedness was found in literature to positively influence students' perceptions of recognition and attitudes towards gamification (Hamari and Koivisto, 2013). Therefore, harnessing relatedness could enhance motivation, participation and sustainability of gamified endeavours.

Another theme which emerged related to competition. Domínguez et al. (2013) argue that gamification positively influences relatedness and encourages competition. In this light, Adukaite and Cantoni (2016) found that some students were motivated by activities involving competition. Supporting this, Fotaris et al. (2016) found that bragging rights contributed to motivation. The researcher agrees that awarding bragging rights through gamification may serve to motivate others to engage. This is supported by findings that gamification increases the practice of collaborative learning (Fotaris et al., 2016) and motivates students to organise themselves in terms of group work (Fabricatore and López, 2014). However, caution should be extended that competition might demotivate some participants, as has been observed in this study. Hanus and Fox (2015) argue competition played an overshadowing role in their study, thus decreasing motivation.

In this light, it emerged that students were motivated to a greater degree by being rewarded individually as opposed to being rewarded against peers. A similar result was obtained by Tan and Hew (2016). However, whilst they attribute this to difference in player traits in their study, the researcher observed that in this study, a sense of relatedness prevailed across all profiles.

It emerged participants in this study were concerned about colleagues who were not being rewarded for their efforts towards an objective or for what was perceived to be achievement of an objective. To understand from another dimension, the researcher turned to literature. Results obtained by Chapman and Rich (2017) indicated that students did not derive motivation from reviewing peers whilst receiving results of a peer review was met with a neutral response. The researcher observed a similar effect in this study, almost reinforcing the view that they prefer to be scored rather than scoring others. However, they are affected when others are not scored. Therefore, their concerns about other colleagues might not yield any action on their part but seemed to demotivate.

In overcoming the balance between collaboration and competition, Suh et al. (2016) found that introducing competition coupled with a sense of altruism increased relatedness of students. In terms of technologies which prevail among students, de-Marcos et al. (2014) suggest that harnessing collaboration offered by social media coupled with the competition offered by gamification could positively enhance motivation. However, Fischer et al. (2016) caution that in social scenarios, the statuses and activities of all participants must remain visible to ensure that the sense of relatedness is sustained.

In essence, relatedness strongly influenced motivation. Given the technologies prevalent among students today, it seems as though socialising and engaging others is essential. This sense of willingness to collaborate should be harnessed to engage students. However, gamification design should consider the tension between competition and collaboration.

8.5.1.3. Competence, confidence and self-esteem

In this study, gamification was found to increase competence, instilled confidence and enhanced self-esteem. Participants experienced competence from earning rewards and recognition in the gamified course. Similar results existing in literature (Banfield and Wilkerson, 2014; O'Donovan et al., 2013; Suh et al., 2016).

In terms of confidence, Fotaris et al. (2016) found that recognition as a result of gamification increased competence and self-confidence whilst developing competencies like problem solving and analytical skills. Hamari and Koivisto (2013) found that recognition positively influences relatedness. Conversely, in this study, we found that non-recognition results in reduced relatedness to the extent that amotivation may occur. The value of recognising students is highlighted by Hamari

and Koivisto (2015) who found that recognition is positively associated with attitude to use a gamified system whilst attitude is positively associated with continued use.

Another dimension relating to competence in this study was a call from participants for immediate or real-time feedback. Turning to literature, Fischer et al. (2016) argue that immediate feedback enables fast and immediate evaluation. Similarly, Tan and Hew (2016) found that receiving feedback from gamification instilled a sense of competence among students. In this study, participants were provided feedback on a weekly basis and when queries were raised, primarily due to feasibility. In previous iterations of the course, students were afforded feedback on assessments and when they raised queries. Gamification seemed to shorten the feedback cycle. However, whilst some participants in this study indicated that this weekly feedback was beneficial, some signalled a need for more frequent feedback.

As in the case of relatedness, Hanus and Fox (2015) found that students in their study were somewhat less empowered that that could succeed, which resulted in demotivation. Whilst this was not the case in this study, the researcher argues that this might be as a result of gamification in that study removing some autonomy in how students choose to learn. In this study, when students experienced a similar sentiment, they were able to raise queries with the lecturers or the researcher.

In essence, it emerges that recognition and feedback are central to establishing a sense of confidence and motivating students. However, feasibility should be considered. Furthermore, gamification should strive to avoid reducing students' degree of perceived empowerment. In order to achieve this, clear lines of communication and ongoing support are necessary.

8.5.2. Intrinsic Motivation Inventory

From the perspective of Intrinsic Motivation Inventory (IMI), interest/enjoyment and value/usefulness positively influenced motivation. Effort/investment, whilst being motivational, seemed to demotivate some participants. A similar influence was experienced as a result of tension/pressure, predominantly in relation to the perceived workload in the gamified course.

The following subsections will further discuss the influence of gamification on motivation from the perspectives of each of the constructs of IMI.

8.5.2.1. Interest, enjoyment – central to motivation

In this study, interest and enjoyment positively influenced students' motivation. A positive influence from interest is not isolated to this study with gamification being described as providing increasing interest and instilling a sense of fun, enjoyment and satisfaction (da Rocha Seixas et al., 2016; O'Donovan et al., 2013; Siemon and Eckardt, 2017). To a slightly lesser degree, de-Marcos et al. (2014) found that gamification moderately enhanced enjoyment among their students. The value of

understanding enjoyment is explained by Hamari and Koivisto (2015) who concluded that enjoyment is positively associated with continued use.

Critically, this study found that interest did not remain as a consistent level. This was supported by Hanus and Fox (2015) who also observed diminishing satisfaction over time. However, in this study, interest fluctuated among different participants at different times, presenting opportunities to engage demotivated students.

As discussed, a sense of community prevailed in this study. This sense of community played a critical role in fostering interest and enjoyment and was thus core to motivation. A similar result was observed by Fotaris et al. (2016) who found that gamification made learning fun and engaging whilst some students derived motivation by beating colleagues. Within an educational context, Domínguez et al. (2013) attribute this interest and enjoyment to reward systems which present learning in an innovative, fun and encouraging way whilst making makes progress more apparent. This relates to shortening of the metaphor prevalent in higher education discussed earlier.

In terms of fostering interest, caution is extended by Souza-Concilio and Pacheco (2013) who argue that even though gamification enhances interest, it must not detract from learning objectives. Another recommendation is offered by Suh et al. (2016) who argues that it is vital to the basic human needs to sustain enjoyment. Failure to address these needs may fail, regardless of elements adopted.

Although interest and enjoyment positively influenced motivation, the experience of interest fluctuated at different times in the course. Factors influencing this included a sense of community, the perception that learning was made fun. However, gamification should not detract from learning objectives and should address students' needs.

8.5.2.2. Value, usefulness and enhancement of learning

As far as value/usefulness, participants experienced gamification as being valuable primarily for academic work. These experiences resulted in enhanced understanding of content and skills whilst encouraging students to reflect on their learning. Furthermore, gamification motivated students to direct the own learning whilst providing insight into what they might expect in their careers.

In terms of academic work, gamification was found to motivate students, enhance learning and increase understanding whilst motivating skills-development (Buckley and Doyle, 2016; de-Marcos et al., 2014; Domínguez et al., 2013; Fabricatore and López, 2014; Fotaris et al., 2016; Katsigiannakis and Karagiannidis, 2017; O'Donovan et al., 2013).

However, this was not consistently the case. Domínguez et al. (2013), whilst finding some motivational benefits, found no significant cognitive difference between students who experienced gamification and those who did not. In this study, all students in the course progressed through the

gamification as a single group. Therefore, comparisons are not possible. However, the value for academic work found in the literature is prevalent in the results of this study.

Furthermore, participants in this study, perceived value from the insight provided into what participants might expect in their careers. A similar result was found by Tan and Hew (2016). The researcher believes that this result, specifically in this study, was encouraged by the storyline, despite many participants not ranking the storyline as highly motivating.

In terms of academic engagement, gamification was found to enhance attendance, engagement, participation and completion rates (Fotaris et al., 2016; Katsigiannakis and Karagiannidis, 2017; O'Donovan et al., 2013; Olsson et al., 2015; Siemon and Eckardt, 2017). These benefits were realised in this study. However, participation rates were not affected in all instances as was found by de-Marcos et al. (2014), where participation remained unchanged.

Gamification also added value in that it prompted students to reflect on their learning. This was prevalent in this study and in literature. Fabricatore and López (2014) found that academic achievement was positively influenced by gamification and that students felt challenged in their learning. Another study, by Iosup and Epema (2014). found that students reflected more about their course due to gamification rather than being motivated by the gamification itself. In essence, gamification encouraged reflection on learning rather than game-play. The researcher argues that further value was derived when students in that study realised the multifaceted nature of learning and learning being not only about exams (Iosup and Epema, 2014).

In a study in the South African context, Adukaite and Cantoni (2016) found that gamification influenced motivation as it was perceived as a novel way of learning in a context without widespread availability of technology. However, the researcher questions whether the novelty is brought about by gamification or due to technology being new to participants in that study.

Since exploring academic performance was not an objective of this study, the researcher turned to literature, which indicates that the influence of gamification on academic performance was undetermined (O'Donovan et al., 2013) or non-existent (de-Marcos et al., 2014). However, it was determined in this study that participants did expect and shared experiences of increased academic performance.

Furthermore, in terms of tangibility, there were expectations in this study that rewards translate into academic performance. This was prevalent to the extent that students in a study by Fotaris et al. (2016) indicated that they would have exerted greater effort if game results were translated to marks. On the other hand, Hanus and Fox (2015) found that gamification might demotivate students who are already motivated by the existing learning activity. They argue that this lower motivation will in

turn affect academic performance. Whilst this further signals a need for effective gamification, the researcher maintains that this does not detract from the value and usefulness of gamification.

A critical point of caution is extended by Fischer et al. (2016) and Amriani et al. (2013) who stress that the academic must play a role in moderating the game and ensuring that distinctions and balance is maintained between academic engagement and playfulness.

In essence, value and usefulness related predominantly to motivating students in terms of learning and to engage in the gamified course. Despite this further suggesting that the academic context dominates when integrating gamification into education, it is necessary to ensure that there is a balance between fun and learning to extract maximum benefit.

8.5.2.3. Effort, investment and perceived workload

In this study, significant effort was required to understand and perform the course, but participants indicated willingness to engage the course again.

A key theme that emerged was in relation to perceived workload. In this study, participants perceived an increased workload in the gamified course. Despite this, the researcher observed that many participants continued to engage the gamified course, alongside other commitments. However, it still resulted in a decrease in motivation. However, at an Honours level, the researcher argues that students face a considerable increase in workload as compared to undergraduate courses. As discussed, Siemon and Eckardt (2017) found that students were willing to engage a gamified course provided that it would not affect workload. When students in their study experienced an increase in workload, a sense of disconnection emerged among some students. Whilst expectations of gamification relating to workload were not explored in this study, experiences indicate that the workload served as a point of tension.

A further theme which emerged was relating to the workload for academics. In terms of this study, designing and delivering gamification was a time-consuming and resource intensive endeavour. This was not isolated to this study (Iosup and Epema, 2014; O'Donovan et al., 2013). Even though the course spanned a single semester, the activities on the platform related to designing and delivering the game mechanics and dynamics took, according to the Docebo system logs, in excess of 100 days (Figure 8-1).

Figure 8-1: Screenshot of time spent by researcher on the gamified platform

ebrahim	2449h 35m

It should be reiterated that the system did offer automatic assignment of rewards which could yield value (Siemon and Eckardt, 2017). However, such rewards were only suitable for tasks like logging

in, posting & commenting, uploading activities and accessing resources. When students were asked to critically analyse or debate a situation, which required essay-writing, for example, it was not possible to assign these rewards automatically. Manual intervention was required to critique students' submissions and allocate rewards. In this light, Domínguez et al. (2013) argue that significant effort and investment is required for gamification to be fully motivating. Furthermore, in their study, a need to validate submissions emerged to ensure that no cheating occurred and to adapt to requests for immediate feedback.

Ultimately, whilst gamification is beneficial, it increases workload for both students and academics to yield success.

8.5.2.4.   Tension, pressure, fatigue and anxiety

In this study, it emerged that some participants experienced tension and fatigue due to the length and workload of the gamified course. A similar result was observed by Hanus and Fox (2015) who found the benefits of gamification were short-lived and that participants experienced increased tension and fatigue over time. In probing literature further, de-Marcos et al. (2014) found that contributors to tension included a lack of knowledge and awareness, a lack of interest, a lack of time, technical problems and difficultly in engaging the gamification. Some of these factors played a role in influencing tension experienced in this study.

On the other hand, it also emerged in this study that the duration of the gamified course allowed participants to adjust into the routine and workings of the course. Participants in a study by O'Donovan et al. (2013) faced a similar experience. As time progressed, as was found in this course, participants in their study found that their tension decreased, experience improved, and motivation increased. They propose employing both shorter and longer-term goals to assist students with adjusting whilst avoiding fatigue. Additionally, Chapman and Rich (2017) observed that due date bonuses and penalties along with affording degrees of flexibility decreased tension and motivated students.

Ultimately, tension and pressure may result in demotivation. It is essential to ensure that fatigue is avoided through considering both shorter and longer-term rewards to ensure sustained engagement.

8.5.3.   Influence of gamification on motivation – towards intrinsically motivating

In this study, the researcher found that integrating gamification into e-learning positively influenced students' motivation, in some cases tending strongly towards intrinsic motivation.

Buckley and Doyle (2016) argue that gamification is more effective for intrinsically motivated students. The researcher disagrees with this argument as intrinsically motivated students would not require gamification to motivate them as their motivation prevails prior to gamification. Gamification

seeks to enhance students' motivation which leads the researcher to argue that effective gamification is independent of students' level of motivation. The focus should be to motivate as much as possible, regardless of where motivation lies on the continuum of self-determination.

Banfield and Wilkerson (2014) found a dramatic increase in intrinsic motivation as a result of gamification whilst Suh et al. (2016) suggest that achieving intrinsic motivation is achieved by enhancing learning content and considering autonomy, relatedness and competence when designing gamification. The results in this study support this suggestion. At the same time, Fischer et al. (2016) cautions that punishment mechanisms are discouraged in an educational context. In order to avoid demotivating students, punishment was avoided in this study.

Tan and Hew (2016) argue that an effective technique in intrinsically motivating is tangible rewards, particularly in longer-term gamification. Results in this study affirm that tangible rewards like CV letters and participation marks served to strongly increase motivation. However, a question is posed about whether motivation through rewards represents intrinsic motivation. The researcher argues that motivation through rewards does not represent or result in complete intrinsic motivation. Rather, gamification plays a role in guiding students along the continuum of self-determination up to a point close to intrinsic motivation. The final step into intrinsic motivation lies in the hands of the students.

8.6. Conclusion

This chapter sought to discuss the key results and emerging themes in the context of existing literature. Whilst some results obtained in this study were supported in existing literature, other results were contradictory.

Nonetheless, a predominant theme which emerged from discussions is that effective gamification of e-learning depends on a multitude of factors including expectations, learning objectives, player profiles, facilities and access, and motivation (relating to SDT and IMI). The researcher argues that modifications to any of these factors will influence the motivational influence of gamification.

Therefore, it is essential to acknowledge that whilst considering key factors are central to gamification, every gamification of e-learning endeavour is arguably bespoke.

9. CHAPTER NINE: CONCLUSION

9.1. Introduction

With the explosion of e-learning in higher education in various formats ranging from supporting classroom teaching through to MOOCs, it is increasingly crucial to address the challenges faced by students, academics and institutions. Failure to address these challenges could affect the sustainability of such initiatives.

As a background to this study, the researcher identified that challenges prevalent in e-learning relate to motivation. Based on this, the aim of this study was to investigate the influence of gamification of e-learning on students' motivation. In order to achieve this aim, the researcher identified three research questions which entailed understanding students' expectations of gamification, factors influencing their experiences and understanding how gamification influences their motivation. To conduct this study, the researcher adopted a case study design encompassing a mixed methods research approach. After conducting an initial questionnaire, twelve interviews and an end of course questionnaire, the researcher analysed and discussed the qualitative and quantitative data. It was found that integrating gamification into e-learning has the potential to address the challenges prevalent in e-learning, thereby increasing motivation.

This chapter commences by offering recommendations for academic staff to effectively integrate gamification into e-learning. Thereafter, the chapter provides recommendations for higher education institutions. Then, the limitations of this study are discussed. This dissertation concludes with recommendations for future research.

9.2. Recommendations for integrating gamification

Based on the key results and discussions presented in Chapter Eight, recommendations are first provided for academic staff and thereafter for higher education institutions.

9.2.1. Recommendations for academic staff

Whilst gamification provides potential to enhance e-learning, there are various elements which may be adopted, and uncertainties may exist in terms of integrating gamification into e-learning. Hence the researcher provides recommendations which will potentially result in effective gamification at a course level.

9.2.1.1. Recommendation 1: Integrate gamification in stages

As discussed, the gamification project in this study was resource intensive. The researcher attributes this primarily to the fact that various game elements were applied and analysed in a semester-long e-learning course with the aim of understanding how gamification influences motivation. Outside of this study, dedicating expansive of resources is not an option that academics might enjoy.

A recommendation is offered to approach gamification in a phased manner. The researcher suggests, based on the findings and experiences of this study, that it would be appropriate to commence with a single game element which would likely motivate participants and explore the influences of this element on motivation. Thereafter, additional elements may be introduced. Such an approach would not necessarily require substantial investment and offers flexibility to explore other elements, if desired. Furthermore, should an element not yield desired effects, academics may easily turn to other elements. Additionally, there are freely available online tools which offer game elements features and functionality including Kahoot!, Socrative and Class Dojo, among others.

A further recommendation is to apply gamification in short bursts. In this study, participants experienced a degree of tension due to a perceived increase in workload coupled with commitments outside the course. In particular, they attributed the increased workload to gamification and found that it influenced their interaction with the gamified course and other courses in the programme. Furthermore, a sense of fatigue prevailed among some participants resulting in decreased in motivation. Based upon these results, the researcher recommends applying gamification at an individual learning activity, section, topic or assessment level. This approach will also provide academics with opportunities to evaluate and tweak gamification endeavours, if required.

9.2.1.2.   Recommendation 2: Understand students' motivational drivers and adapt

As can be gleaned from the results from this study, integrating gamification is not a one-size-fits-all approach which guarantees that all participants will be motivated. This is supported by the results wherein different participants were motivated very differently. These results relating to the motivation of the group as a whole is expected to differ among another group of students since they might be motivated differently. Therefore, the researcher recommends designing gamification based on what motivates a particular group of students is essential. Consideration should be given to the choice of platforms, game elements and types of rewards.

Decisions about platforms would be dependent on students' prior exposure and confidence with technology whilst selection of game elements would be governed by game preferences and gamer profiles prevalent within a group. Types of rewards should be selected based upon which game elements motivate participants coupled with consideration of the feasibility of introducing tangible rewards with real-world value. Rewards need not be financial in nature – CV letters are an example of this.

In essence, surveying students prior to implementing gamification is recommended as an essential tool when gamifying learning. Whilst the researcher acknowledges that a gamification endeavour might already be designed prior to a course commencing, any design should ideally feature a degree of adaptability to cater for unforeseen expectations or requests from students.

9.2.1.3.   Recommendation 3: Align gamification with objectives

Whilst understanding participants is necessary, it is equally important to design gamification which serves to intrinsically motivate students, as much as possible. As suggested, the act of arbitrarily awarding badges and points will fail to ensure sustained motivation. Therefore, the researcher recommends that gamification design must consider learning objectives and motivational objectives.

As explained, prior to the commencement of the gamified course, the researcher designed rewards, including badges and points, based on learning objectives. The intention was to design gamification that would hold greater significance for participants. In this study, it was found the academic context seemed to play a significant role in motivating students. Based on this, the researcher believes that gamification based on learning objectives will result in a sense of meaning and relevance for students.

As was clearly evident in the results, gamification motivated participants in different ways. For example, participants were motivated, to varying degrees by a sense of autonomy, relatedness, competence. Furthermore, constructs like interest/enjoyment, value/usefulness, effort/investment and tension/pressures were experienced to varying degrees. In the context of gamifying education, there may be a need to motivate participants to develop specific skills related to these constructs. For example, in this study, when exploring different constructs, it was found that gamification improved participants' self-esteem, confidence, research abilities, writing abilities and other skills. Based on this, the researcher recommends that motivational objectives and related constructs must be considered in designing effective gamification.

9.2.1.4.   Recommendation 4: Encourage co-operative competition

In this study, a recurring theme of a sense of community emerged among participants. This prevailed to the extent that it resulted in participants deviating from their BrainHex profiles.

Whilst they were motivated by rewards, there was preference for being rewarded individually as opposed to being rewarded against peers. Furthermore, participants were concerned about their colleagues' earning, or not earning, rewards in the game. Those who earned rewards serving as a benchmark for comparison whilst those who did not earn rewards, despite placing effort, served as a point of concern for some participants.

Since this sense of community served to motivate, the researcher recommends that a sense of co-operative competition be encouraged among students. This might take the form of altruistic or group activities which earn collective rewards. Furthermore, whilst gamification does arguably introduce a sense of competition, there is a need for collaboration in learning and cohesiveness in society. Therefore, activities inculcating a spirit of co-operative competition is recommended.

9.2.1.5. Recommendation 5: Collegiality is crucial

Despite the fact that a sense of community prevailed among participants, it is also recommended that a sense of community prevails among academics.

Though gamification is arguably a novel approach at some institutions, the researcher recommends that awareness of gamification as a technique to enhance learning is necessary among academics working in any programme where students are enrolled in a gamified course. Furthermore, due to its potential to enhance e-learning, support for gamification between academics is also recommended.

9.2.2. Recommendations for higher education institutions

Although recommendations have been provided for academics, academics exist within higher education institutions. Thus, support at an institutional level is important for the sustainability of gamification. Thus far, many institutions globally have explored and implemented gamification in some form whilst other institutions will do so in the near future. Therefore, the researcher includes recommendations towards effective integration of gamification at an institutional level.

9.2.2.1. Recommendation 1: Support students

Since students are central to any university, the researcher recommends that institutions render support for students who are enrolled in a gamified course.

Since participants experienced that adequate facilities and technologies were provided by the institutions, this did not provide hindrance to their experience of gamification. This leads to a broader recommendation that in order to ensure that a seamless experience of gamification is provided, support from the institution is necessary. Within an existing university, there are various mechanisms to support students academically and technically. It is recommended that these support structures are harnessed for effective gamification.

In terms of academic support, existing institutional or departmental structures should be aware when gamification is integrated into specific courses and how this might influence participants experience of a course. There should be consistent lines of communication between academics and the academic support team to ensure that students who require additional support are assisted.

Similarly, existing technical support structures within an institution should also be harnessed. Institutions like the site of this study have ICT support centres where students can gain access to end-user support with LAN computers and students' own devices. Furthermore, students are supported with ICT troubleshooting, accessing the Internet and engaging the learning management systems (LMS). Aside from this type of support, it is recommended that support staff also be acquainted with gamification and platforms used to deliver gamification. This will position existing ICT support centres as a central point of assistance for students in using gamified e-learning platforms.

Additionally, the possibility of remote support for geographically dispersed students should also be explored.

9.2.2.2.   Recommendation 2: Support and recognise academics

Whilst students require support, academics should also be supported and recognised.

In this study, the researcher undertook the necessary research into platforms and carried the costs associated with gamifying the course. However, at an institutional level, having each academic subscribing to such services not advisable, sustainable nor feasible.

Therefore, the researcher recommends that institutions which are currently utilising LMS systems should explore integrating and supporting gamification into these platforms. Thereafter, institutions should integrate gamification into existing LMS training initiatives. It is possible that this might also represent a starting point to introduce gamification to a university community. Furthermore, the researcher argues that if academics are supported in integrating gamification into their teaching practice, additional research may emerge.

Since gamification was demanding in terms of its implementation, it is also necessary to ensure that academics are recognised in their efforts towards integrating gamification and other arguably innovative approaches into their teaching. This will motivate academics to pursue and research innovative teaching approaches, thereby contributing to the body of knowledge.

9.3.   Limitations of this study

Every researcher endeavours to conduct comprehensive high-quality research to ensure that recommendations are beneficial. However, it is necessary to recognise any limitations that existed.

For the purposes of this study, the researcher elected to utilise an Honours-level course at the University of KwaZulu-Natal where the sole method of delivery of content and tasks was an e-learning platform. Whilst the participants were accessible over the Internet and in person, it was crucial to recognise that the results derived from the application of gamification to this course, while replicable, are not generalisable. Despite this limitation, the utilisation of a case-study approach signifies that the objective is to less about generalisability and more about in-depth understanding of the phenomenon being investigated.

All participants were required to complete the initial and end-of-course questionnaires, but it was not feasible to interview all participants. Every endeavour was made to try and purposively sample interviewees in order to obtain diversity. However, this technique may be considered a limitation.

The data collection phase of this study spanned one semester. During this time, it was possible for participants to approach the researcher via email with any feedback or queries pertaining to the study

or research project. However, since the method of approach was electronic, it is possible that some participants may have been reluctant to share feedback outside of the questionnaires and interviews. To overcome this, the researcher tried to ensure that students who were sampled for face-to-face interviews were also provided with opportunities to share feedback or queries in person. However, it is still possible that some participants might have been reluctant to raise queries.

Since the gamification project and the associated research was undertaken by the same individual (i.e. the researcher), it was possible from the outset that participants would provide certain responses that may not have been entirely accurate. To mitigate this potential bias, the researcher ensured that the gamification project was conceptualised and introduced to the participants as being separate from the research process with a guarantee that participation in one aspect would not affect the other, and vice versa. Furthermore, the researcher actively supported and welcomed feedback, of any nature, from participants on an ongoing basis. Additionally, when facilitating questionnaires and conducting interviews, the researcher tried to ensure that body language, tone of voice and choice of words used would not result in participants being influenced, either negatively or positively.

Given that this study aimed to analyse the behaviour of participants within a closed e-learning environment, there was a further possibility of bias emerging. In the pursuit of ensuring that this bias was circumvented as far as possible, awarding of any recognition within the research project was done in an open and transparent manner. Participants could, at any stage, query all aspects of the rewards. In addition, the researcher consulted with both course lecturers on a regular basis, more so where the potential for bias was present. Any gamification-related queries or feedback received by the lecturers from students were also communicated to the researcher. In a final effort to manage bias, participants were given an opportunity to share feedback of their experiences in the end-of-course questionnaire as well as in an external course evaluation facilitated by the lecturers and independent of this research.

As discussed, BrainHex profiles are not mutually exclusive constructs and overlaps may occur between profiles. A further limitation of this study is arguably the use of the BrainHex profiles in the manner in which they were used in the study. As discussed, the researcher considered only predominant profiles of participants, as opposed to considering overlaps in their profiles. Whilst this approach may be considered a limitation, the approach of reporting only the predominant BrainHex profile has been applied in prior studies (O'Donovan et al., 2013). Furthermore, this study did not consider exceptions to the BrainHex profiles which might also be considered a limitation.

Lastly, since participants in this study were technically proficient compared to students in other disciplines, it is possible that the results of this study may not be observed in a setting where students are not as technically proficient. Whilst this could not be overcome in this study, discussions

acknowledge this limitation and suggest that students' technical proficiency be understood prior to integrating gamification into e-learning.

9.4. Recommendations for future research

Even though this study aimed to understand the influence of gamification of e-learning on motivation, gaps remain in the literature on gamified e-learning. Therefore, recommendations for future research are provided:

i. This study found that some participants believed that integrating more gamification in other courses in the academic programme would be beneficial to their learning. Further research into integrating gamification across multiple courses within a single programme, even if done less intensively, should be pursued.

ii. Whereas this study focused on technology students, further research is needed on gamified e-learning among students from other disciplines. Similarly, the students in this study were at a 4th year postgraduate level. Further research is needed on students at undergraduate and other postgraduate levels before an institution-wide outlook is possible.

iii. This study was conducted within a public South African university. Within the context of MOOCs being adopted by more South African institutions coupled with the different types of higher education institutions in the country (universities, FET colleges, TVET colleges, etcetera), further collaborative research between in public and private institutions is needed.

iv. Whilst this study adopted a case study methodology and generalisability was not an objective, further research is necessary in the area of gamified e-learning in the South African context to paint a broader picture of the South African gamified-learning landscape. Furthermore, further research into gamified e-learning in other developing countries is warranted.

v. This study found real-time feedback and personalised gamification might enhance gamification. Additionally, participants also cited their usage of mobile phones to learn. Future research should explore the development, implementation and utilisation of a gamified e-learning system with strong mobile capabilities.

vi. This study found that participants preferred badges, leaderboards, points progress bars and storylines, respectively. However, these are not the only game elements that are available. Furthermore, it should be noted that Masterminds and Conquerors comprised the majority of participants. Therefore, further research into the influence of other individual game-elements on motivation among a more diverse audience, in terms of gamer profiles is necessary. This will provide deeper insight into the influence of the various game-elements on a more diverse set of player profiles.

vii.   As discussed, a strong sense of community was found among participants despite the competitive nature of the gamified course. Contextually, there is a principle which many participants might have subscribed to known as Ubuntu which refers to a sense of humanity and acknowledgement of the value of community ("What is Ubuntu," 2014). Ubuntu is an essential principle in constructing a collaborative, inclusive and united South Africa to the extent that it is also the basis of the South African Constitution. Based on the recommendations around this sense of community, further research into the influence of Ubuntu in gamification will yield greater insight towards designing effective social gamification in contexts where social identity and culture play a dominant role in learning.

viii.   Gamification has been explored in this study as an approach to motivate students whilst the course adopted a constructivist pedagogical approach. Gamification pedagogy as described by Bíró (2014) remains an area for exploration.

9.5. Conclusion

In this study, the researcher sought to understand the influence of gamification of e-learning on motivation. Results indicate that participants initially held high expectations of gamification. Furthermore, whilst many participants reported a positive experience in terms of onboarding, facilities, game design and some game elements, they reported a sense of demotivation at other game elements, at not obtaining rewards whilst also grappling with workload.

Participants in the gamified course reporting being influenced to participate, collaborate and engage in the gamified course as a result of gamification. In particular, factors like relatedness, competence, interest/enjoyment and value/usefulness positively influenced motivation. On the other hand, factors like autonomy, pressure/tension and effort/investment presented degrees of uncertainty. Some participants were initially uncertain of gamification but concluded the course sharing experiences of the positive influence of gamification on e-learning.

At the commencement of this study, the researcher discussed the apparent tension between the reluctance of students to engage e-learning courses and their inclination to engage games. Based on this, it was suggested that gamification might serve as a solution to some of these challenges.

In this study, it emerged that benefits can be derived by students when gamification is integrated into e-learning. These include motivating students to engage academic content, recognising students among peers, encouraging greater effort, enhancing understand of content, and developing skills and research abilities. Furthermore, gamification can also enhance participation, collaboration and relevance in engagement whilst encouraging students to reflect on their learning techniques and promoting self-directed learning. In the longer-term, gamification encourages participants to reflect on how their learning prepares them for their career.

Based upon these results, recommendations were offered for effectively integrating gamification coupled with recommendations for future research.

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APPENDICES

Appendix A – Additional tables

Table A-1: Expectations of e-Learning

Variable	N	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)	Median	Variance	Sum (S)
Reliability Statistics									
Cronbach's Alpha .818									
N of Items 7							**Central Tendency**		
I am confident in my abilities to engage on an e-learning platform.	35	0	2.9	17.1	37.1	**42.9**	4.00	.694	147
Engaging in an e-learning course will assist me in my intended career.	35	0	5.7	25.7	22.9	**45.7**	4.00	.963	143
Using e-learning will help me to balance my workload.	35	0	5.7	22.9	**42.9**	28.6	4.00	.761	138
Using e-learning will enhance my learning abilities.	35	0	5.7	31.4	28.6	**34.3**	4.00	.904	137
Learning to use the features of an e-learning platform will be easy for me.	35	0	8.6	22.9	**37.1**	31.4	4.00	.904	137
I feel that, if needed, my friends and family will support me in my e-learning activities.	35	0	11.4	28.6	**37.1**	22.9	4.00	.916	130
Using e-learning will motivate me to learn.	33	0	8.6	17.1	**45.7**	22.9	4.00	.797	128
Expectations of e-Learning							**4.00**	**.588**	

Table A-2: Expectations of Gamification

Reliability Statistics									
Cronbach's Alpha	.829								
N of Items	7						**Central Tendency**		

Variable	N	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)	Median	Variance	Sum (S)
Using gamification will motivate me to learn.	35	0	2.9	5.7	**45.7**	**45.7**	4.00	.526	152
Using gamification will enhance my learning abilities.	35	0	2.9	5.7	**51.4**	40	4.00	.504	150
I am optimistic of my ability to perform well in the "game"	35	0	0	25.7	28.6	**45.7**	4.00	.694	147
Using gamification will enhance my performance in this course.	35	0	0	28.6	**42.9**	28.6	4.00	.588	140
I am excited to be participating in a gamified course.	35	0	5.7	25.7	**42.9**	25.7	4.00	.751	135
Using gamification will motivate me to engage more on the e-learning platform.	33	0	2.9	28.6	**34.3**	28.6	4.00	.746	130
I feel that applying gamification to e-learning will be useful.	34	5.7	**91.4**	0	0	0	2.00	.057	66
Expectations of Gamification							**4.00**	**.594**	

Table A-3: Participants' Ranking of Game Elements at the commencement of the course

Game Ranking of Game Elements	Points	Badges	Leaderboards	Progress Bars	Storyline
1: Most Motivating	7	3	9	2	5
2: Good Motivator	6	11	4	5	0
3: Satisfactory Motivator	6	6	5	7	2
4: Poor Motivator	7	4	2	8	5
5: Least Motivating	0	2	6	4	14
WEIGHTED SUM	65	69	70	85	101

Note: Lowest weighted sum indicates greater motivation

Table A-4: BrainHex vs Ranking of game elements prior to the commencement of the course

Crosstabulation: BrainHex vs Ranking of game elements		Seeker	Daredevil	Mastermind	Conqueror	Socialiser	Achiever
Points	Most motivating	0	0	2	3	0	1
	Good motivator	0	0	1	2	1	2
	Satisfactory motivator	0	1	3	1	0	0
	Poor motivator	1	2	1	2	0	1
	Least motivating	0	0	0	0	0	0
Badges	Most motivating	0	0	0	2	0	1
	Good motivator	0	1	3	5	0	1
	Satisfactory motivator	0	2	3	0	0	0
	Poor motivator	0	0	1	1	1	1
	Least motivating	1	0	0	0	0	1
Leaderboards	Most motivating	1	1	2	2	1	1
	Good motivator	0	0	1	1	0	1
	Satisfactory motivator	0	0	1	2	0	2
	Poor motivator	0	0	2	0	0	0
	Least motivating	0	2	1	3	0	0
Progress Bars	Most motivating	0	0	2	0	0	0
	Good motivator	1	2	2	0	0	0
	Satisfactory motivator	0	0	0	4	1	2
	Poor motivator	0	1	3	2	0	1
	Least motivating	0	0	0	2	0	1
Storyline	Most motivating	0	2	1	1	0	1
	Good motivator	0	0	0	0	0	0
	Satisfactory motivator	1	0	0	1	0	0
	Poor motivator	0	0	0	3	0	1
	Least motivating	0	1	6	3	1	2

Table A-5: Crosstabulation: BrainHex vs Criteria for Rewards

Crosstabulation: BrainHex vs Criteria for rewards	N	Mastery	Relevance	Research	Interactions	Speed
Mastermind	9	8	6	6	2	6
Conqueror	9	7	8	6	6	1
Daredevil	5	4	4	3	5	5
Achiever	5	2	3	3	1	2
Socialiser	1	1	0	0	0	0
Seeker	2	2	0	1	0	0

Table A-6: Participants' Ranking of Game Elements at the end of the course

Game Ranking of Game Elements	Badges	Leaderboards	Points	Progress Bars	Storyline
1: Most Motivating	7	14	5	4	1
2: Good Motivator	9	4	14	1	3
3: Satisfactory Motivator	12	3	8	5	3
4: Poor Motivator	2	7	1	14	7
5: Least Motivating	1	3	3	7	17
WEIGHTED SUM	74	74	76	112	129

Note: Lowest sum indicates greater motivation

Table A-7: Crosstabulation: Ranking of game elements vs criteria for allocation of rewards

Crosstabulation: Ranking of game elements vs Criteria for allocation of rewards		Mastery	Relevance	Research	Interactions	Speed
Points	Most motivating	5	6	6	4	4
	Good motivator	5	5	2	2	2
	Satisfactory motivator	5	3	3	2	2
	Poor motivator	5	5	4	3	2
	Least motivating	0	0	0	0	0
Badges	Most motivating	2	3	1	1	0
	Good motivator	8	8	7	4	2
	Satisfactory motivator	5	6	4	4	5
	Poor motivator	4	2	2	2	3
	Least motivating	1	0	1	0	0
Leaderboards	Most motivating	9	4	5	3	3
	Good motivator	3	3	3	3	2
	Satisfactory motivator	3	5	4	1	1
	Poor motivator	1	2	1	0	1
	Least motivating	4	5	2	4	3
Pro...	Most motivating	1	2	1	0	0

	Good motivator	4	3	3	2	4
	Satisfactory motivator	5	4	4	3	1
	Poor motivator	7	6	5	4	4
	Least motivating	3	8	2	2	1
Storyline	Most motivating	3	4	2	3	3
	Good motivator	0	0	0	0	0
	Satisfactory motivator	2	1	0	1	1
	Poor motivator	3	4	3	2	0
	Least motivating	13	10	10	5	6

Appendix B – Additional graphics

Appendix B1 – High quality game guide

Welcome to Specialist Technologies!

We are delighted that you have decided to commence your corporate tenure with us. STG is a premier ICT services and solutions provider serving various organisations within South Africa. We have expanded rapidly over the past 10 years and continue to expand. We trust that you will have a fruitful career with us and promise to provide you with a challenging but fulfilling experience.

A career with STG essentially comprises four broad phases.

⇨ **Junior**, where an employee learns about the various aspects and areas within our business by rotating through various areas. Along the way, employees may pick up experiences and tools to assist them in future phases.

⇨ **Middle**, where an employee has graduated from rotations and is able to specialise in various disciplines trending within our industry at the time. Employees obtain these specialisations which will allow them to develop into our leadership of the future.

⇨ **Senior**, where an employee joins our Leadership Bootcamp and has the opportunity to learn first-hand regarding our intended strategic initiatives and direction. These employees are a step closer to taking leadership of STG.

⇨ **Executive**, where an employee holds a C-level rank within STG and has proven excellence in their field. In the case of expansion, these Executives may grow into other regions or into a Board structure.

With the right approach, any employee can progress to the level of Executive at STG!

Overview: The Executives

CEO: The highest ranking executive whose main responsibilities include developing and implementing high-level strategies, making major corporate decisions, managing the overall operations and resources of a company, and acting as the main point of communication between the board of directors and the corporate operations.

COO: the executive who oversees ongoing business operations within the company. The COO typically reports to the CEO (Chief Executive Officer)

CTO: the executive who has ultimate responsibility for all technology policy and related matters such as research and development (R&D).

Specialist Technologies

Stand out from the crowd…

Become the CEO…

Your Career Journey at STG…

Junior
Global IT Trends

Middle
Social Media and Knowledge Management

Senior & Executive
Global Technology

Onboarding Agreement
- Employee Access Card (10)

T1 - A1 (HR)
- Medical Aid Contribution (20)
- Pension Fund Contribution (20)
- Cellphone Allowance (15)

T1 - A2 (Marketing)

T1 - A3 (Technology & Innovation)
- Tablet PC (30)
- Laptop Upgrade (25)
- Laptop Docking Station (20)
- Extra Software (15)

T1 - A4 (Sales)

T1 - A5 (Assessment Prep)

T1 - A6 (Presentation to "Client")

T2 - A1
- Researcher of Note (15)
- Microblogging Novice (10)
- Conversationalist (10)

T2 - A2

T2 - A3 (HipChat)
- Microblogging Specialist (15)
- Knowledge Management Consultant (15)
- Conversation Starter (10)

T2 - A4 (Sharing Executive Insights)

Participation
- Influencer - 100 posts tagged useful (75).
- Contributor - 100 new posts (50)
- Engager - 100 comments (25)

Soft Skills
- Initiative (30)
- Team Player (30)
- Community Builder (30)
- Communicator (30)
- Professional (30)
- Critical Thinker (30)
- Confident (30)
- Efficient (30)
- Ambituous (30)
- Reliable (30)

T3 - A1
- Global Technology Expert (20)
- Industry Thought-Leader (15)
- Risk Advisor (15)
- Critical Advisor (15)

T3 - A2

T3 - A3 (Group Work)

We are an organisation of people…

Overview: Executive Roles (cont)

CIO: the executive responsible for the information technology and computer systems that support enterprise goals.

CMO: the executive responsible for activities in an organization that have to do with creating, communicating and delivering offerings that have value for customers, clients or business partners.

CKO: The executive responsible overseeing knowledge management within an organization.

Read more about Executive Leadership at http://www.investopedia.com and http://searchcio.techtarget.com

Now, you need to complete the **Onboarding Agreement** and **Topic 1—Activity 1** on Docebo…

Register at http://ukzn.docebosaas.com. If asked for a code when registering, use: **specialtopics731**

Appendix C – Lecturer consent to conduct study using ISTN731 course

Rosemary Quilling – Senior Lecturer
(031) 260 3287
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School of Management, I.T. & Governance
University of KwaZulu-Natal

18 June 2014

The Office of The Registrar
University of KwaZulu-Natal

PERMISSION TO UTILISE THE ISTN731 COURSE FOR MCOM RESEARCH

We, the undersigned are the lecturers who will be lecturing the Special Topics in IS&T (ISTN731) course in the second semester of 2014. Mr Ebrahim Adam (Student Number: 208507431) is currently registered for a Master of Commerce qualification at UKZN.

He has sought our permission to conduct research using the students registered for the ISTN731 course which is offered on the Westville Campus for his research concerning:

Gamification of e-Learning: Applying gamification to an Honours-level e-Learning Course at UKZN.

We hereby grant Mr Adam the necessary permission to conduct his research using the ISTN731 2014 (semester 2) course to platform his study. Our requirements are that:
- Any engagements occurring within the educational jurisdiction of the course would require our prior approval.
- Arrangements to gain feedback from the students as research participants i.e. outside the course, would not require our prior approval as long as these adhere to the approved research protocol.

Thank you for your assistance in this regard.

Yours sincerely

_____   _____
Rosemary Quilling   Craig Blewett
Senior Lecturer   Senior Lecturer

Appendix D – Gatekeepers permission to conduct study at UKZN

UNIVERSITY OF ™
KWAZULU-NATAL
INYUVESI
YAKWAZULU-NATALI

18 June 2014

Mr Ebrahim Adam
School of Management, IT and Governance
College of Law & Management Studies
UKZN
Email: 208507431@stu.ukzn.ac.za

Dear Mr Adam

RE: PERMISSION TO CONDUCT RESEARCH

Gatekeeper's permission is hereby granted for you to conduct research at the University of KwaZulu-Natal (UKZN) towards your postgraduate studies, provided Ethical clearance has been obtained. We note the title of your research project is:

"Gamification of e-Learning: Applying gamification to an Honours-level e-learning course at UKZN".

It is noted that you will be constituting your sample by randomly handing out questionnaires and performing interviews with students at UKZN's Westville Campus who are registered for the Special Topics in IT Honour-level course (ISTN731).

Data collected must be treated with due confidentiality and anonymity.

Yours sincerely

MR MC BALOYI
REGISTRAR

Office of the Registrar
Postal Address: Private Bag X54001, Durban, South Africa
Telephone: +27 (0) 31 260 8005/2206 **Facsimile:** +27 (0) 31 260 7824/2204 **Email:** registrar@ukzn.ac.za
Website: www.ukzn.ac.za

1910 - 2010
100 YEARS OF ACADEMIC EXCELLENCE
Founding Campuses ■ Edgewood ■ Howard College ■ Medical School ■ Pietermaritzburg ■ Westville

Appendix E – Ethical clearance approval

UNIVERSITY OF ™
KWAZULU-NATAL

INYUVESI
YAKWAZULU-NATALI

17 July 2014

Mr Ebrahim Adam (208507431)
School of Management, IT & Governance
Westville Campus

Protocol reference number: HSS/0816/014M
Project title: Gamification of e-Learning: Applying gamification to an Honours-level e-Learning Course at UKZN

Dear Mr Adam,

Full Approval – Expedited Application

In response to your application dated 11 July 2014, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol have been granted **FULL APPROVAL**.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

....
Dr Shenuka Singh (Chair)

/ms

Cc Supervisor: Mr Craig Blewett
Cc Academic Leader Research: Professor Brian McArthur
Cc School Administrator: Ms Angela Pearce

Humanities & Social Sciences Research Ethics Committee
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Founding Campuses: ■ Edgewood ■ Howard College ■ Medical School ■ Pietermaritzburg ■ Westville

UNIVERSITY OF KWAZULU-NATAL

INYUVESI YAKWAZULU-NATALI

24 July 2017

Mr Ebrahim Adam (208507431)
School of Management, IT & Governance
Westville Campus

Dear Mr Adam,

Protocol reference number: HSS/0816/014M
New project title: Gamification of E-Learning: An investigation into the influence of gamification on student motivation

Approval Notification – Amendment Application

This letter serves to notify you that your application and request for an amendment received on 21 July 2017 has now been approved as follows:

- Change in Title

Any alterations to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form; Title of the Project, Location of the Study must be reviewed and approved through an amendment /modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for period of 3 years from the date of original issue. Thereafter Recertification must be applied for on an annual basis.

Best wishes for the successful completion of your research protocol.

Yours faithfully

Dr Shenuka Singh (Chair)

/ms

Cc Supervisor: Mr Craig Blewett
Cc Academic Leader Research: Professor Brian McArthur
Cc School Administrator: Ms Angela Pearce

Humanities & Social Sciences Research Ethics Committee
Dr Shenuka Singh (Chair)
Westville Campus, Govan Mbeki Building
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Appendix F – Informed consent

Appendix F1 – Informed consent covering letter

UNIVERSITY OF KWAZULU-NATAL

Discipline of Information Systems
School of Management, I.T. & Governance
University of KwaZulu-Natal

22 July 2014

Dear Respondent

MCom Research Project
Researcher: Ebrahim Adam (083 886 4112)
Supervisor: Craig Blewett (031 260 2161)
HSSREC Research Office: Phumelele Ximba (031 260 3587)

I, Ebrahim Adam, am a Master of Commerce student in the School of Management, I.T. & Governance at the University of KwaZulu-Natal. You are hereby invited to participate in a research project entitled: *Gamification of e-Learning: Applying gamification to an Honours-level e-Learning Course at UKZN.*

The purpose of this study is to explore the effect of gamification of e-learning on student motivation, the influence of gamer profiles of students on motivation, and how gamification affects student motivation. This study will run for the duration of the Special Topics in IS&T (ISTN731) course for which you are enrolled and will utilise questionnaires, recorded interviews and observations of your interactions on the e-learning platform.

Your participation in the study is entirely voluntary and you may refuse to participate or withdraw from the study at any time with no negative consequence. There will be no monetary gain from participating in the study. Confidentiality and anonymity will be maintained at all times and results from your participation will not be used for any purposes outside of this study.

If you have any questions or concerns about participating in the study, please contact me or my research supervisor at the contact numbers listed above.

Your participation is much appreciated.

Yours sincerely
Ebrahim Adam

Researcher signature: _____

This page to be retained by the respondent

Appendix F2 – Declaration of informed consent

University of KwaZulu-Natal
School of Management, I.T. & Governance
Discipline of Information Systems

Master of Commerce Research Project
Researcher: Ebrahim Adam (083 886 4112)
Supervisor: Craig Blewett (031 260 2161)

DECLARATION OF INFORMED CONSENT

I, _____, [full name(s) of participant] hereby
confirm that I understand the contents of this document and the nature of the research project, and
hereby consent to participate. I understand that I am at liberty to withdraw from the research project at
any time, should I so desire.

Respondent signature: _____   Date: _____

This page to be retained by the researcher

Appendix G – Research instruments (Questionnaires)

Appendix G1 – Initial questionnaire

University of KwaZulu-Natal
School of Management, I.T. & Governance
Discipline of Information Systems
Pre-Course Questionnaire

Gamification of e-Learning: Applying gamification to an Honours-level e-Learning Course at UKZN.

Note: Gamification is the utilisation of game-mechanics and dynamics to engage with and motivate people in a non-game context, via a digital platform. Game mechanics tools include points systems, levels and leader boards. Game dynamics include badges, on-boarding, social engagement and unlocking of levels/content.

Instructions to respondents:

- Answer all questions unless instructed otherwise.
- Be as honest as possible in your responses.
- Please ensure that you answer all sections applicable to you.

Section A – Demographic Details
Please tick (✓) or fill in the appropriate answer.

1. UKZN Student Number: ☐☐☐☐☐☐☐☐

2. Gender: ☐ Male   ☐ Female

3. Age: _____

4. Racial grouping: ☐ Black   ☐ Coloured
   ☐ Indian   ☐ White
   ☐ Other (please specify): _____

5. Academic Programme: ☐ BCom (Honours)   ☐ BBusSci

Section B – e-Learning Experience & Perceptions
As you are aware, the Special Topics in IS&T (ISTN731) course is offered using e-learning as a medium of delivery. Please answer the questions below by ticking (✓) the appropriate answer.

1. How many e-learning courses (where e-learning was the only medium of delivery) have you engaged prior to this course?
☐ None   ☐ 1 courses   ☐ 2-3 courses   ☐ 4-5 courses   ☐ 5+ courses

2. How would you rate your ability to learn using e-learning systems?
☐ Very poor   ☐ Poor   ☐ Good   ☐ Very good

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3. Please use the scale provided below and tick (✓) only one box that best indicates your response to each statement.

Scale				
1: Strongly Disagree	2: Disagree	3: Neutral	4: Agree	5: Strongly Agree

	1	2	3	4	5
1. Using e-learning will motivate me to learn.					
2. Using e-Learning will enhance my learning abilities.					
3. Using e-learning will help me to balance my workload.					
4. I am confident in my abilities to engage on an e-learning platform.					
5. Learning to use the features of an e-learning platform will be easy for me.					
6. I feel that, if needed, my friends and family will support me in my e-learning activities.					
7. Engaging in an e-learning course will assist me in my intended career.					

Section C – Experience and Perceptions in relation to Gaming

The ISTN731 course will be offered this year with elements of gamification applied to it. In order to enable the researcher to understand your perceptions, tick (✓) the appropriate answers below.

1. Have you previously enrolled in a course that uses gamification to motivate students?

☐ Yes   ☐ No

2. Please use the scale provided below and tick (✓) only one box that best indicates your response to each statement.

Scale				
1: Strongly Disagree	2: Disagree	3: Neutral	4: Agree	5: Strongly Agree

	1	2	3	4	5
1. I feel that applying gamification to e-learning will be useful.					
2. Using gamification will motivate me to learn.					
3. Using gamification will enhance my learning abilities.					
4. Using gamification will motivate me to engage more on the e-learning platform.					
5. Using gamification will enhance my performance in this course.					
6. I am excited to be participating in a gamified course.					
7. I am optimistic of my ability to perform well in the "game"					

3. Do you play video games?

☐ Yes   ☐ No

*If you answered "**No**" to the previous question, please skip through to Section D.*

4. How often do you play video games?

☐ Never   ☐ At least once a month   ☐ At least once a week   ☐ On a daily basis

5. Do you play video games online?

☐ Yes   ☐ No

6. Which of the following devices do you play games on? Tick all applicable

Device	Please tick (✓)
Gaming console (Xbox, PlayStation, etc.)	
Gaming PC	
Gaming Laptop (Alienware, etc.)	
Tablet PC (Windows Tablet, iPad, Galaxy Tab, etc.)	
Smartphone	

Section D – Gamification Preferences

Please answer the questions below by ticking (✓) the appropriate answer

<u>Recall:</u> Gamification is the utilisation of game-mechanics and dynamics to engage with and motivate people in a non-game context, via a digital platform. Game mechanics tools include points systems, levels and leader boards. Game dynamics include badges, on-boarding, social engagement and unlocking of levels/content.

1. For which of the following aspects should badges/points be awarded? You may tick as many options as you would like?

☐ Mastery of knowledge   ☐ Social interactions   ☐ Relevance of interactions   ☐ Ability to research   ☐ Speed in completing tasks

2. Please provide a ranking of the five game-elements listed below based on how motivating each element is likely to be for you.

<u>Note:</u> A rank of 1 should represent the "most motivating" element and 5 should represent the "least motivating" element.

☐ Badges   ☐ Points   ☐ Leaderboards   ☐ Progress Bars   ☐ Storyline

Section E – BrainHex Survey

*Kindly complete the BrainHex typology survey at http://survey.ihobo.com/BrainHex/. In order to complete this survey, you will **NOT** be required to provide any personally identifiable details.*

Based on your survey results, please fill your scores for each BrainHex Class in the table below:

BrainHex Class	BrainHex Score
Seeker	
Survivor	
Daredevil	
Mastermind	
Conqueror	
Socialiser	
Achiever	

If your results indicated that you have any "BrainHex Exception(s)" please indicate them by ticking (✓) the corresponding exception in the table below

BrainHex Exception	Please tick (✓)
No commitment	
No mercy	
No punishment	
No problems	
No pressure	
No fear	
No wonder	

Section F – Additional Comments (Optional)

Please include any additional feedback that you may wish to share regarding the application of gamification for e-learning.

_____

_____

_____

_____

_____

_____

Thank you for your responses!

Please ensure that you return this questionnaire to the facilitator.

Appendix G2 – End-of-course questionnaire

University of KwaZulu-Natal
School of Management, I.T. & Governance
Discipline of Information Systems
Post-Course Questionnaire

Gamification of e-Learning: Applying gamification to an Honours-level e-Learning Course at UKZN.

Note: Gamification is the utilisation of game-mechanics and dynamics to engage with and motivate people in a non-game context, via a digital platform. Game mechanics tools include points systems, levels and leader boards. Game dynamics include badges, on-boarding, social engagement and unlocking of levels/content.

Instructions to respondents:
- Be as honest as possible in your responses.
- Please ensure that you answer all sections applicable to you.

Section A – Demographic Details

Please tick (✓) or fill in the appropriate answer.

1. UKZN Student Number: _____

2. Gender: ☐ Male ☐ Female

3. Age: _____

4. Racial grouping: ☐ African ☐ Coloured
   ☐ Indian ☐ White
   ☐ Other (please specify): _____

5. Academic Programme: ☐ BCom (Honours) ☐ BBusSci

Section B – Playing the Game

Please use the scale provided below and tick (✓) only one box that best indicates your response to each statement.

Scale				
1: Strongly Disagree	2: Disagree	3: Neutral	4: Agree	5: Strongly Agree

	1	2	3	4	5
Autonomy					
1. I was given an option on whether or not to participate in the gamification of the course.					
2. I was offered flexibility in terms of how I chose to obtain points/badges in the game.					

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	1	2	3	4	5
Relatedness					
3. I identified well with other players in the gamified course.					
4. I felt like I could trust other players in the gamified course.					
5. I would play this game on a regular basis.					
Competence					
6. I felt that I was given adequate time to learn to play the game.					
7. I felt that I was competent in playing the game.					
8. I felt that I performed well in the game, compared to other students.					
9. I am satisfied with my performance in the game.					

Section C – Motivating Factors within the Gamified Course

Please use the scale provided below and tick (✓) only one box that best indicates your response to each statement.

Scale				
1: Strongly Disagree	2: Disagree	3: Neutral	4: Agree	5: Strongly Agree

	1	2	3	4	5
Interest/Enjoyment					
1. I enjoyed the gamification of the Special Topics (ISTN731) course.					
2. I would describe the gamification of the Special Topics (ISTN731) course as interesting.					
3. I would encourage future students to enrol for the Special Topics (ISTN731) course due to the gamification.					
Effort/Investment					
4. Understanding the game required a lot of effort from me.					
5. I placed a lot of effort into my performance in the game.					
6. It was important to me to excel in the game.					
7. I tried my best to win the game.					
8. Given the opportunity, I would be willing to invest time in playing the game again.					

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	1	2	3	4	5
Value/Usefulness					
9. I believe that the experience of playing the game has been valuable for learning.					
10. I believe that the experience of playing the game has motivated me to engage with my colleagues on the platform.					
11. I believe that the experience of playing the game has helped me to understand the course content.					
12. I believe that the experience of playing the game has assisted me in improving my academic performance.					
13. I believe that the experience of playing the game has assisted me in my personal development.					
14. I believe that the experience of playing the game will assist me in my career.					
Pressure/Tension					
15. I felt relaxed while playing the game.					
16. I felt competitive whilst playing the game.					
17. I would describe the game as highly competitive.					
Effectiveness					
18. I believe that gamification is an effective tool for learning.					
19. I believe that gamification should be applied to more courses.					
20. I believe that gamification improved my experience in this course.					

Section D – Review of the Game

1. Please use the scale provided to rate each of the aspects in the table below by ticking (✓) the appropriate box.

Scale				
1: Very Poor	2: Poor	3: Neutral	4: Good	5: Excellent

	1	2	3	4	5
1. The e-learning platform (Docebo)					
2. The storyline (Career Journey)					
3. The scoring system (Points/Badges)					
4. The rewards system (Extensions/References)					

2. Please provide a ranking of the five game-elements listed below based on how motivating each element was for you.

Note: A rank of 1 should represent the "most motivating" element and 5 should represent the "least motivating" element.

☐	☐	☐	☐	☐
Badges	Points	Leaderboards	Progress Bars	Storyline

Section E – Additional Comments (Optional)

1. Please include any additional feedback that you may have regarding your experience of learning using gamification.

_____
_____
_____
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2. Please include any feedback that you may have regarding improvements that may be made.

_____
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_____
_____
_____

Thank you for your responses!

Please ensure that you return this questionnaire to the facilitator.

Appendix H – Research instrument (Interview Schedule)

University of KwaZulu-Natal
School of Management, I.T. & Governance
Discipline of Information Systems
Interview Schedule

Interview Details	Interview Number	
	Interview Date	
	Interview Time	
	Interview Location	
Participants Biographic Information	Student Number	
	Age	
	Gender	
	Racial Grouping	
	Academic Programme	

Introduce myself and thank the participant for agreeing to the interview.

Thank you for agreeing to share your time with me today for this interview. I am Ebrahim Adam, a Master of Commerce in IS&T degree student at the Discipline of Information Systems & Technology within the School of Management, IT & Governance at UKZN Westville Campus. In partial fulfilment of my qualification, I am required to conduct interviews for my dissertation. My research title is **Gamification of e-Learning: Applying gamification to an Honours-level e-Learning Course at UKZN.** I will be facilitating today.

I will then explain the interview process, provide guidelines for the session.

Our discussion today is scheduled for one hour. During this time, I would like to get insights into your experiences with the gamification of e-learning. My aim is to understand the most accurate reflections with regard to your experiences. Therefore, your responses will not hurt my feelings or offend me in any way. I am interested in your point of view, regardless of its nature.

I will address the issue of confidentiality.

With your permission, the interview today will be voice recorded. I will also be taking notes as you speak. Throughout the interview, I will refer to you by your first name only. In writing up my findings, I will not attach your name when writing up. You may be assured of complete confidentiality and anonymity.

I will share ground rules in place for the benefit of the participant and the study:

- You may ask questions at any time.
- You are encouraged to share your views with me. Whilst I will facilitate the discussion, you are not required to agree with me in any way. Constructive discussion is encouraged.

- I would like to confirm that you consent to participating in the interview and that the contents of this discussion will remain confidential.

  Consented? Yes/No

- I would like to confirm that you consent to this interview being recorded.

  Consented? Yes/No

Ice-breaker

Please introduce yourself by your first name and please tell me where on the game leader board you currently sit. Also, please share your BrainHex survey class with me.

Current Position on Leader board: _____

BrainHex Survey Class: _____

Discussion

As advised earlier, I am exploring Gamification of e-Learning: Applying gamification to an Honours-level e-Learning Course at UKZN. Before we continue, let's discuss what is meant by the term gamification.

Thematic Strands/Areas to Probe (under each area lies possible questions):

Section A

- Game Performance:
  - o What has led to your performance thus far?
- Motivation
  - o Would you describe yourself as self-motivated?
  - o How do you motivate yourself in this course?
  - o Have there been any external factors that have motivated you?
- Accessing the e-learning platform
  - o How often?
  - o What devices?
  - o Reasons behind logging on the way you do…

Section B

- Gamification Elements
  - o Which elements of gamification have motivated you the most thus far?
  - o Which elements of gamification have motivated you the least thus far?
  - o What are your views with regard to the storyline? Do you feel it plays a motivational or de-motivational role?
- Sourcing content for engagement
  - o From where?
  - o What defines content which is suitable?

- o Why do you post content?

Section C

- Understanding the game
  - o How would you describe your understanding of the game?
  - o What are your views on the storyline? Is it of relevance to you? Does it appeal to you?
  - o Do you understand the scoring mechanism? Is it fair?
  - o In your opinion, is gamification is effective? Why?
- Challenges
  - o Are there any individual challenges that YOU face in this course, particularly around the gamification?
    - How much of time do you dedicate to the game? Is the game time-consuming?
    - Is there a financial cost involved in you accessing the platform? Do you consider this cost as expensive or affordable?
    - Does engaging with the gamified platform affect your academic schedule? How so?
    - Are you comfortable accessing the platform?
    - Are your friends & family aware of this course? Are they supportive of you engaging in this course?
    - Do you face any challenges in sourcing content to engage on the platform? What are these challenges? How do you deal with them?
  - o Context-specific challenges
    - How would you define the availability of the technology to support you (computers, LAN facilities, accessibility)?
    - Is the Internet access available to support you in playing the game (on-campus, off-campus)?

Section D

- Impact of Gamification
  - o Would you say that there has been a decrease/increase in your engagement in this course? What factors do you feel have played a role in this? Has gamification played any role here?
  - o Has gamification made a difference to how you study/learn? If so, please describe these changes.
  - o Do you feel that your marks will be higher/lower as a result of gamification?
  - o Do you find the gamification aspects an extra weight/burden in this course? What factors regarding gamification have led to this conclusion?

Conclude and close

Notes:

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