A qualitative investigation of student experience in a gamified course at the Open University of Mauritius

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ABSTRACT

The COVID-19 pandemic has caused a paradigm shift from traditional on-campus presence learning to online learning. While the transition to digital education and online learning has been embraced worldwide, the biggest challenge remains the lack of motivation and engagement of the online student. Gamification is the use of game design elements in non-game contexts and in an online learning context; it is an innovative strategy to encourage motivation and engagement. This study shows the findings of qualitative research that aims to examine students' experience in an online gamified course. The gamified online course, Music and Movement, was offered to Bachelor in Education (Honours) Early Childhood Education and Care (ECEC) students at the Open University of Mauritius in the semester August to December 2021. The course was redesigned using a gamification theoretical framework called D6. Out of 46 ECEC students, 15 volunteered to further contribute through semi-structured interviews. The collected data was transcribed and analysed using open coding. The findings reveal that the perception and experience of students about the gamified online course can be categorised into five main themes, namely gamified course elements, general feelings and experience of students, personality of the tutor, traits of the students and collaborative work.

Keywords: Online learning, gamification, game design elements, student experience, gamified

Categories: • *Applied Computing ∼ Education, e-Learning, Interactive learning environments*

1 INTRODUCTION

The education sector has experienced a paradigm shift from traditional classroom environments to online learning settings because of the unprecedented development of the COVID-19 pandemic. Lockdowns have been imposed in many countries which has led to the closure of

university and college campuses thereby rapidly switching to online learning. In this time of crisis, online learning has emerged as a victor ludorum for the education sector.

Singh and Thurman (2019) have conducted a systematic literature review of the definition of online learning and they have defined online learning as:

> Online education is defined as education being delivered in an online environment through the use of the internet for teaching and learning. This includes online learning on the part of the students that is not dependent on their physical or virtual co-location. The teaching content is delivered online and the instructors develop teaching modules that enhance learning and interactivity in the synchronous or asynchronous environment.

Online courses have the potential to open the pathways for more opportunities for students in "*small, rural, or low socioeconomic school districts*" (Chaney, 2001) to take courses that generally would not be offered. It is considered to be a relatively cheaper mode of education in terms of the no cost of transportation (no commute between home and school). Technology-enabled learning allows for learning anytime and anywhere without the barriers of time and location but with the possible support of in-person engagement. Furthermore, online courses have benefited students by enabling continuous learning during the pandemic.

However, there are many challenges faced in an online learning environment. The existing literature has described these as "*a sense of isolation, the struggle with staying motivated, lack of face-to-face interaction, difficulty in getting immediate feedback, the need for constant and reliable access to technology.*" (De Paepe et al., 2018; Lei & Gupta, 2010; Venter, 2003; Zuhairi et al., 2006).

The contribution of this study is to evaluate the students' experience in an online learning gamified course at the Open University of Mauritius. In this study, the following research question guided the investigation:

- What are the students' learning experience in an online gamified course?

Qualitative research was the most suitable approach to obtain in depth understanding about gamification in the online learning context. Among the research on gamification in online learning, there is a scarcity of qualitative study specially among Mauritian university students. As such, this paper singles it out as a significant contribution to the current learning. The findings of this paper will be useful to universities to better motivate and engage students through an innovative pedagogical approach like gamification.

2   LITERATURE REVIEW

An attitudinal study conducted on Jordanian university students through a survey questionnaire showed that student attitudes towards online learning is generally negative (Mahfouz & Salam, 2021). Recent research by Meşe and Sevilen (2021) showed that an absence of social interaction, a non-alignment of the course content and expected outcomes, and the instructional

structure of the learning environment, are factors influencing a student's motivation in online learning. A quantitative study conducted by the authors on the behaviours and attitudes of students in online learning at the Open University of Mauritius in December 2020 (Doomun & van Greunen, 2022) has shown that there is a feeling of isolation and a lack of sense of community between the instructor and students that causes a negative attitude of the students towards online learning.

One of the most influential online learning models is the community of inquiry framework. It is a process to create meaningful learning experiences (Garrison et al., 1999). The three key elements of community of inquiry are cognitive presence, teaching presence and social presence. Cognitive presence is "*the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse*" (Anderson et al., 2019). Teaching presence is "*the design, facilitation, and direction of cognitive and social processes for the purpose of realising personally meaningful and educationally worthwhile learning outcomes*" (Anderson et al., 2019). Social presence is "*the ability of participants to identify with the community (e.g., course of study), communicate purposefully in a trusting environment, and develop inter-personal relationships by way of projecting their individual personalities*" (Garrison, 2009). The three presences work together in an overlapping, interdependent method to support a student's individual learning through a deeper level of community (Szeto, 2015).

It is also important to understand the principles of motivational theories to be able to improve the lesson design in online learning. There are two types of motivation namely extrinsic and intrinsic. In extrinsic motivation, knowing to get a reward will push a person to complete a task or activity while in intrinsic motivation an activity is performed purely out of enjoyment. According to Dicheva et al. (2015), "*online learning requires more self-regulation, intrinsic motivation, time management and independence*" of the student. Hence, gamification emerged as a promising strategy for its perceived benefits in terms of motivation, engagement and learning progress.

Gamification is defined as "*the use of game-design elements in non-game contexts*" (Deterding et al., 2011) or "*using game-based mechanics, aesthetics and game thinking to engage people, motivate action, promote learning, and solve problems*" (Kapp, 2012). Evidence from the literature has demonstrated that game elements can be used to encourage extrinsic and intrinsic motivation by satisfying the three basic psychological needs, which are autonomy, competence, and relatedness (Ryan et al., 2006; Sheldon & Filak, 2008). The self-determination theory argues that if these needs are met, people are motivated to grow optimally. In a gamified learning environment, the elements such as feedback, challenges, progression, and badges contribute to the competence factor. The autonomy can be achieved through game elements like avatar features and a relevant story line. The relatedness need is satisfied through team play and social interaction.

According to Werbach and Hunter (2012), the game design elements are shaped into a pyramid model constituting dynamics, mechanics, and components. The highest level is the *Dynamics* which include constraints, emotions, narrative, progression, and relationships. They are the interactions and actions that occur during the gamified experience (Camerer, 2003).

The middle level is the *Mechanics* which are a set of rules that drive forward the outcome of interactions within the system. They include challenges, chance, competition, cooperation, feedback, resource acquisition, and rewards. *Components* are at the lowest level of the gamification process and include achievements, avatars, badges, collections, content unlocking, gifting, leader boards, levels, points, virtual goods, etc. For example, a student tries to solve a challenge (mechanic) and earn points (component) if he or she solves it, and this creates a sense of progression (dynamic).

The existing literature has emphasised that gamification must be well-designed and integrated in the learning for it to be successful. Merely combining game elements does not result in a successful gamification application. However, it is the way the game elements are embedded in the lesson design that will improve the learning.

3   METHODOLOGY

This section illustrates the research design process by discussing the data collection methods and data analysis techniques that were used during the research.

3.1   Research model and procedure

A quantitative survey was carried out at the beginning of the semester to obtain baseline information about the students in terms of their game-playing habits. The course selected was an undergraduate course titled "*Music and Movement*" offered to the B.Ed (Hons) Early Childhood Education and Care (ECEC) students at the Open University of Mauritius. The main objective of the course is to help students understand the importance of music and movement in the child's psycho-motor development and develop various activities that will promote their holistic development. The research was guided by the theoretical framework D6 to embed the game elements in the online course. The detailed step-by-step procedure is elaborated on in Section 3.3. The online gamified course was run from August 2021 to December 2021. To evaluate the game elements designed in the online course, at the end of the semester a qualitative method was used through semi-structured interviews with the participants. The investigation of the game elements application and evaluation were based on the participants' perception and experience in the designed gamified course.

3.2   Participants and Sampling

Convenient sampling was done to choose the course "*Music and Movement*" from this programme with the consent of the instructor to cooperate in this research. 46 students registered for the course at the university. Out of the 46 students who completed the gamified online course, 15 students volunteered to further contribute by participating in the semi-structured interviews. Guest et al. (2006) found that in qualitative studies, 12 interviews is sufficient to

achieve data saturation. After obtaining consents from the participants, the interviews were recorded and later transcribed whereby participants were given pseudonyms. From the analysis of the qualitative data, the participants highlighted aspects of their experience in a gamified online learning course. The emerging themes of the study are discussed in Section 4.

3.3   Gamifying the course

The D6 gamification design framework by Werbach and Hunter (2012) was applied in gamifying the online course. The D6 framework consists of six steps:

- **D**efine Business Objectives

- **D**elineate target behaviour

- **D**escribe your players

- **D**evise activity loops

- **D**on't forget the fun

- **D**eploy appropriate tools

This framework has also been used in another education context by Aldemir et al. (2018).

As per the framework the first step was to define business objectives. Hence, the learning objectives of the course were re-organised according to the needs of the online content.

According to the second step, in order to delineate target behaviours, several workbooks that contained all activities that need to be completed were prepared together with the presentations of the content. Each presentation slide included integrated media content and a group work challenge. The students were expected to complete the workbooks to gain experience points. A narrative inspired by the series "*La Casa de Papel*" (Money Heist) was used to create a scaffolded and coherent learning experience for each student.

At the beginning of the semester, the students received a welcome letter signed by The Professor. The Professor is the instructor and is represented by a customised avatar. The first quest was ungraded to familiarise students with the system. Difficulty level of the remaining challenges gradually increased as the student progressed in the course. As a trigger for each level, reminder emails with detailed information about the tasks and rewards for completing the quests were sent to students.

The Bartle's (2022) player types for gamification categorise players in four groups: Achiever, Explorer, Socialiser and Killer. The Achiever likes to collect badges and they are all about points and status. The Explorer likes to discover new things by unlocking a level or milestone rather than getting points and prizes. The Socialiser likes to interact with other players through collaboration to achieve things rather than on their own. The Killer is very competitive with winning as their motivator. For collaborative activities, students were grouped according to a city name like Berlin, Tokyo etc. Before assigning the group, students filled out a 'player type'

survey as per Bartle's player types to determine similarities in their characteristics and thus group them accordingly as pointed out by the third step in the framework.

The fourth step in the framework was to devise the activity loops which include progression and engagement loops. As engagement loop, students were informed to complete the workbooks and solve the challenges. As a result, feedback and experience points were provided based on their performances. The different levels of badges were displayed on a leaderboard. As progression loop, the students completed each level of difficulty as they progressed. The level of difficulty of the challenges increased gradually as they achieved the learning outcomes. Furthermore, a roadmap of the events was created for students to show the timeline in a chronological order.

As per the D6 framework, the fifth step was to embed a fun element whereby Lazarro's (2022) four keys model was applied to integrate 'fun' which included different type of challenges, leaderboards, badges and surprise elements. All badges were designed with inspiration from the narrative concept. Students were required to collaborate in a group to account for the people factor.

Lastly, the sixth step was to deploy the appropriate tools. Moodle was the Learning Management System (LMS) used by the university and it was appropriate to deploy Level up which is a plug in for the gamification aspect.

4   RESULTS AND DISCUSSION

From the analysis of the qualitative data, the participants highlighted aspects of their experience in a gamified online learning course. There were many themes that emerged from the interview data. For the purpose of the paper, the categories identified in Table 1 were further elaborated.

Most of the students appreciated all the gaming elements, namely badges, points, leader boards and the narrative. Three comments extracted from the interview illustrated this:

> The game elements that I really enjoy are the badges and the points. It was quite motivating to give my best so that I can move to the next level and collect all the five badges.

> To be frank I love all the game elements. I like the narrative because I am a fan of Money Heist.

> I enjoyed all the game elements. The leader board game element I enjoy the most as it motivates me to complete the task to reach 100% on the leader board. Every time I complete a task I check the leader board to see how many activities left and how many activities have been completed.

According to the participants who did not like the leader board that was due to its competitive nature. The leader board turned out to be not appropriate for non-competitive students. One respondent pointed it out through the comment:

Table 1: Classification of the themes with the user experiences

Gamified course elements	Badge
	Point
	Leader board
	Narrative
	Progression
	Challenge
	Content design
General feelings and experience of students	Fun
	Motivating
	Interesting
	Encouraging
	Stimulating
Personality of tutor	Motivational presence
	Positive feedback
	Continuous support
Traits of students	Characteristics
	Technology competence
Collaboration/Teamwork	Builds friendship
	Social community
	Participation/Interaction

> I enjoy the leader board least as it brings a competitive environment.

The lack of confidentiality for marks may discouraged low-performing students. One participant raised this issue through the comment:

> Ranking should be confidential because some might get upset to know their ranks. Not everyone wants to expose their marks and it might hurt someone with poor performance.

On the contrary, some of the students agreed on the competitive element that the leader board provided through the following statement:

> I enjoy the leader board as I was able to know where my performance has reached as it was like a competition.

The study also found that most of the participants enjoyed the originality of the narrative. Two participants' comments on the narrative elements illustrate this:

> It was very interesting to use this movie to present this module. I really like this movie, it was fun when I received the first email signed as the Professor.

> It was fun and I was surprised that a movie could lead us in this course. Receiving instructions from the professor was amazing and giving each Group a city name like in the movie was fun.

The progression element demonstrated a positive growth throughout the gamified experience. The badges raised interest to know what the next task was to be completed. One participant eagerly responded through the comment:

> The badges help me to progress as the dodo picture in the badge interested me. Being Mauritian, the dodo is very meaningful to me.

According to the participants, the activities were quite challenging but manageable and interesting. They pushed them to be more creative. Two comments extracted from the interviews illustrated this:

> This module was very challenging and enriched me where I have discovered how to use Jamboard, Google docs …

> The activities were not too complex. They were achievable and the level pushed us to be more creative and to develop educator's skills.

The majority of the participants confidently expressed that they liked the instructional design of the module, i.e., the layout of the course and the navigation was clear and well-organised. Two comments extracted from the interviews illustrated this:

> The layout of the course and navigation was clear, simple, well-organised, and very easy to use when we get used to it after two to three weeks of session. It is well designed to facilitate learners.

> It was well presented and the slides were colourful and not bulky. It was easy to use.

The study reveals that the majority of the students were positive towards the gamification concept. Participants eagerly responded to the motivating, stimulating, fun and enjoyable nature of this gamified online course. They referred to the gamified lesson design as a motivational experience. This was in line with Özhan and Kocadere (2020) who concluded from their findings that emotional commitment in online gamified course increased students' motivation. To emphasise the fun element, one participant responded:

> Other courses are only lectures and it is quite boring. I know even if the course was carried out last session, it would have been fun. We learnt in a fun way and I always look forward to the online class.

Another participant highlighted the motivational factor by expressing that:

> This way of learning is stimulating and motivating as there were many support and elements …

The instructor's presence and characteristics were perceived to influence their perception of the gamified experience. The participants acknowledged that the instructor was providing continuous support throughout the learning. Similarly, according to Baker (2010), a noticeable instructor presence can determine the motivation of students in online learning environments. One participant commented on this, saying:

> Whenever we ask questions, the tutors were always there for us.

The participants stated that the instructor was fun and an enthusiastic person. One participant commented on this trait:

> I liked receiving mails from the professor and it was so exciting to see what tasks the professor will ask for.

Another element that was derived from the findings is whether the attitude of the instructor embodied a pedagogy of care. As Dr. Maha Bali, professor at the American University of Cairo, states (O'Shaughnessy, 2020), "*Sometimes, the most valuable thing we can offer our students is genuine care for them, their well-being, their happiness.*" To acknowledge this, one student stated:

> The reminder shows that the tutor cares for the students.

On another note, one issue that some participants pointed out was the technical difficulties that some students experienced when doing the online activities. This may have hindered their learning and hence affected their perception of the online gamified course. The comment of one of the participants illustrates this:

> Some of them could not participate as they were having technical problems.

Finally, there was a controversial issue on the teamwork and participation. The reason of labelling it as controversial is that some claims were contradictory.

The personality of the students seemed to determine their contribution in the group work activity. The lack of team dynamism hindered their participation as a group. Negative arguments included:

> In my group there was some girls which were not interested to work in the group activity and was saying that they are shy …

> In my group not everyone participated, and it was quite difficult to work with students that did not take the work seriously and work as a team.

On the other hand, whenever there was cohesion in the group, the collaborative activities were helpful in creating a social community and building friendship among the students. Positive arguments included:

> The group activities were very interesting specially to develop a social community and help to build interaction between teammates. During the online learning we got the opportunities to know some of our classmates well.

> I appreciate my teammates Helsinki where we have work as a team. With this group activity a friendship has born and we have shared our ideas with each other.

4.1 Lesson learnt

From this study, it is found that the following elements need to be present to create a motivational learning experience in an online learning course:

a) A relevant story line that will create a coherent and rewarding experience till the completion of the online course. A narrative can be an adventurous or fantastical theme taken from a movie or book, but it should be a relevant or popular one so that students can relate to it.

b) The leader board element creates a mixed response as it can be a motivational booster for competitive students while for non-competitive students, the students use it to reach out for help. Before integrating this game element in the lesson design, it important to know the competitive nature of the students.

c) An enthusiastic instructor that will not only provide support and guidance but will also provide an emotional presence to the students throughout the course. Instructors that are regularly sending reminders and encouragement through email or chats are appreciated by the students.

d) Activities that will overcome the shyness trait in students so that they can collaborate without hesitation when doing group works. This can be overcome through break-the-ice activities.

e) Design group activities that will promote social interaction and participation of students. In an online environment, such activities help to build friendship and community among the students.

4.2 Limitation and Future Research

The scope of the study was to focus on the students' experience based on the gaming elements proposed by Werbach and Hunter (2012) that were embedded in a specific course at the Open University of Mauritius. As the perception of the participants are limited to the context of the

study, future work should be done to explore the relevance of the study in different contexts. A further study with iterations and longer duration may be repeated. As future research work, a framework will be proposed and validated.

5 CONCLUSION

In this research, a qualitative method has been used to analyse students' learning experience throughout a gamified online learning course. The results of the study show that the students have a positive attitude as they referred to the learning experience as fun, stimulating, motivating and encouraging. The integration of the game elements in the design lessons were recommended by the students. They revealed that the following game elements: badge and points as rewards, original narrative, levels of progression and a reasonable complexity of challenge, should be included in a gamified course. They also encouraged a well-designed content that was easy to use. However, the leader board game element remains a mixed response from the students due to its competitive nature. Shifting the goal of the student from a good grade to curiosity of what happens at the end of the narrative proved to be successful in accomplishing the learning objectives. Some valuable findings that came out of the research was the importance of the personality of the tutor in creating a fun and caring learning experience. This was not only the presence of the instructor in terms of continuous support and feedback, but also in terms of embodying a positive student-instructor relationship. Another element from the findings is the personality traits of the students that can affect the collaborative group activities. Students that are shy still face a difficulty in participating in teamwork. However, based on the findings, whenever there was synergy in the team, the group activities build a social community and nurture a friendship among the students. To conclude, the outcome of the students' experiences on gamification in online learning showed that the students were motivated and propelled through the learning experience in a fun and enjoyable way.

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