Students' Learning and Gaming Preferences and their Expectations of Gamification

*Flavia C. Morone Pinto, Nevena Jaftha, Suzanne Borg, Marouska Zahra Micallef, Tatjana Chircop**
Corresponding Author: Tatjana.Chircop@mcast.edu.mt
**Applied Research & Innovation Centre, MCAST*

Abstract: Gamification is a relatively new concept that uses game elements in a non-game context. The use of gamification in education appears to increase students' cognitive load and performance levels. The objectives of this research were to identify students' profiles, their gaming and learning preferences, and to explore students' expectations of gamification in education. A descriptive study was opted for, and an online questionnaire was carried out with level 1-6, full-time, MCAST students. The survey comprised 271 students, with an average age of 20±4 years old, most of whom were Maltese (81.9%; $\chi 2$, p= .000). The majority of students think that lectures can be turned into a fun game (63.8%; $\chi 2$, p= .000) and they also like the idea in and of itself (71.6%; $\chi 2$, p= .000). The favourite type of game for the male participants in this study were first-person shooters, while for the female participants it was intelligence and quiz/trivia games $\chi 2$ (8, N = 271) = .69.764, p = .000. Students reported that they might feel more involved in a lecture that makes use of game elements (34.3%; $\chi 2$, p= .000), and if a specific task is gamified, they would probably feel more competitive and eager to complete it (43.9%; $\chi 2$, p= .000). When asked which specific game delivery platform has the potential to improve their studies the most, the largest share of students responded with web-based learning platforms (44.3%; $\chi 2$, p= .000). In conclusion, understanding students' profiles allows for further personalisation of teaching activities. Activities can be customised based on students' learning preferences, with learning instruction guided by the students' expectations of what it would be like to make classes game-like, i.e., gamification.

Keywords: Education; game design; learning technology; active learning; student motivation

Introduction

Although the idea of making something game-like is nothing new, gamification as a formalised and widely implemented strategy is a relatively new concept which only gained traction in the twenty-first century. The idea of gamification as a process which adds layers of game elements to an unrelated subject or task is to take what makes games fun for players and apply that to other areas as a means of motivating people (Chou 2016).

Although the use of gamification in education has the potential to increase both achievement levels and cognitive loads (CL), in general, students have positive thoughts regarding gamification strategies (Hwang, Hong, Cheng, Peng and Wu 2013; Turan, Avinc, Kara and Goktas 2016). The Cognitive Load Theory has three types of activities that add to the working memory load: intrinsic load (mental investment in completing a task), germane load (mental investment in supporting schema development and learning), and extraneous load (that does not support task completion or learning). When total CL goes beyond one's memory capacity, this has a negative impact on learning and performance (Sweller 1988).

In collaborative learning, the intrinsic CL needed to complete a task can be reduced by the distribution of cognitive effort across several individual working memories. Still, if tasks are of a simple(r) nature and a lower level of interactivity, individuals can deal with more ease with the working memory load generated (Retnowati et al. 2018). For example, though enjoyable, interactivity can create additional CL that can burden the process of vocabulary memorisation (deHaan, Reed and Kuwada 2010). Some authors (de-Marcos, Domínguez, Saenz-de-Navarrete, and Pagés 2014; Hwang et al. 2013) attribute high levels of CL to the competitive element of gamification. Involving unnecessary game elements in the design has the potential to increase extraneous CL (Turan et al. 2016). Therefore, the CL factor ought to be considered and certain provisions taken to maximise the effectiveness of gamified interaction (Kalyuga and Plass 2009). For example, extending the timeframes for competition in order to give players more time to think can reduce anxiety and CL (Hwang et al. 2013).

Understanding the audience of a gamified platform is of utmost importance in order to design gamification in a way that leaves the required effect. Along with understanding the audience's own preferences, it is important to know what game elements/mechanics have the potential to resonate in educational settings. This also makes it easier to recognise when the game elements may be getting in the way of the underlying motive of this application (Chou 2016).

Considering the idea of using games or game elements as a learning strategy, it is also important to know the player types. Bartle categorised players into four groups, each of which roughly shows how members of such groups would interact with the game and other players, and what they hope to get out of the game experience. The categories include Socialiser, Killer, Achiever, and Explorer, divided among a four-quadrant grid (Bartle 1996). The mechanics that attract learners vary according to player types and so do the elements that trigger the mechanics (Kocadere and Çağlar 2018). Still, players may show characteristics different to their player types, depending on the game features included in the design of the gamified system (Ašeriškis and Damaševičius 2017), as well as the contextual (Kocadere and Çağlar 2018) and enviromental circumstances of the game (Bartle 2005).

Thus, the personalisation of the platform to be used and the content to be gamified are essential (Chou 2016; Harteveld and Sutherland 2017; Xu and Song 2017; Schäfer, Bachner, Pretscher, Groh, and Demetriou 2018) and customising gamification in accordance with player types is the first step towards personalisation (Lopez and Tucker 2019). However, the 'Epic Meaning' may be the most important of the elements discussed. The 'Epic Meaning' is often described as the greatest purpose behind people's actions or how something contributes to the greater good (Chou 2016). In terms of gamification, Epic Meaning can be thought of as an overall outcome. What would a user of this application get out of the experience? Why would someone want to do this gamified task in the first place? Could something greater be achieved if gamified learning is widely used? (Chou 2016).

It has been shown that gamified learning can motivate students to explore where they have failed and how they can improve for the next attempt. In a number of experimental studies, students who utilised gamified pedagogy tried and completed a greater variety of tasks than the students who were taught via non-gamified pedagogy (Armier, Shepherd and Skrabut 2016; De Pontes, Medeiros, Guerrero and De Figueiredo, 2019). This pattern of greater success held even when it came to tasks which were harder than the norm (Haruna, Chu, Mellecker, Gabriel and Ndekao 2018;Hew, Huang, Chu and Chiu, 2016) and tasks which were previously neglected (Caton and Greenhill 2004), as well as homework (Laskowski 2015; Saran and Al-Magsoosi 2018) and bonus tasks (Barlow and Fleming 2016; Laskowski 2015). In addition, students spent more time working on activities (Kermek et al. 2018),

more time working in groups, and more time preparing for the projects they had to work on (Armier et al. 2016). They also produced higher-quality output (Caton and Greenhill 2014; Hew et al. 2016; Lam, Hew and Chiu 2018). Therefore, one can conclude that a gamified setting has the potential to motivate students to keep trying and making progress (Briffa, Jaftha, Loreto, Morone-Pinto and Chircop 2020; Chou 2016).

In order to understand students' player-and-learner characteristics and preferences as a precondition to develop a personalised gamified learning system, a normative survey was planned to reach a representative number of students in MCAST. The survey was guided by the following research questions: (1) What is the students' level of satisfaction with MCAST? (2) What are MCAST students' learning preferences? (3) What are MCAST students' gameplay preferences? (4) Do students like the idea of turning classes into a game? Based on this set of questions, the objectives of this research were (1) To identify students' profiles by using their social, demographic, and educational characteristics in order to evaluate their satisfaction with their learning journey in MCAST; (2) To know if there is a relationship between students' personality traits and (*2a*) game preferences, and (*2b*) their learning preferences; and (3) To explore students' expectations of gamification in education.

Methodology

A descriptive-normative survey[1] was designed with the intention of exploring the prevailing conditions related to the students' expectations on gamification in education. This method seeks to answer the question: "What are the students' expectations of gamification in education?"

The survey was conducted between March and May 2020 with MCAST Levels 1-6 students from different institutes: ICA, Institute for Creative Arts; IAS, Institute of Applied Sciences; ICS, Institute of Community Services; IBMC, Institute of Business Management and Commerce; IICT, Institute of Information and Communication Technology; IET, Institute of Engineering and Transport; as well as the Gozo Campus that offers a number of courses from different iinstitutes.

This study used a simple random sampling method. The sample calculation considered the following parameters: The total number of students between levels 1 and 6 (6,029 students) (MCAST, 2020), where the confidence interval (for the general level of accuracy, 50%) is ± 5 and 95% confidence level. Students from the "Introductory level A and B" were excluded from the sample calculation. The sample would have ideally include 361 students. However, 271 responses were received, 90 short of the ideal sample.

To perform this survey, an online questionnaire was distributed through Google Forms with the purpose of obtaining information about the (1) students' social, demographic, and educational profile, (2) factors leading to students' satisfaction in MCAST (3) students' learning preferences; and (4) students' game-related characteristics and preferences. It was possible to map these four subdomains and correlate categories.

In the subdomain "students' social, demographic, and educational profile", the age, gender, and nationality of the participants were researched. Students were asked if they attend college only or if they also work, and how they felt about their college/work balance, so

1 The survey also targeted other components of the project, such as challenges and barriers that students encounter on their learning pathway in MCAST and their preferences regarding bite-sized courses (Skills Kits) that are offered in the institution. However, these questions are omitted from this study in order to narrow the focus on students' gaming and learning preferences and their expectations of gamification in MCAST.

as to consider their emotional state when they were responding. They were questioned about their current course and level of education at MCAST, as well as their parents' level of education.

Students' satisfaction with MCAST services (learning support, teaching, and assessment methods), their sense of belonging to MCAST, and the reason for attending a course at MCAST were part of the subdomain called "factors leading to students' satisfaction at MCAST".

In the subdomain "students' learning preferences", the participants were asked to identify the type of student they are—team player, hands-on, introvert, etc., by using characters from the *Harry Potter* novel series to illustrate different characteristics. They were also asked about how they feel when starting a new term, how they behave when they receive a task or a deadline, what their ideal learning environment is, and their opinion about learning through games.

In the "students' game-related characteristics and preferences" subdomain, the participants were asked to identify what kind of player they are based on Bartle's Player Typology (1996), and whether the use of game elements/gamification of specific tasks would stimulate their learning engagement. The students were also asked which game delivery platform would enhance their studies (Apps, web-based learning, or classroom games) the most, and what access platform they use to play games or would use to access learning games/activities if they were digital. Table 1 shows the correlation between the subdomains, categories, and the questions applied in the questionnaire, as well as the expected outcomes.

Subdomains	**Categories**	**Correlated Questions (Q)**	**Expected Outcomes**
Students' social, demographic, and educational profile	• Socio-demographic aspects and emotional balance • Personal growth and family background • Career	Q1 - Q8;	Sample representativeness regarding age, gender, and nationality, as well as educational level and areas of study. Know the general profile of the participants.
Factors leading to students' satisfaction at MCAST	• Satisfaction with specific aspects related to the institution • Sense of belonging	Q11 b, c, d, Q 12 and Q 13;	Know how participants feel at MCAST and how they recognise it.
Students' learning preferences	• Learning methods and styles • Attitude towards gamified learning	Q14 - Q20;	Participants' preference regarding the place of study and available/preferred digital resources. Learn if the participants are inclined towards the idea of studying/learning through games.

Students' game-related characteristics and preferences	• Player types • Access and resources	Q21- Q26	Identify the type of players students are and what their game-related preferences are. Know participants' opinions regarding the best digital way to improve their studies. Know resources available to students.

Table 1: *Relationship between students' domain, subdomains, and categories with the respondents' age and gender*

The questionnaire was available in both English and Maltese language.

According to the nature of the data, descriptive statistics were applied in this study (Microsoft® Excel for Windows, version 15.0., 2013). A normality test was carried out to assess the distribution of the data (a Shapiro-Wilk test showed significant departure from normality). The data is presented in the form of absolute numbers (N) and frequency (%). A Chi-Square Independence test was performed to test the association between categorical variables, statistically different if $p < .05$. Mann-Whitney U-test was applied to identify gender difference between medians of scale variables, statistically different if $p < .05$ (IBM® SPSS Statistics for Windows, Version 24.0., 2016).

Results

3.1 Students' Social, Demographic and Educational Profile

The survey included 271 students, with an average age of 20 ± 4 years old, predominantly 17 to 20 years old ($\chi 2$, p = .000), with the proportion of male (52%) and female (48%) respondents being balanced ($\chi 2$, p = .504). The majority of participants included in the study were Maltese (81.9%; $\chi 2$, p= .000). However, considering the proportion of students at MCAST (Maltese, 86%; non-Maltese, 12%) compared to the proportion of students included in this study (Maltese, 81%; non-Maltese, 16.6%), the comparison proved not to be significant ($\chi 2$, p= .314).

Most students reported that they were only attending college (64.9%; $\chi 2$, p = .000), and most of their parents have a secondary level of education (mother, 43.5%; father, 34.7%; guardian, 11.1%). Table 2 shows the general data collected.

Variables		**N**	**%**	***p*-value**
Total of Students	N sample	271	100	-
Gender	Female	130	48.0%	.504
	Male	141	52.0%	
Nationality	Maltese	222	81.9%	.000*
	European (non-Maltese)	26	9.6%	.314[2]
	Non-European	19	7.0%	
	Undefined[1]	4	1.5%	

Are you currently...	Studying	176	64.9%	.000*
	Studying and Working	95	35.1%	
Level of Education [Mother]	Primary	20	7.4%	
	Secondary	118	43.5%	
	Post-Secondary	58	21.4%	.000*
	Tertiary	67	24.7%	
	Not Applicable	8	3.0%	
Level of Education [Father]	Primary	25	9.2%	
	Secondary	94	34.7%	
	Post-Secondary	61	22.5%	.000*
	Tertiary	73	26.9%	
	Not Applicable	18	6.6%	
Level of Education [Guardian]	Primary	14	5.2%	
	Secondary	30	11.1%	
	Post-Secondary	28	10.3%	.000*
	Tertiary	18	6.6%	
	Not Applicable	181	66.8%	

Table 2: *General student information related to social, demographic, and educational aspects*

Notes: Data represented by absolute numbers (N) and percentages (%). Undefined[1] means that based on the answer that the participants provided to an open question was not possible to categorise them as Maltese, European (non-Maltese), Non-European based on their nationality. *Chi-Square goodness of fit test statistically different if $p < .05$. [2]The Chi-Square test was applied considering the percentage of participants in the Maltese and non-Maltese (European and non-European) categories, comparing the actual number (N) with the expected number (%).

3.2 Factors Leading to Students' Satisfacation in MCAST

Regarding students' satisfaction on aspects related to MCAST, a positive trend was observed for all three domains (median= 4, by the Likert scale, ranging from 1, very unsatisfied, to 5, very satisfied). The majority of participants reported being satisfied with learning support (42.1%), teaching methods (43.2%), and assessment (42.1%). A Mann-Whitney U-test identified no gender difference between the medians of these three variables: students' satisfaction with learning support (U = 8902.500, p =.666, z = -.432), teaching methods (U = 9164.500, p =.999, z = -.001), and assessment (U = 8911.500, p =.677, z = -.417).

For most of the participants, the sense of belonging in the classroom comes from feeling welcomed by friends and lecturers (35.4%; $\chi 2$, p= .000). Although male students (20.3%) aged 17 years (13%) represent a majority of the responses related to the option "feel welcomed in class by friends and lecturers", no statistically significant association was found with this variable and "gender" $\chi 2$ (4, N = 271) = 4.334, p = .363 or "age" $\chi 2$ (8, N= 269) = 7.483, p = .486.

The majority of the students stated that the reason they attend MCAST is because it provides a wealth of knowledge and information (46.5%; χ^2, p= .000). No statistically significant association was found between this variable *versus* "gender" χ^2 (5, N = 271) = .681, p = .984. On the other hand, a significant association was found between "students' reason to attend MCAST" *versus* "age" χ2 (10, N= 269) = 22.113 p = .015.

3.3 Students' Learning Preferences

Half of the referred students stated that, when starting a new term, they feel relaxed (50.9%); however, if they have an assignment or a deadline, the majority said they need to start immediately if there is to be any chance of doing it well (43.5%). For both situations, a statistically significant difference was found, as shown in Table 3.

Variables		**N**	**%**	***p*-value**
How do you start off the new term?	I am late for my first class because I am too busy catching up with mates.	17	6.3%	.000*
	I've already read all the course material but I can't wait to find out more from the...	27	10.0%	
	I am involved in MCAST extra-curricular activities and I'm busy with that.	4	1.5%	
	I'm totally stressing already. This year is meant to be really difficult.	85	31.4%	
	I am relaxed, today is a day like any other.	138	50.9%	
Assignment and deadline is in 3 weeks. When do you start?	I'll need to start it straight away if there's any chance of me doing well.	118	43.5%	.000*
	I'm busy with other things this week. Maybe next week?	107	39.5%	
	Start? I've already finished.	19	7.0%	
	Um, the night before?	27	10.0%	

Table 3: *Students' feelings when they start a new term or they have an assignment or a deadline ahead*

Notes: Data represented by absolute numbers (N) and percentages (%). *Chi-Square goodness of fit test statistically different if p< .05.

When asked about their ideal study environment, the majority ticked the option "at home" (72.32%; χ^2, p= .000). Some chose "in a group" (13.28%) or "in a quiet library" (9.59%). Still, a few reported that "outdoors" is the ideal environment to study (4.80%).

Students were asked to select the type of student they were, based on the learning styles of *Harry Potter* characters. Most of them identified themselves with the character of Harry Potter (41.3%; χ^2, p= .000), who was "better at trying and doing than studying".

The students were asked to share the first word that came to mind about games. While the majority gave the name of a specific game (14.75%), many also said the word "fun" (14.02%), and some words related to positive effects linked to well-being (12.92%). Figure 1 summarises all the categories identified.

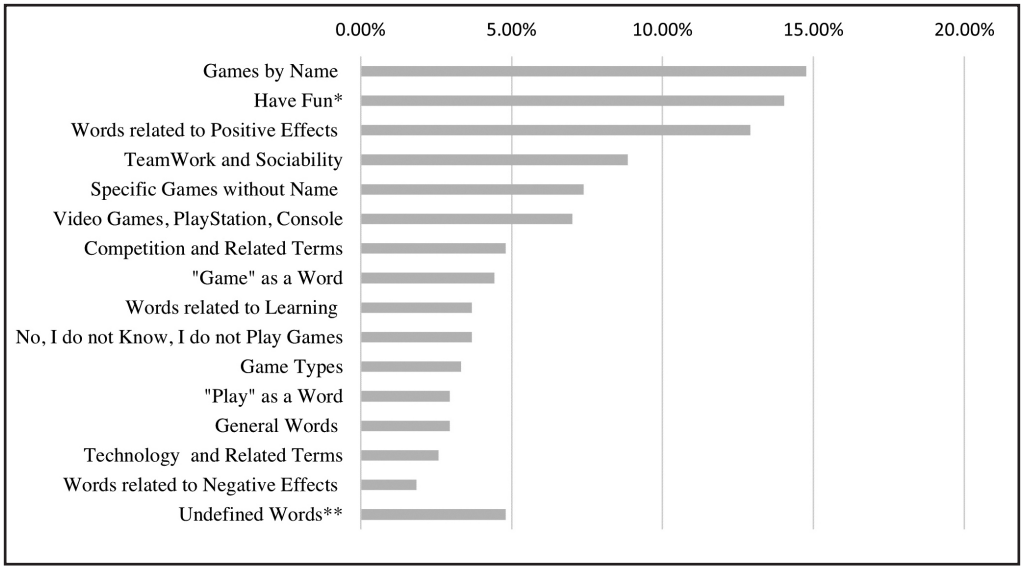

Figure 1: *The first word that comes to the students' mind when they think of games*

Note: Data shown as percentage (%). *Although "fun" is a word with a positive connotation, it was treated in a separate category by expressiveness in the research (frequency of occurrence). **Undefined words mean that that there was a description in a sentence or use of code or unknown words where it was not possible to identify the keyword related to the question addressed.

Students thought that lectures can be turned into a fun game (63.8%; χ^2, p= .000) and the majority liked that idea (71.6%; χ^2, p= .000). A cross-tabulation between these two variables showed a significant association between them $\chi 2$ (1, N= 271) = 86.385, p= .000. In addition, 57.9% of students who think that lectures can be turned into a fun game would like to have this.

3.4 Students' Game-related Characteristics

In general, most students prefer adventure or thriller games (21%; χ^2, p= .000), followed by first-person shooters (20.3%), intelligence and quiz/trivia games (17%), sports, racing and simulation games (13.7%), strategy games (6.6%), collaborative internet games (6.3%), singing, dancing or playing instruments games (5.2%), and fighting games (4.4%). A few of them really do not like games or games elements (5.5%).

The favourite type of game for male participants in this study was the first-person shooter, while for female participants it was intelligence and quiz/trivia games χ^2 (8, N = 271) = 69.764, p = .000. Figure 2 depicts the difference between students' favourite type of game according to their gender.

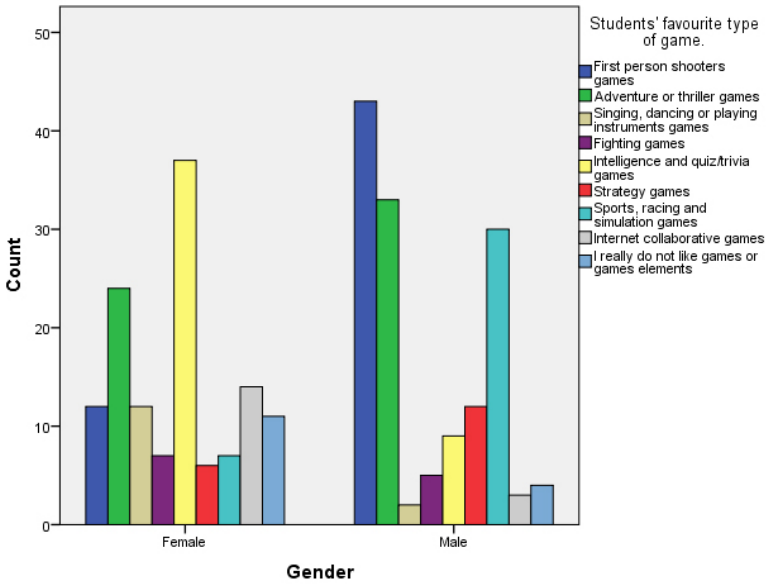

Figure 2: *Students' favourite type of game by gender*

Concerning the player type, the majority of students identified themselves as "achievers" (35.1%; χ^2, p= .000), followed by "explorers" (24%), "socialisers" (17%), and "killers" (16.6%). A few of them said that they really do not like games or game elements (7.4%). Most students-male and female in equal distribution-identified themselves with the "achievers" type player χ^2 (4, N = 271) = 13.512, p = .009, Table 4.

Variables		Gender				
		Female		Male		*p*-value
		N	%	N	%	
Students' favourite type of game.	First-person shooters	12	9.2%	43	30.5%	.000*
	Adventure or thriller games	24	18.5%	33	23.4%	
	Singing, dancing, or playing instruments games	12	9.2%	2	1.4%	
	Fighting games	7	5.4%	5	3.5%	
	Intelligence and quiz/ trivia games	37	28.5%	9	6.4%	
	Strategy games	6	4.6%	12	8.5%	
	Sports, racing and simulation games	7	5.4%	30	21.3%	
	Collaborative internet games	14	10.8%	3	2.1%	
	I really do not like games or game elements	11	8.5%	4	2.8%	
Students' player type[1].	Killers-I am motivated when I attack and disrupt other players in their in-game experiences.	15	11.5%	30	21.3%	.009*
	Achievers—I understand that it is much more fun when rising to the challenge and eventually winning a game.	44	33.8%	51	36.2%	
	Explorers—I am a naturally curious person who wants to search through every square inch of a game.	28	21.5%	37	26.2%	
	Socialisers—I just want to enjoy the community that a game can cultivate. I like to help other players way out of the situation.	28	21.5%	18	12.8%	
	I really do not like games or game elements	15	11.5%	5	3.5%	

Table 4: *A cross-tabulation between "Students' favourite type of game" and "Students' player type" versus "Gender"*

Notes: Data represented by and absolute numbers (N) and percentages (%). *Chi-Square goodness of fit test, statistically different if $p < .05$. Type of game player based on Bartle's taxonomy (1996).

Students said they might feel more involved in lectures that use game elements (34.3%; $\chi 2$, p= .000). Although some were sure that they would become more involved (31%), a few stated that their involvement would not change (10.3%). In addition, a few students reported that they really did not like games or game elements (4.8%), and some of them said it did not matter (19.6%). When compared, no statistically significant association was found between this variable and gender ($\chi 2$, p= .590; $\chi 2$).

Along these lines, the majority of respondents confirmed that, if a specific task were to be gamified, they would feel more competitive and eager to complete it (43.9%; $\chi 2$, p= .000). Many of them selected the option "maybe" to indicate that there is a chance that they might become more competitive and eager (40.6%). A few said that game elements would not make them feel more competitive and eager to complete it (4.1%). "It did not matter" for some of them (9.6%) whereas others stated that they did not like games or game elements (1.8%).

The cross-tabulation between the variables "the use of game elements" and "a task to be gamified" showed that, in the view of the participants, there is a positive association between the use of game elements, gamification, and student engagement with the lecture $\chi 2$ (32, N= 271) =167.279, p= .000, Table 5.

Game elements make students feel more engaged with the lecture.		**If a specific task is gamified, would you feel more competitive and eager to complete it?**					
		Yes	No	Maybe	It does not matter	I really do not like games or games elements	*p*-value
Yes	N	66	1	14	3	0	.000*
	%	24.4%	0.4%	5.2%	1.1%	0.0%	
No	N	5	5	12	5	1	
	%	1.8%	1.8%	4.4%	1.8%	0.4%	
Maybe	N	35	0	55	3	0	1
	%	12.9%	0.0%	20.3%	1.1%	0.0%	
It does not matter	N	11	3	26	13	0	
	%	4.1%	1.1%	9.6%	4.8%	0.0%	
I really do not like games or game elements	N	2	2	3	2	4	
	%	0.7%	0.7%	1.1%	0.7%	1.5%	

Table 5: *Cross-tabulation between "the use of game elements" and "a task to be gamified"*

Notes: Data represented by absolute numbers (N) and percentages (%). *Chi-Square of Independence different if $p < 0.05$ level.

When asked which specific game-delivery platform has the greatest potential to improve their studies, the largest share of students ticked web-based learning platforms (44.3%), followed by classroom games (27.3%) and apps (24%) on mobile phones χ^2 (3, N = 271) = 77.561, p= .000. When asked how would they access learning activities/games if they were to be digital, 1.5% of students stated that they do not have access to any device anywhere.

Discussion

The data collected in this study reflects the general profile of the participants (social, demographic, and educational) in MCAST, who were, on average, 20±4 years old, had equal gender representation, had representation of their nationality within the sample mostly similar to that found at population level.

Regarding gender, it was important to know if there was any difference in preferences regarding games or game elements among male and female students in the institution. It was found that the favourite type of game for male participants were First-Person Shooters Games (FPSGs). FPSGs are designed to closely engage players in violent virtual activities (Jansz and Tanis 2007); still, players (of FPSGs) seem to experience rather small amounts of violence in games, compared to the time they spend in non-violent gaming situations (Weber, Behr, Tamborini, Ritterfeld and Mathiak 2009). It is noteworthy that male players are likelier to incorporate video games as a specific part of their socialising routines (Tomlinson 2019).

Although both male and female players perceive video games as a means of relaxation, they define what makes them desirable or relaxing in different ways (Tomlinson 2019). Along these lines, female participants in this study reported a preference for intelligence and quiz/trivia games. Moreover, women tend to dislike violent content and heavy gender-stereotyping in the presentation of characters (Hartmann and Klimmt 2006) and that is probably one of the reasons why women seemed to choose games about interesting facts/questions or that can be intellectually challenging.

In their study based on Data-Driven Gamification Design in education, Toda, Oliveira, Shi, Bittencourt, Isotani and Cristea (2019) explored how gender differences in preferences of game elements can be used to support gamification design. The authors found that males would make more use of social interactions, with strong confidence rules pairing game elements 'Progression and Choice', and females' user experiences and rewards are more relevant with association rules indicating strong confidence for the need of 'Acknowledgement and Progression' (Toda et al. 2019). As this study was conducted in Malta, and thus being mostly comprised of Maltese participants, the motivations of both genders for choosing one type of game over another could be affected by culture.

Along with the gender preferences and cultural issues, the differences of which must be respected, the design of educational technologies must take into account how the human mind works and what its cognitive limitations are. When it comes to collaborative learning, Retnowati, Ayres and Sweller (2018) found that, when teammates have gaps in their knowledge base and the learning environment encourages problem-solving (instead of a worked examples approach), collaborative learning is superior to individual learning. In addition, a combination of different levels of expertise promotes interaction, as when the levels of expertise are more even, a learner is in no need for interaction in order to fill the knowledge gap (Retnowati, Ayres and Sweller 2018). Interestingly, Hwang et al. (2013) found that even though female participants in their study reported higher levels of cognitive anxiety and CL than their male counterparts, this did not affect their acceptance of the game.

More important still than knowing the course or educational level of students to help design the games is understanding how digital games in education affect the CL (Turan et al. 2016). Computer-assisted collaborative learning environments do not ensure success per se. Therefore, auxiliary measures need to be introduced, such as "transactive[2] memory scripts, argumentation techniques and knowledge awareness tools" (Retnowati, Ayres and Sweller 2018: 2). It should also be noted that involving students in the research and development of a gamified learning system will improve the system, deliver a user-friendly platform for the target audience, and promote users' sense of ownership and responsibility (Haruna et al. 2018; Tsay et al. 2018).

A very important question is what keeps students interested in being in the classroom and how this environment could be maintained virtually if gamification is applied. Based on the current study, it seems that students' sense of belonging in the classroom is related to the feeling of being welcomed by friends and teachers, as well as a sense of fairness and respect. Furthermore, the majority of the students stated that the reason they attend MCAST is because it provides a wealth of knowledge and information (46.5%). A study that investigated the effect of hybrid learning instruction (a combination of online and face-to-face learning) on learning outcomes, satisfaction, and sense of community of undergraduate students found that students in a hybrid course had significantly higher learning results, satisfaction, and a stronger sense of community than students in a traditional classroom setting (Chen and Chiou 2014). The authors found that the learning style had a significant impact on the learning outcome in a study group (Chen and Chiou 2014; García and Cano 2018). It is important to stress that a learning style is not a fixed construct, as learning preferences tend to vary from one situation to another (Kolb 2000).

Furthermore, virtual learning environments deliver access to a broader network of students and thus increase the likelihood that students will enrol and succeed in these classes. With this in mind, a hybrid system could serve as a means to produce a stronger sense of community, provide engagement mechanisms, and improve performance (Machajewski 2017). However, virtual environments, including gamified ones, should consider the three socio-emotional aspects linked to online learning: interaction, sense of community, and identity formation (Delahunty et al. 2014; Cheryan et al. 2011; Rovai 2002).

Most students reported feeling relaxed when starting a new term. However, a considerable number of students reported feeling totally stressed. Thus, it is important to find a balance between the states of "relaxation" and "stress", and to understand how to improve the sense of responsibility and engagement without placing students in extreme pressure situations. Gamification might present a solution to this because many participants in this research associated games with having fun. Most of them also said that they might feel more involved with lectures that use game elements and, if a specific task is gamified, they would probably feel more competitive and eager to complete it.

Even though a number of authors reported that students found the gamified course more or much more motivating than a traditional course (Chapman and Rich 2018; González 2018; Haruna et al. 2018; Leaning 2015), other authors are cautious when concluding about the effects of gamification on student motivation and engagement, often suggesting additional studies (Alsawaier 2018; Preist and Jones 2015). For example, Mese and Dursun (2019) found that the participants' in their study were more motivated with competition than the urge to gain knowledge. That is to say, in order to gain points and keep competing, some students were creating irrelevant subjects on the forum. In return, these posts were boring some students and had a negative effect on their social presence. Owing to the fact that latent learning was not measured in their study, the effect it had upon the results

2 When information is shared among teammates in a more efficient way according to their expertise, transactive memory occurs (Retnowati, Ayres and Sweller, 2018).

of the achievement test was disregarded. Therefore, the authors advise that future studies also measure this type of knowledge (Mese and Dursun 2019).

Thus, there is no unanimity among the aforementioned authors about the effects of gamification on students' motivation and engagement. It is important to stress that aspects related to the personalisation of gamification should be considered in order to achieve motivation and engagement, as well as improve performance (Harteveld and Sutherland 2017; Schäfer et al. 2018; Xu and Song 2017).

The main objectives of this research were to identify students' preferences and understand their expectations regarding gamification in education. The study found that most participants liked the idea of turning classes into a fun game and seem to have the necessary electronic resources to study in a virtual environment delivered via learning apps or web-based learning. It was also found that most students, regardless of gender, prefer adventure or thriller games. Participants also associated themselves more with the character of Harry Potter who "[…] was better at trying and doing than studying". This reflected students' personality traits and the way they prefer to study and learn. This comes as no surprise, given that students attracted to a Vocational Education and Training (VET) institution are likely to be the ones who prefer a more hands-on learning approach. It is important to assess to what extent, and in which ways, a gamified system could offer students the same possibility of "learning by doing".

When it comes to the player types, both male and female students in this study predominantly recognised themselves as "achievers", followed by "explorers". Kocadere and Çağlar (2018) observed that the "achiever" found appealing competition mechanics which involved progression and resource acquisition. On the other hand, the "explorer" type of player was also positively affected by progression mechanics, but with the accent on immersion delivered by the narrative mechanics and reward mechanics that were a part of the narrative (Kocadere and Çağlar 2018). When it comes to a specific game element, the element that was disliked by nearly all types of players (except "socialisers") was "team" (Kocadere and Çağlar 2018). Given that cooperation is an educational goal, the "team" element is vital to discourage extreme competition. Therefore, instead of disregarding it, the motivational value of this element could be repurposed by giving it more weight outside of the gamified system; for example, including a "teammate" achievement along with other achievements in the students' final grade transcript or a separate document that contains a description of all the achievements that a student has obtained on a gamified learning platform on their learning pathway in MCAST. Although the findings seem to reveal an optimistic trend for the use of gamification in MCAST, it is important to be clear about the strengths, weaknesses, opportunities, and threats related to gamification in education.

Conclusion

The study population (271 MCAST students) is characterised by young students (average age of 20±4 years old), majority Maltese (81.9%), and mostly only attending college (64.9%). In general, the students expressed being satisfied (median 4) with the learning support, as well as the teaching and assessment methods at MCAST, on a Likert scale, from 1 to 5, with 5 being very satisfied. The majority of participants classified themselves as types of student who are better at trying and doing than studying (male: 50.4%, female: 31.5%, total: 41.3%), and most of them think that lectures could be turned into a fun game (63.8%).

When it comes to player types, as per Bartle's player typology (1996), the majority of students identified themselves as "achievers" (male: 36.2%; female 58.8%; total: 31.5%). Furthermore, although most of the students stated that they prefer adventure or thriller

games (21%), the majority of female respondents prefer intelligence and quiz/trivia games (28.5%), while most male respondents favour first-person shooter games (30.5%).

Students recognised web-based learning (44.3%) as the delivery platform with the greatest potential to improve their studies. If learning materials and activities are available in a web-browser, students would be able to use a variety of tools to access them, such as mobile phones, PCs/notebooks, or tablets (37.3%).

In conclusion, the findings provide insights into students' learning/gaming preferences and their expectations of gamification in education. With the help of student profiles, it is possible to personalise teaching activities by customising them in accordance with students' learning preferences. Learning instructions could be guided by students' expectations of what it would be like to turn classes into a game, i.e., gamification.

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Declarations of interest

None.

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Ethics

All study procedures are in accordance with the ethical standards of the responsible committee on human experimentation and with the Helsinki Declaration of 1975, as revised in 2000. The research protocol used in this research was reviewed and approved by the Institutional Research Ethics Board (MCAST), Paola, Malta [Protocol No. #I06_2018].

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