



The University of the West Indies
St. Augustine Campus
Faculty of Humanities and Education
Caribbean Studies Project
HUMN 3099

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Title of Thesis:

The introduction of gaming in the high school curriculum: A feasibility study.

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ABSTRACT

Gaming is emerging as a means to improve the performance of persons not only from a creative aspect, but also for regular cognitive tasks. This rapidly growing area of gaming has also created an opportunity for its examination as a means of knowledge transfer in the classroom. This study explored the feasibility of the use of gamification in secondary schools in Trinidad and Tobago to gain deeper insights into its potential implementation. Quantitative data were obtained from educational stakeholders through an online survey. Though some challenges were identified, the study overall found support for the implementation of gamification for instructional purposes in the secondary school system.

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INTRODUCTION

In recent years, gamification, defined as “the integration of game mechanics to influence behaviour and engagement” (DuBravac 67), has produced much positive impact globally. These positive effects have been realised in areas including health and education (Fleming et al. 1; Malay 1). In the field of education, gamification has emerged as an innovative means to effectively achieve learning objectives, as learners concentrate better, easily absorbing and retaining pertinent information (Fleming et al. 2; Kirkley et al. 61; Malay 1). Gamification provides opportunities for improved engagement, intrinsic motivation and productivity as a result of combining tasks with game mechanics (Kirkley 6; Malay 1), which promotes repetition and by extension learning in a satisfying way. Further evidence of the value of gamification can be observed from its use in business and law enforcement (DuBravac 67), cognitive behaviour therapy (Fleming et al. 1) and academia (Baker 1), where collaborative learning tasks encourage social engagement and leads to “metagaming”, defined as a continuation of learning through “nurturing affinity spaces” such as online discussions (Gee and Hayes 129; Kafai and Burke 314-315).

Playing video games is an activity in which many persons engage for leisure the world over (Brooks et al. 129). Gamification has made many advances, from the first simple video game of Pong invented by the American game manufacturer Atari in the 1970s. It was a simple game in which a ball was deflected by moving a bar up and down. At present, more complex games exist with enhanced graphics, full-motion video, 3-D effects and high-fidelity stereo sounds. Games now employ input devices such as joysticks and steering wheels which enhance the ability of the user to interact with programmes. Video games have become an important part of society, with an increased amount of time spent on video games annually that is increasing rapidly (Fleming et

al. 1; Marketingcharts). Working on a way to introduce educational video games to replace some of the time spent on entertaining video games could help reinforce school lessons and assignments. Studies show that students that play video games show a lower GPA and less time spent on class work than students that do not play video games (Wadley). The introduction of gamification can therefore help merge students' leisure pursuits with education. As Inchamnan and Wyeth highlight, videogames promote enthusiasm, intrinsic motivation and engagement with problem-solving tasks (1). This type of motivation would no doubt be of benefit to educational systems, especially in countries of the developing world including the Caribbean region.

In the Caribbean region, educational systems have been impacted by varied change initiatives over the last two decades, often due to instructional models proposed by multilateral and donor organizations (Jules 1). Yet in spite of varied innovations in education, there continues to be a call for redefining education as an instrument that can transform Caribbean societies, given the fact that our education systems appear effective (Jules 1). This should involve consideration of unique global changes and a new educational philosophy while ensuring that learning becomes enjoyable (Jules 1). As Kafai and Burke emphasize, previous discussions on the use of videogames centred on potential problems, whereas current research highlights many advantages to be gained from its use in education (316). This study therefore seeks to explore the role that gamification, as an unparalleled global change, can play in secondary education.

The Republic of Trinidad and Tobago, like so many other Caribbean nations, continues to seek improvements to its education system. Similar to other Caribbean countries, there have been changes made to the education system over several decades. Recently Trinidad and Tobago's Ministry of Education has promoted the inclusion of video games as a teaching strategy in its Science, Technology, Engineering and Mathematics (STEM) primary curriculum,

in Math and Science (Kalloo et al. 21). The use of gamification is also noted in indigenous educational videogames, Pennacool and JJ & Friends, which are televised in Trinidad and Tobago and target primary school students. However, there is currently little information available on gamification and its possibilities in Trinidad and Tobago's secondary schools. This study seeks to address this concern.

It is important to emphasize that the use of videogames in education should not be considered a panacea, as there are other factors that can impact the teaching-learning process. Of note is that videogames are effective in education when the game is engaging and there are clear linkages between the game and its objectives (DuBravac 67; Kafai and Burke 313). However, there continues to be much debate on the effect of videogames on children, such as the role of addiction and aggressive behaviour. Some studies show that children can become more immune to violence from the exposure of violent, realistic games. In addition, some can become obsessed with video games causing them to do fewer physical activities and consume junk food, which can be injurious to health when lengthy time periods are invested in playing. ("University of Utah Health"). Still, the benefits of video games in education may well outweigh possible disadvantages, once teachers are clear on how the videogame will enhance learning. As citizens of the CARICOM region, where human resource development and by extension national development is considered a priority (Morgan 1), it is important to note that:

...the fragile archipelago of our Caribbean sits like a fleet of fragile boats buffeted by the international storm and incapacitated by its own limitations. There are many things that need to be fixed and fixed urgently, but the preparation of the next generation is one of those responsibilities and challenges that cannot be postponed.

And this ultimately is the urgency and necessity of reinventing education. (Jules 1)

A possible means, then, for ‘reinventing education’ in the secondary school system in Trinidad and Tobago can be through gamification. Videogames can be useful in educational settings, as demonstrated in research that points to positive outcomes (DuBravac 5; Fleming et al. 3). As such, the use of gamification in teaching for improving learner knowledge, attitudes and skills is a rich area for research in the Caribbean region.

CHAPTER ONE

Trinidad and Tobago's Ministry of Education has introduced technology in schools via distribution of laptops for secondary school students and online teaching during the Covid-19 pandemic, but there seems to be a lack of continued training or development to enhance virtual instruction. For example, there seems to be minimal consideration given to the use of video games in the curriculum. Video games are usually a pervasive source of entertainment around the world, with games impacting many spheres of our society even apart from kindergarten and primary school education. Health care and other aspects of tertiary education, business and military training are some sectors that have embraced games, simulations, or gamification as a means realizing effective training and learning goals (Baker). In Trinidad and Tobago, education appears to be slowly progressing through the twenty first century.

Discussing Trinidad and Tobago's educational system, Mahase states that "our education system does not cater for individual learning styles and teachers are restricted because they have a curriculum to complete in a specific time frame. If the child cannot keep up with the pace or the curriculum this is reflective of the inadequacies of the teaching system, not of the child's ability to learn." Yet there seems to be hesitance when it comes to development, particularly in the technological aspect of education. As Mahase further asserts, "Every child, disability and all, is capable of learning. One has to be creative in how one teaches them. Old-fashioned teaching methods (cramming and regurgitating) will not work for many children."

According to Villagrasa et al., gamification is not about turning the classes into a game but using it to create engagement. Gamification generates comprehensive, immersive environments that facilitate the acquisition of knowledge and increase learner motivation. (Acosta-Medina et al. 155) Video games entertain as well as motivate, so why not combine all these elements into

educating young minds? While there have been several educational initiatives in Trinidad and Tobago, there seems to be little follow-up of adequate training and resources provided to schools to fulfil the government's policy goals. These goals appear to be lofty statements that are not readily translated into effective action. The Trinidad Pennacool online education is a positive start to the use of gamification in Trinidad and Tobago's educational arena, and one can see value in this method being used as an asset to education that should be explored and developed further.

Gamification can benefit not just students but all involved in teaching and learning. There are many methods that can benefit the stakeholders in education such as parents, students and teachers. These include creating online downloadable resources so that students and teachers can always access the video games, as compared to board games. This will allow the users to keep track of their progress and have more personalised study sessions. Several studies have shown results of academic improvements for learners (Airas; Ni Mhurchu et al.) It is therefore crucial to give students a platform to enhance their knowledge and skills, implementing instructional content in a simulated scenario that can prepare them more effectively for real world challenges. In turn, this can lead to the creation of jobs and a more interactive curriculum, with teaching adjusted based on data collected from the video games. This teaching strategy could not only be used in secondary schools, but expanded to the tertiary level to allow students to reinforce and update their knowledge and skills.

This study thus seeks to explore the feasibility of implementing gamification in secondary schools in Trinidad and Tobago as a learning initiative. In the chapter which follows, the literature on gamification in education will be discussed.

CHAPTER TWO

Much interest has been generated in recent times on the use of gamification in the field of education. Several studies have addressed teaching and learning initiatives with a focus on gamification and documented the results. In this chapter, an examination of the literature on gamification in education will be undertaken. The findings on the impact of video games integrated into the teaching-learning process and its effects on learners will be discussed, with a view to the feasibility of gamification's implementation as a teaching-learning initiative in the context of Trinidad and Tobago.

Mathematics is one of the core subject areas that reaches into many areas of life. For some learners, the subject of mathematics can be challenging. New ways of teaching this subject are often explored to help students. A study undertaken by a company, 7 Generation Games, focused on the introduction of gamification to tackle such the issue of low achievement in Mathematics in the USA. The participants were grades 4 to 6 American Indian children in rural Dakota. The study, entitled the Dakota Learning Project (DLP), was an eight-week experimental pilot study with the aim of raising the math test scores in the content areas of multiplication and division of students in the rural community. The use of a 3-D virtual platform allowed students to solve math problems, which contained elements of Dakota culture. At the start of the study, there was a pre-test in which the students' scores were recorded. All grades were tasked with playing the apps during school hours for over eight weeks. Accurate responses led to a continuation of the game, while incorrect responses routed users to apps, links or videos that taught the necessary content. At the end of the study, there was a post-test to note any changes in math scores. ("7 Generation Games")

The advantages that were constantly noticed in gamification studies in comparison to traditional teaching was the ability to technically teach various skills at once, sometimes without the user even realizing it. The DLP is a computer game primarily designed to get students to spend more time practising their mathematics skills, but by using a traditional Native American setting to keep students more engaged and motivated, culture can be taught simultaneously therefore extending the playtime of the game's activities. (De Mars 5) When an activity is genuinely enjoyable, one is more inclined to play for longer hours which was achievable for the DLP video game. Encouraging students to study for longer periods of time is not so easily done during and after school hours, especially with difficult subjects that are commonly not interesting for students in the twenty-first century.

When the experimental group playtime and percentage were recorded at an average of two minutes per question of game progression, students were asked a question in which each answer was carefully recorded. The total minutes the class spent on the tasks was computed from the information gathered whilst they played to better understand how the participants interacted with the game (De Mars 14). Phase I's objectives were achieved showing great promise in the study in which the testers, schools and after-school programmes were even interested in continuing using these tools. Not only was the feasibility of the programme shown in the results gained, but it shows most importantly the increase of motivation levels in the students. (De Mars 16) The results of this study point, therefore, to benefits that can be gained with the use of gamification in teaching.

When one thinks of physical education, video games might not be the first thought that comes to the mind. Physical education provides cognitive content and instruction designed to develop motor skills, knowledge, and behaviours for physical activity and physical fitness (Division of

Population Health). The Nintendo switch has a plethora of selections to choose from such as the Just Dance series, Ring fit adventure or even Mario Tennis Aces that may pique one's interest. These games are specially designed to keep one interested while playing using aspects from the Gamer Motivation Model. The major benefits to the use of active video games (AVGs) are the ability to collect data and track the player's progress in a user-friendly way that is personalized compared to a group environment in school where teachers may not have the time to give individual attention.

A study by Ni Mhurchu et al. involved twenty children aged 10 to 14 years who were the participants in a twelve-week pilot experimental study in Auckland, New Zealand. The twenty children were randomly selected and placed into two groups; a control group and an intervention group. While the children all played electronic video games, the control group did not receive any intervention, whereas the intervention group was given a bundle of active video gaming tools. The parents were asked to encourage their children to engage in physical video games over the non-physical electronic games. Data reflecting the participants' physical activity were obtained at baseline, mid-study and at the end of the 12-week period. Analyses of activity counts were repeated by means of a linear Poisson regression model, with regression analysis of covariance (ANCOVA) used to test the impact of the intervention. All data were analysed using the Statistical Analysis Systems (SAS) package.

The results of the study revealed greater physical activity in the intervention group, with increased reductions in waist circumferences and body mass indices (BMI) for the intervention group as compared to the control group. These promising results suggest that active video games can serve as an effective form of motivation, as demonstrated by its ability to get users to increase their physical movement in this study.

Research by Duncan and Staples investigated the link between AVGs and students' physical activity levels during play time. Following up on data that showed that students are generally sedentary, thirty primary school children in Britain were randomly selected to take part in a 6-week AVG intervention during recess time. The participants were placed in either a control or experimental group, with their footsteps and heart rate monitored. Analysis of covariance was repeatedly used to measure differences in physical movement during recess time. The results of the study thus showed that steps per day gained were greater for the participants when using the AVGs during the first week of testing. However, this trend did not continue by the middle and end of the intervention, as the "traditional" recess activities gained more steps per day after the first week of the study. The findings thus seem to point to the positive impact of AVGs only at the initial stages of its introduction.

Another study examined the use of AVGs and physical activity levels over a longer period of time. What this did was give the students more time to gain experience, making their physical activity skills intensify at the second semester compared to the first semester. Although these studies are well researched, not much has been done to understand the association between AVGs and other related academic achievements. Dance Dance Revolution (DDR) was used on a group of Latino children three times a week with a DDR-based exercise program at school to test this. The results showed the children in the intervention group had a faster running time, greater improvements in their math test scores and improved reading scores compared to students who simply participated in overtime in the controlled group. (Ni Mhurchu et al.) When given that extra time, students steadily improved at a faster rate using stimuli like video games over the "traditional" methods used. A common trend seen with these studies are the potential for resources to become difficult to provide, but just like computer labs are made for student to have

access to that technology, rooms designed with video game equipment in mind can be made just like a gym.

History, another core subject required in the education system is not easily grasped by most students. Further, research and self-motivation are skills that are usually lacking due to the vast distractions presented in the twenty first century. Goals, rewards and even location are just some of the design considerations when making games for education. Exploration outside of the classroom was the agenda when making a game for History and for one case study. (Airas 52) Most of the participants for the study were not enthusiastic about a programme involving schoolwork. This changed however once they started to understand and recognize the language associated with the game's ancient cultures such as the military unit of ancient Greece which raised their enjoyment from playing the game which seemed to have a positive effect on subjects. When educational video games are designed from the perspective of education first and gaming second, it became uninteresting to most users.

Another game used with the students, called Pax Warrior, seemed to be more engaging for the students to play. A simulator style game which allowed the participants to re-enact the decision making of the United Nations during the genocide in Rwanda, frustrated many due to a lack of an outcome where everyone wins. This game, though seemingly frustrating, created an environment where the students were able to discover novel solutions to conflict during their continued gameplay. This research suggested that new insights can be gained when playing games, even if the game is not necessarily fun, such as when there is a death due to a decision made. (Airas 53) The findings of this study suggest that the genre of a game may play a more important role in attaining the learnings outcomes for students. Simulations can thus create more

in- depth thinking in relation to situations and outcomes, whereas flash card style games may be more beneficial for fast paced information.

Overall, the studies reviewed in this chapter point to the positive effects of gamification on learner behaviours, knowledge and skills. This, in turn, provides an important indication that the use of gamification in the secondary school's curriculum, the focus of this study, can be a worthwhile opportunity to improve educational outcomes. The chapter which follows provides the data collection and analysis for this study.

CHAPTER THREE

Feasibility studies are done at the preliminary stage of research to evaluate and explore the viability of a project (Orsmond and Cohn 1). In line with Orsmond and Cohn, this study is an example of a feasibility study. The following research question guided this study:

1: What is the feasibility of implementing gamification in secondary schools in Trinidad and Tobago as a learning initiative?

To answer this research question, quantitative data were obtained through the distribution of an online questionnaire. The online questionnaire was used as it provided a quick response rate and was cost and time effective. In addition, online questionnaires tend to be more accurate in terms of participant responses and are easy to use for those involved in the research process, including participants and researchers when compared to pen and paper questionnaires. (Lumsden and Morgan)

The participants for this study were selected by means of snowball sampling, “a technique to identify and recruit candidates for a study in which existing participants recommend additional potential participants, who themselves are observed and asked to nominate others, and so on until a sufficient number of participants is obtained.” (APA) The questionnaire was designed using Google forms. Over thirty participant responses were collected and analysed using descriptive statistics. The three main areas designed to be answered in the questionnaire focused on participants interest levels in the use of gamification, their experiences with educational video games and their perspective of gamification as it can be used in the field of education.

This chapter thus provides an assessment of the public’s interest in gamification as a teaching method in Trinidad and Tobago’s current secondary school curriculum. Through the

questionnaire, a better understanding of the public’s perspective on gamification and its potential for use in instruction will be obtained. This information is represented in Figure 1 and Figure 2 which show the age group and type of participants.

The responses obtained from the questionnaire are presented below.

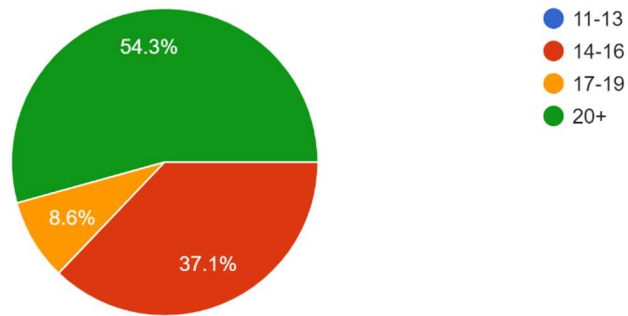


Figure 1. Age group of participants.

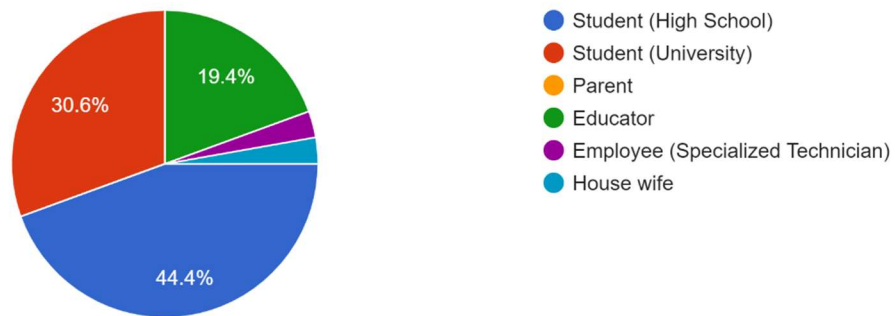


Figure 2. Participant Occupation.

The questionnaire responses showed that most of the participants (n=36) were over the age of 20 and most of the responses (75%) came from the student population. Consequently, the majority

of the responses show the perspectives of students at the university and high school level combined.

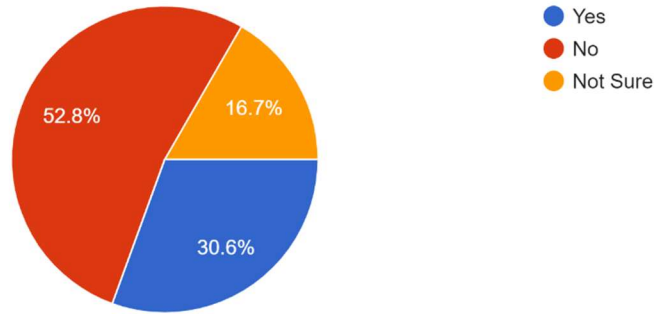


Figure 3. Knowledge of the term ‘gamification’.

Figure 3 reveals that a minimum number of participants are aware of the term ‘gamification.’ This suggests a need for educating the general population about the concept and uses of gamification.

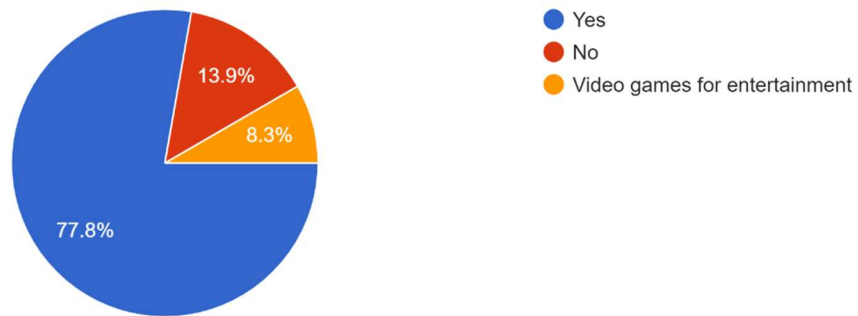


Figure 4. Prior experience with educational video games.

Figures 3 and 4 give insight on the public’s experience with educational video games. Though 52.8% (n=36) of the participants were unaware of the term, 77.8% had used educational video games before. This suggests that while gamification and educational video games are closely

related as they both strategically promote engagement and motivation in its design, they are different, there is still a need for public education on this topic.

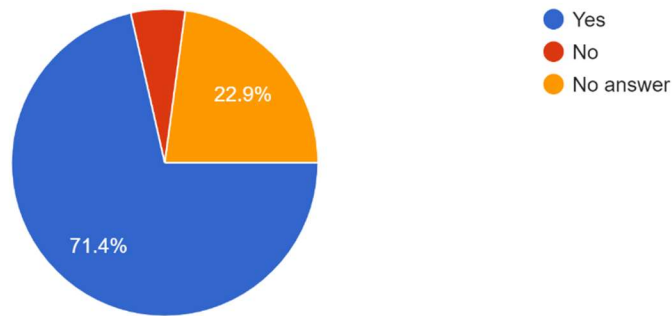


Figure 5. Participant benefit from educational video games.

When asked whether the participants benefitted from using an educational video game, most of the respondents, 71.4% (n=35) answered in the affirmative, as displayed in Figure 5. Just two participants, 5.7%, stated that they did not benefit from educational video games. Of the 36 participants for this question, one did not give a response. While this data suggest that gamification has not reached all citizens, there is great promise for improving learning through this means as the majority of participants have gained some benefits.

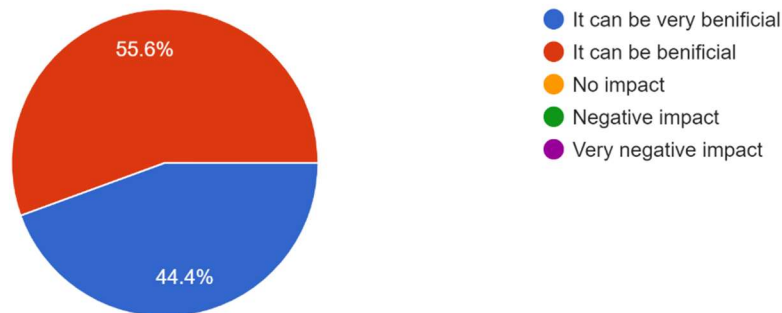


Figure 6. Understanding of gamification as a tool for learning.

The last few figures showed that the participants understood what gamification and educational video games can offer as a tool for student learning, some even experiencing it themselves. Interestingly enough, all participants agreed that gamification can be of benefit if used in the teaching-learning process, shown in Figure 6. This data is valuable as it suggests that gamification is well on the way to being accepted as a teaching tool.

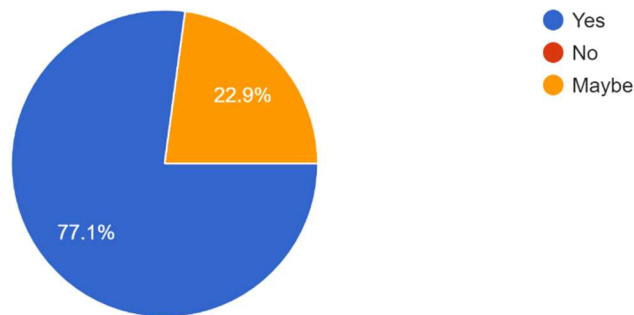


Figure 7. Perspective on gamification’s benefit in the understanding of content.

Gamification and by extension, educational video games have been found in studies to reinforce the understanding of topics taught in schools (Airas, “7 Generation Games”). Figure 7 shows that while 22.9% of the respondents were unsure if gamification could help with understanding instructional content, the majority of the responses (77.1%) demonstrated certainty about the positive role that gamification can play in learning. This is further strengthened when viewed with the willingness of the majority of respondents to use video games for the purpose of education, as shown in Figure 8.

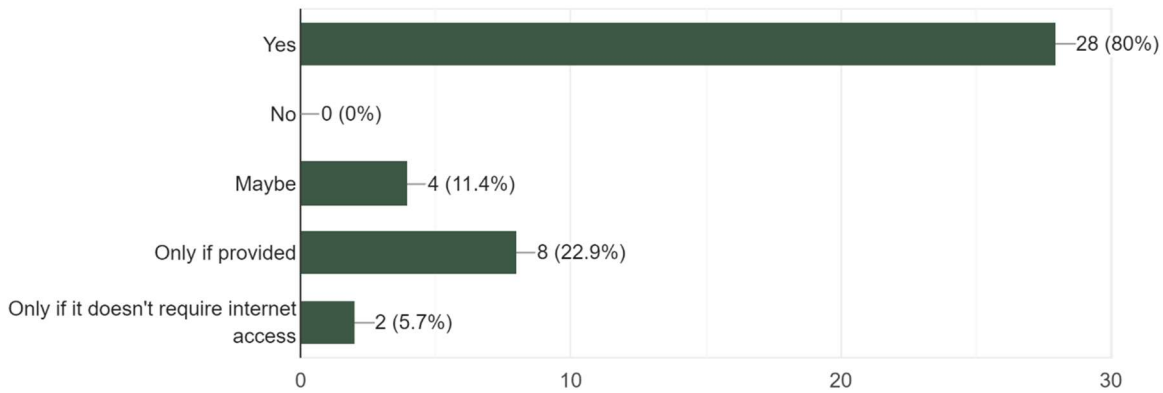


Figure 8. Showing participants' willingness to use educational video games.

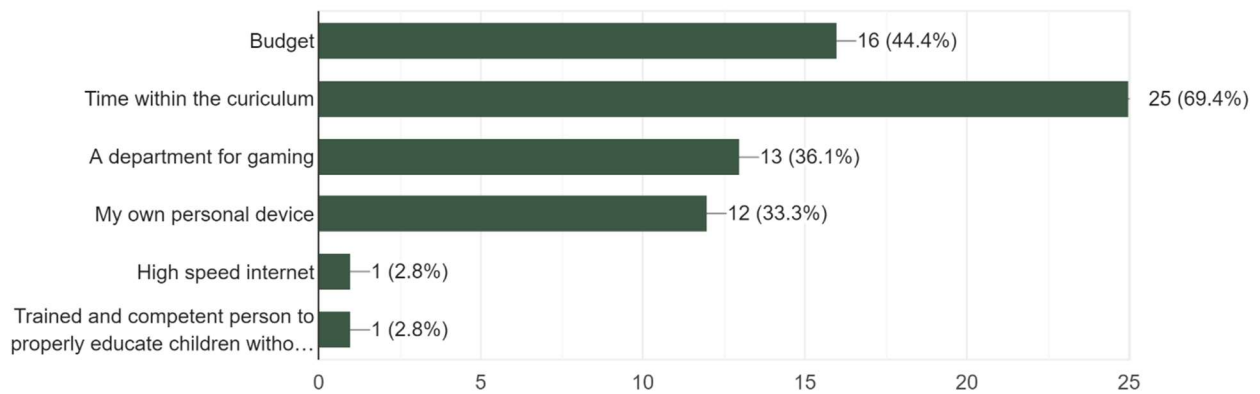


Figure 9. Showing gamification introduction requirements.

Figure 9 shows the participant view of what is required to have educational video games integrated in the curriculum. 69.4% percent of respondents were concerned about the availability of the time to use such a tool within the current school's curriculum. Resources such as internet speed can be provided in schools but at least 33.3% percent of the respondents revealed that they would prefer to work with their own devices. This showed that the majority of the participants

are open to trying a new strategy, such as gamification, in the education system, once the right requirements are met to use such a system.

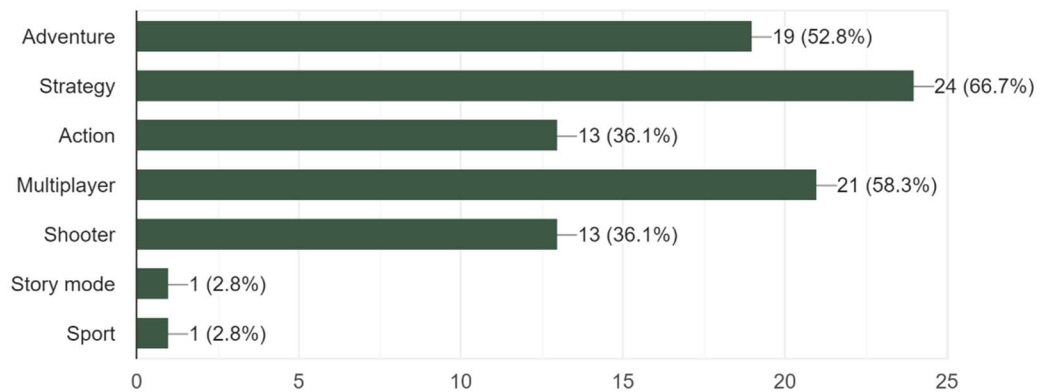


Figure 10. Participants' preferred genre.

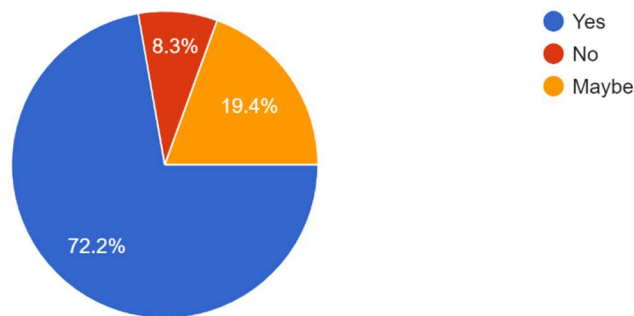


Figure 11. Perspective on genre's importance.

The genre of a game helps guides the design of the game elements such as the challenge and skill to accomplish the goal or tasks given to the player. In response to the importance of the game's genre, the top three responses were strategy, multiplayer and adventure genres, which shows what the respondents prefer to play. These responses are similar to that of a study conducted by

Ray et al. which discovered that the game genre can create unique results in the human brain when played. Strategy games were found to link processing speed and white matter connectivity in the brain while action games triggered the region of the brain governing mood. The research also found that performance on task requiring speed was improved with subjects who played a strategy game (IOS Press; Ray et al. 437).

An adventure/story game will have a greater quantity and quality of dialogue which can be advantageous in the teaching English or another language. Action and shooter/target games are more fast paced and may be needed for specific game designs. A shooter game, for example, may have the stigma attached that suggests that the player may become more violent, but research shows that video games may be associated with a small but potentially negligible increase in aggressive behaviour (Warnick). Gamification can apply the targeting element of a shooter, for example, to select an answer from a selection of multiple options to respond to a question given. This method can build interest and coordination which can be done both digitally and physically with props.

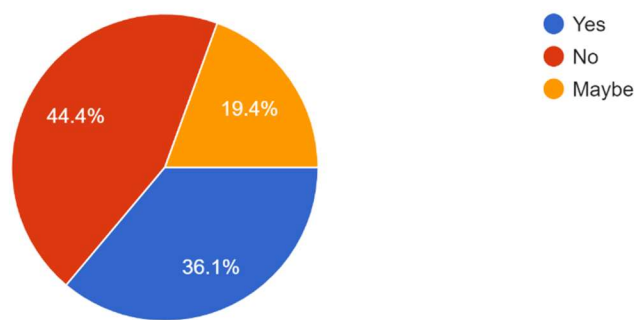


Figure 12. Responses on the need for winnable games.

Figure 12 reveals that while most of the participants understand that there is no need for success every time a game is played, some may want some form of satisfaction or reward from playing a game. While this was proven to not be a necessity, as noted with the study that focused on the teaching of history (Airas 52), for the teaching of most subjects, having a clear achievable goal would encourage beginners to the gamification system to keep using it.

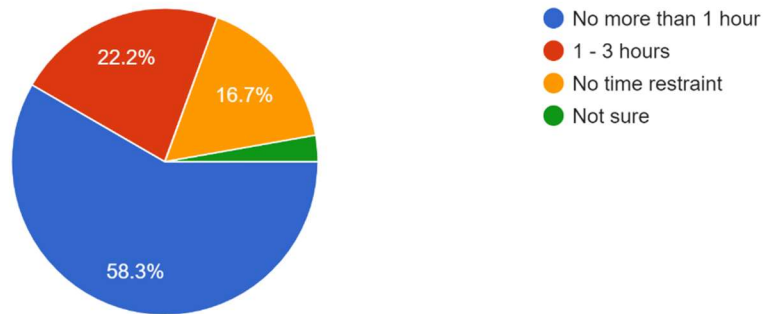


Figure 13. Showing participant's preferred time spent on active video games.

Figure 13 shows that 58.3% of the participants do not want more than one hour of use of a gamification tool per day. This question in particular gives insight into the stigma of video games not being beneficial, even if they are designed for educational purposes.

The overall findings of this study thus showed a positive view of implementing gamification in schools. The next chapter provides a brief summary of the study.

CONCLUSION

The data analysed in this study assessed the public's interest in gamification as a teaching method, which shed light on the feasibility of gamification in schooling. The overall data show that in terms of integrating gamification into the school's curriculum, the perspective shared by the respondents is a very positive one. However, there were some concerns about its proper use and possible challenges that may ensue given the structure of the school curriculum. While there is interest in gamification, therefore, the findings suggest that effective implementation needs to go hand in hand with adequate resources and proper infrastructure in schools, a lack of which may hinder the effective implementation of a gamification initiative.

Many of the responses from the questionnaire were given by students who are an integral part of the education system, which suggest that learners are interested in some form of educational change. The findings of this study further reveal that gamification in the school context can meet this need. The analysis of the data showed that the over-20 age group is very interested in the concept of gamification as a teaching method, which points to the potential for implementing gamification at different levels of the education system.

In examining the participants' understanding and experience with gamification, the responses showed that 77.8% of those who had prior experience with educational video games were mostly confident about the benefits these could provide. This in turn may have contributed to their understanding of gamification. Gamification will allow students to hone their skills when used with education in the same way simulations are used for training in various spheres, which is why all respondents, regardless of personal experience, agreed that gamification would provide support for understanding instructional content. Implementing gamification can help to close that

gap and give instant results. Genre, goals and time spent are some of the requirements that need to be meticulously designed to make gamification in education as successful as possible.

The questionnaire also focused on the implementation of gamification, allowing the respondents the ability to select multiple answers and give open-ended responses as desired. Most respondents noted that time within the curriculum to support gamification's implementation was necessary, which suggests that the curriculum is already overburdened, or that the execution of gamification for instruction may prove too challenging for the current education system or teachers. A solution to this can be the use of the afterschool homework activity combined with gamification which can eliminate scheduling issues that may occur within the current curriculum. Using a reward system may also encourage students to work on tasks or prompts given by a list of daily tasks commonly used in games to earn rewards.

Financing will always be a part of any new project that needs to be included in a school and Trinidad and Tobago's school system has two categories of schools: public and private (UNESCO). Public schools will clearly have an advantage since financially they are supported by the government but when it comes to private schools, this may represent another hurdle to gamification's implementation. This can be seen in the responses that identified the need for and the challenge in having all learners own a personal device, which was ranked the third highest in responses. Other challenges reflected in the responses included the need for a specialised department for gaming, which is linked to the importance of the technical development side of gamification in Trinidad and Tobago. One suggestion would be the inclusion of gamification coursework in teacher training programmes. There were also two open-ended responses that pointed to the need for high-speed internet and trained and competent personnel. These responses

support the idea of capable teachers and sufficient resources to support such an initiative, which will lead to the success of gamification in the curriculum.

Another suggestion for strengthening the effective use of gamification for learning is making educational video games online for schools. This can create opportunities to collect data from students' results almost instantly, which can make for efficient and regular updating and refining of the games. A capable department with this information at their disposal can make for a more dynamic learning experience, which will in turn foster a more creative problem-solving environment within the secondary school.

The results of this preliminary study thus point to many opportunities and strengths with regard to the rapidly growing field of gamification. The responses also imply that the viability of gamification is likely to be a successful one since all participants agreed on the benefits that gamification can provide. Despite the challenges expressed in some responses, which can be resolved by addressing resource and training needs, the findings from this study provide support for the feasibility of implementing gamification in the secondary school system in Trinidad and Tobago. As Jules has asserted, in the Caribbean, "education cannot be business as usual." Gamification, an important tool through which the "rapid obsolence of knowledge in the information revolution" (Jules 1) can be addressed, using the transfixing elements of play for improved educational gains in Trinidad and Tobago's secondary school context, is a feasible means to this end.

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APPENDIX A – Questionnaire Protocol

1. Age group

- 11-13
- 14-16
- 17-19
- 20+

2. What kind of participant are you?

- Student (High School)
- Student (University)
- Parent
- Educator
- Other

3. Gamification is the adding of game-like elements to something. Have you ever heard of this term before?

- Yes
- No
- Not sure

4. Have you played any educational video games before?

- Yes
- No
- No answer

5. If yes, did you benefit from playing them?

- Yes
- No
- No answer

6. Do you think educational video games can be used as a tool for learning?

- It can be very beneficial
- It can be beneficial
- No impact
- Negative impact
- Very negative impact

8. Do you think educational video games will help learners better understand topics presented within the classroom?

- Yes
- No
- Maybe

9. Would you be willing to use educational video games? (Multiple answers allowed)

- Yes
- No
- Maybe
- Only if provided
- Only if it doesn't require internet access

10. What do you think would be needed to introduce educational games in the classroom?

(Multiple answers allowed)

- Budget
- Time within the curriculum
- A department of gaming
- My own personal device
- Other

12. What genre do you enjoy playing? (Multiple answers allowed)

- Adventure
- Strategy
- Action
- Multiplayer
- Shooter
- Other

13. Do you think the genre played is important?

- Yes
- No
- Maybe

14. Do you think a video game needs to be winnable to be effective? (These games are usually simulations where the outcome may not be what was wanted)

- Yes

- No
- Maybe

15. How much time do you think a learner should spend on educational video games per day?

- No more than 1 hour
- 1-3 hours
- No time restraint
- Other