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Research Article Title: Exploring the value of online games to promote students' engagement in an IT module.

Due date: 31 October 2016

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Abstract

This quantitative research sought to determine the value of using online games in improving students' motivation and understanding of Information Technology related modules for first year students at a Higher Education Institution (HEI). The study's population consists of first year students enrolled for a Bachelor of Information Technology in Business Systems degree. Data was gathered through the use of a questionnaire. Results indicate that the use of online games improved their engagement in IT modules such as Programming Logic and Design. It was also established that playing the online game Tetris improved interactive and mathematical skills which are critical in creating the foundational knowledge for Information technology modules. This study is exploratory and therefore limited in scope and depth. No generalizations from the results could be made.

1 Introduction

Cook, Macintoch and Rashtoch (2000) assert that tertiary institutions the world over have their own practices to ease the stresses of first year students' transition into higher education and in doing so help to improve institutional throughput rates. According to the same authors, this is important because higher throughput rates translate into higher student retention that has become a significant issue for both students and institutions. In South Africa, Essop, Nxesi and Mputing (2013) contend that there is an articulation gap between high school and university, in which students leaving high schools are ill prepared to deal with the challenges of teaching and learning in higher institutions.

In a study by Scot, 2000 (cited in Pandor, 2006), first year results for Information Technology related modules at tertiary institutions are historically poor. These observations are consistent with the findings of Lever (2009) on first year results at tertiary Institutions in South Africa. The author pointed out that first year students struggle to maintain their commitment to studies as well as to bridge the gap between the high school environment where Information Technology subjects are not stand alone subjects and tertiary studies where IT is offered in a modular format. Lever, (2009) contends that while at high school the subjects are done over a full year with the teacher devoting more time to prepare students for examinations, the approach changes drastically at tertiary level where most of the modules are unfamiliar and offered in

semesters with the educator focusing mainly on presenting key information pertaining to a module, leaving the assessment process in the hands of students.

The lack of preparedness for tertiary education by matriculate grandaunts is compounded by the fact that they are coming from 80-90% of South African schools which are considered poor schools (Habib; 2011). Their background knowledge in Information Technology is limited to allow them to deal with the fast pace approach of teaching at undergraduate level. In the higher education context, Clayton (2011) admits that the lack of preparedness results in students' absenteeism from modules perceived to be difficult and subsequently, this is leading to low throughput rates.

With the challenges of slower transition from high school to tertiary education, Krause, Hartley, James and McInnis (2005) as well as Krause, McInnis and Welle (2002) (cited by Du Plessis and Benecke, (2011) agree that early management has a positive influence on the academic and social development of new students. One such early management approach is the use of online gaming as a strategy to improve the performance of IT students in their first year. Ke (2008), Papastergiou (2009), Inal and Kizilkaya (2009) contend that educational online games have been found to be effective in motivating students to learn.

Rieber (2005) defines gaming as the use of interactive media with dynamic elements that are under user control. Salen and Zimmerman (2004) gave an amplified definition of games as a system in which players engage in artificial conflict, defined by rules, that results in a quantifiable outcome. Moursund (2007) further refines the definition by requiring the game system to incorporate technology.

Over the last century in the United States, there has been a consistent interest in harnessing the power of technology to add contemporary relevance and improve instruction (Fladen and Blashki, 2005; Kirriemuir and McFarlane, 2004). Wastiau, Kearney and Van den Berg (2009) explain that games are specifically designed to teach people about certain subject, expand concepts, reinforce development or assist them in learning a skill as they play. Extensive work has been done in the use of games in education but this has been confined to language development, arts and culture as well as mathematics at the level of pre-primary and primary level of education (Ronan and Elihu; 2000).

This study therefore seeks to explore the use of games as a teaching tool in an Information technology related discipline at tertiary level. Due to the multiplicity of games on the gaming market, the study will focus on the use of collaborative online games such as Tetris® as a teaching tool to motivate students in Information technology modules for Bachelor of Information Technology. It is envisaged that by playing this collaborative online game, students will develop interest to learn abstract Information Technology modules such as Programming Logic and Design and Programming.

Tetris is a puzzle game comprising of blocks that are made up of four segments. During gameplay seven randomly rendered tetrominoes or tetrads shapes composed of four blocks each fall down the playing field. The object of the game is to manipulate these tetrominoes with the aim of creating a horizontal line of blocks without gaps. When such a line is created, it disappears, and the blocks above (if any) fall. As the game progresses, the tetrominoes fall faster, and the game ends when the stack of tetrominoes reaches the top of the playing field.

In its collaborative format, two players will help each other to identify the tetrominoes that should fit into the hole of the playing field. Players' collaborative skills and spatial and geometric skills are put to test as the tetrads drop faster. As the students play the game either as individuals or in the collaborative format, they sharpen the visual spatial skills to place tetrominoes in their correct holes when completing the rows. In Programming Logic and Design it is assumed Tetris simulates a code. It is hoped therefore by playing the game, it will set the foundation for understanding the basics of coding which is the backbone of Programming Logic and Design.

2 Problem Statement

Under-preparedness by students entering tertiary level education is a major cause of concern for stakeholders in the education system in South Africa (Du Plessis and Benecke; 2011). This under-preparedness is systemic in the South African education environment and requires higher education institutions to build capacity in their teaching and learning to stop students from dropping out of higher education institutions. As asserted by Habib, (2011) tertiary Institutions get their students from 80-90% of the poor schools in South Africa. These students find it challenging to adapt to the fast pace teaching approach at higher education institutions. Performance in Information Technology (IT) modules has been singled out by Moeke and Maile (2008) as frustrating for first years due to a lack of prior experience, knowledge and the fast

pace at which these modules are taught. Manifestation of the problems in tertiary institutions is absenteeism in IT modules and subsequently low throughput rates for IT modules. For example, the three-year trend in the module programming Logic and Design has shown a drop in throughput rate from 40 % in 2012, 36 % in 2013 and further down to 31 % in 2014 (IIE;2015). These throughput rates are a cause of concern to all stakeholders and calls for educators to find ways in which to encourage student engagement with the learning content and in that way promote increase throughput rates. Related to the problem the aim of this study is to determine if an online game such as Tetris can be used to teach important IT skills related to Programming Logic and Design.

Related to the description of the problem, the following research questions explore the problem in more detail:

- In what way did the collaborative game of Tetris used in the IT module encourage students to actively engage with the content of the module?
- Did the use of the collaborative game Tetris have any value for Information Technology students understanding of the contents of IT modules in their transition from school to higher education?

Linked to the above the aim of research is to clearly explain the purpose of the research. Within this context the study focuses on establishing in what way the use of Tetris as a collaborative game encouraged first year Information Technology students to engage more actively with the learning content of the module and whether there is value in using Tetris as a collaborative games to enhance module content knowledge and support students in making the speedy transition between school and higher education studies.

3 Literature Review

Gayla and Keesee (2012) define an educational game as a game designed to teach humans about a specific subject and to teach them a skill. Salen and Zimmerman (2004) also point out that games constitute a system which players engage in artificial conflict, defined by rules, that results in a quantifiable outcome. The same scholars also point out that the use of games and games based learning has been part of education for decades. Rieber (2005) contends that although games have been a staple in the classroom for years, they were largely single player or turn based rather than truly collaborative.

The Horizon Report (2011) identifies three types of educational gaming. There are games that are not digital, games that are digital but not collaborative, and collaborative digital games. Examples of digital games that are not collaborative include Typing Instructor, Cell Craft and Simcity. In the category of digital games that are collaborative there are World of Warcraft, Moonbase Alpha and Tetris.

Various scholars have published extensively on the role of gaming in teaching and learning. Ke (2008) Papastergiou (2009) Inalanci Kizilkaya (2009) all contend that games encourage exploration and are particularly engaging to students. Their view is also supported by Kinzie and Joseph (2008) who state that gaming and simulations can enable students to develop familiarity with activity before they engage it. In the case of entry level students at tertiary institutions, this could be a sure way of initiating them into the complex world of Information Technology modules in their first year.

A study by McGonigal (2011) on students' engagement showed that the longer children stayed in school, the less engaged they become. Seventy-six percent of elementary learners were engaged at first but this dropped to 61 percent in middle school and down to 44 percent in high school and finally 30 percent at tertiary level. McGonigal (2011), as supported by Perensky (2012) states that the cure for lagging engagement lies in gaming. Gaming evokes in the student's emotional effects ranging from joy, relief, love surprise pride curiosity, excitement, contentment and creativity. The scholar goes on to say that when those emotions activate certain areas of the brain, they also counteract feelings of depression for periods long after the game is ended.

In the learning process, Van Horn (2007) validates that games keep students focused on the goal and provide challenge. By incorporating challenge, Ash (2011) asserts that games can also be adapted based on the students' needs. The author further points out that appropriate scaffolding can be provided in games through the use of levels allowing the player to advance on to more complex levels as the player achieves mastery. The author surmised that flexibility from one level to the other is a variation to the repetitive nature of theory learning which is lagging in students.

Games and simulations have found consistent use in languages, science, History, geography at all levels but not much gain has been recorded in Information Technology subjects (Buck 2012).

The choice of Tetris as an online game is based on its extensive availability and compatibility with the gadgets students at tertiary institutions have. In-built game features testing students' ability to think logically at speed when filling holes in the playing field relates well to the programming Logic and Design module done at the Bachelor of Information Technology degree.

Linked to the literature review, the following key definition will be relevant to the research:

Collaborative games: Zagal and Rick (2006) define a collaborative game as a computer game where “all the participants work together as a team, sharing the payoffs and outcomes.” In collaborative gaming, if the team wins or loses, everyone wins or loses. The players have the same goal to work to minimize the team's utility (Marschark, 2006). This study will explore if collaborative games contribute to the three learning attributes as propounded by Alavi (1994) namely active engagement, cooperation and problem-based learning.

4 Research Methodology and design

This research is exploratory, using quantitative methods mediated by a questionnaire administered to 40 students studying towards the Bachelor of Information Technology Systems. In explaining quantitative methods, Creswell (2009) places emphasis on the testing of the objectivity of theories or assumptions through examination of variables.

4.1 Research Paradigm and Methodology

The post-positivism paradigm is best applicable paradigm in this research. Post-positivism came as a modification of positivism that believed in the certainty of a single truth objectively observed without any influence from the researcher (Crotty, 1998). Post-positivism, as much as it embraces the notion of objectivity and realism, goes a step further by stating that the researcher cannot objectively observe reality as an outsider. (Cohen, Manion and Morrison, 2007).

The study made use of students in Bachelor of Information Technology as its unit of analysis. The researcher sought to explore the value of using a collaborative game called Tetris in motivating students to attend and participate actively in Programming Logic and Design. Data was gathered using questionnaires and it is possible that data may be influenced by environmental factors in the tertiary institution such as the teaching skills of the educator,

classroom environment and the availability of learning resources contributing to certain attitudes of the towards the module.

4.2 Quantitative Methodology

The researcher used the quantitative approach in conducting the research. That choice was influenced by Aliaga and Gunderson (2000) who define quantitative research as research that explains a phenomenon by collecting numerical data that are analyzed using mathematically based methods.

Quantitative research goes hand in hand with the post-positivism worldview in an attempt to objectively capture reality and minimize bias. Creswell (2003) cements the relationship between quantitative research and the researchers' post-positivist world view for it is the only approach that allows the post-positivist to develop knowledge. As the chosen approach, quantitative research allowed for the use of non-experimental designs and in this particular case, a survey was used as a strategy of inquiry. Furthermore, it allowed the researcher to be objective and also to complete the study in the set timeframe as quantitative methods of research allow for quick and precise collection of data (Velez, 2008).

4.3 Survey Design

In conducting the survey, the researcher made use of a cross-sectional survey design which allowed the researcher to get information about the participants without manipulating the environment. The choice of this design is further supported by Gronlund (1981) who states that a cross-sectional survey design is objective, observational and limits the researcher bias as there is no manipulation of the environment. The other benefit of using the cross-sectional survey design is that it allowed the researcher to compare many different variables at the same time.

In this research students were exposed to the online game Tetris once and then the questionnaire was administered once as required in a cross sectional design. The fact that the cross-sectional survey design lacks depth can also be of benefit to future research in gaming. Future studies may have to focus on the features of the games that maximize collaborative learning or perhaps how to integrate games in the curriculum in tertiary education.

4.4 Data Collection Method

The use of the cross-sectional study allowed the use of questionnaires. Du Plooy-Cilliers (2014:152), posit that questionnaires allow the researcher obtain detailed insight into the subject under study. This view is further supported by Maree (2007) who points out the importance of the questionnaire as a tool for collecting data by stating that questionnaires help to organize structured responses in the form of numerical data. Both closed-ended questions and open ended questions were used to collect data. In this study the sample was not dispersed, making the administration of the questionnaire easy.

In this study the questionnaire was self-administered where the students were asked to complete it in their own time. Self-administered questionnaires allowed them to reflect deeper on the questions addressed.

4.5 Research Population and sampling

In this study the population was defined as all the first year students registered for the Bachelor of Information Technology at a higher education institution. The selected IT module was Programming Logic and Design, offered as two semester modules in the first year. The 2016 intake for Bachelor of Information Technology is made up of 70% male and 30% female students. Their ages range from 18-22 years. (Registration contracts: 2015). In total there were 75 students attempting the module for the first time and none of them was repeating the module. The respondents did not have a background knowledge of Programming Logic and Design (Second line interviews on registration).

For the purpose of this study, convenience sampling was used. The non- probability convenience sampling, which is also known as opportunity sampling (Field, 2005:7) allowed the researcher to draw a sample from 'part of the population that was close at hand'. The seventy-five students (75) students enrolled for the Bachelor of Information Technology in 2016 are divided into two groups. The sample will be made of forty (40) students from one group.

The chosen sampling method gave the researcher the ability to use the online game (Tetris) before an IT module Programming Logic and Design. First the students played the game as solo players and then as competing pairs. The interaction of students with different abilities in gaming resonates with Fredericks' (2005) definition of collaborative learning through games

where small teams made up of students with different levels of ability improve their understanding through the use of a variety of learning activities.

4.6 Limitations applicable to the research

The results of this study were limited because it was exploratory by nature and only required to collection of data at one point in time from one sample group. The sample size was restricted to first year Bachelor of Information Technology in Business Systems degree students group one and therefore may not be transferable beyond this group. Though the methodology used was quantitative, no generalisation can be made. Another limitation is the time factor as the study was completed within a set time frame therefore it was not as extensive as it would have been had the time-frame been longer.

4.7 Ethical considerations

The well-being of the respondents in this study was of utmost importance. The three ethical principles (Jonsen, 1996) of informed consent, risk-benefit and fair selection were taken into consideration. Kant's (1998) philosophy of informed consent was ensured. The respondents were given full information that enabled them to decide to participate voluntarily. Consent forms with information sheets attached were given to the participants. The information sheets contained detailed information related to the research to enable participants to make informed decisions.

Aita and Richer (2005) emphasize, in terms of ethical conduct that the participants need to know the benefits or risks associated with the research in question. In this research study, participants could benefit directly from the study if there was value in using online games to motivate students in IT modules. To avoid any discrimination, the anonymity of respondents was ensured and their input treated as confidential. Respondents could at any time withdraw from the study.

4.8 Validity and reliability

The researcher paid special attention to reliability and validity of the information gathered from the participants. Du Plooy-Cilliers (2014:254) assert that validity and reliability are ensured through large sample sizes, choice of correct sampling method and reliable research tools. In terms of validity based on sample size, data collected from a sample of forty students enrolled in

the Bachelor of Information Technology in Business Systems was valid in addressing the research questions since the participants are students currently registered for Programming Logic and Design. The use of non- probability convenience sampling allowed the researcher to draw a sample from 'part of the population that was close at hand'. Data collected using that sampling method was valid as all participants were students at the institution of higher learning. The third element put forward by Du Plooy-Cilliers (2014) which relates to the use of reliable research tool to support validity and reliability was the analysis of data collected using the questionnaire. Responses were coded based upon on a master coding sheet assembled by the researcher. The use of descriptive words and category designation to isolate specific ideas and opinions related to the online game made the research findings valid as these were directly linked to link to the research questions.

5 Data Analysis, Findings and Discussion

Information gathered was coded to identify significant experiences and ideas to evaluate their impact on students' responses to the use of online games to promote students' engagement in a particular IT module. All information gathered from the participants was reviewed per question and in the case open ended questions responses gathered were categorized according to key descriptive words which enabled the researcher to present findings using descriptive statistics. Categorization of information also allowed for more in-depth analysis of the responses. The questionnaire sought to determine participants' involvement and experiences in the use of Tetris as an online game in this IT module for the purpose of motivating as well as improving their understanding of Programming Logic and Design. Tetris' inherent features demanding the ability to figure out mobile tetrads the can fit into rows with specific shapes in space requires speed, accuracy and abstract thinking from participants. The key question this research sought to address was whether these inherent features could be used to motivate and improve participants understanding of Programming Logic and Design.

5.1 Familiarity with Online games.

The first question was to establish whether the respondents had knowledge of online games. That question served to establish the extent of exposure to online games that which could have led participants to develop interest to the gaming world. Figure 5.1 shows that 63 % of the respondents who participated in the study knew some form of online games and the other 37% did not have knowledge of any online game. Furthermore it was necessary to establish how many students knew the game before and that helped to determine the form of assistance that needed to be given to other respondents when explaining the game.

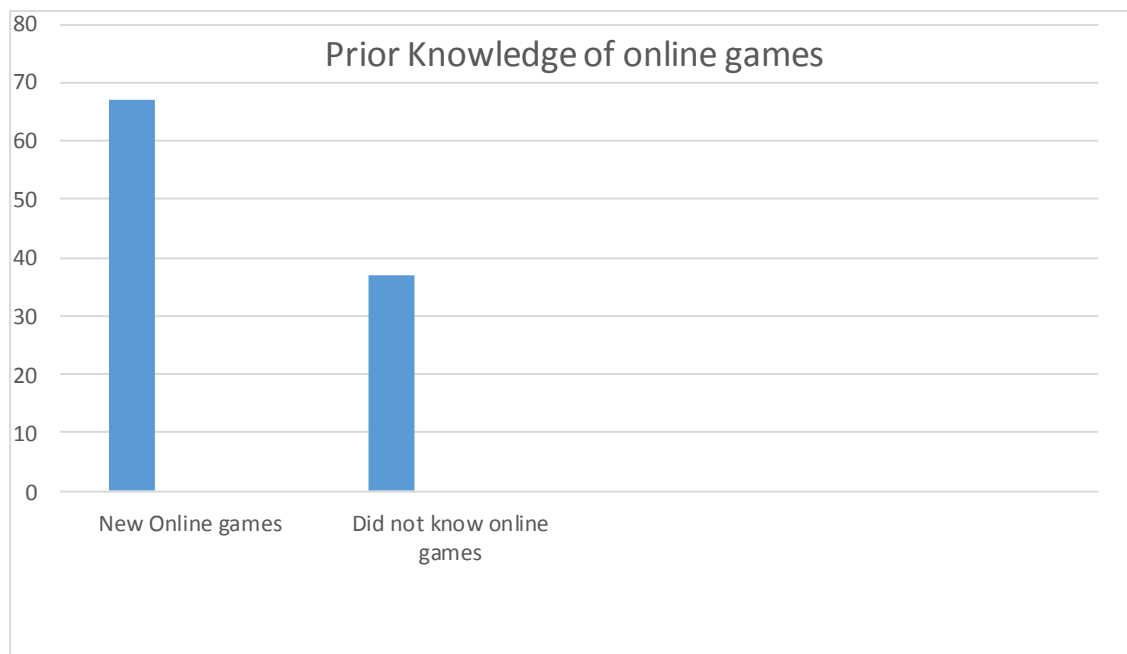


Figure 5.1: Participants prior knowledge of online games

Related to familiarity respondents were also asked if they considered online games to be important in preparing them for Programming Logic and Design. Seventy-five percent (75%) of the students affirmed that online games helped them to master specific skills in IT modules.

5.2 Value of Online games and user friendliness in IT modules.

Figure 5.2 below establishes the respondents' own perception regarding the importance of online games in mastering the contents of IT modules namely Programming Logic and Design. The respondents were made to reflect on their participation in gaming and link it to the learning

of

an

IT

module

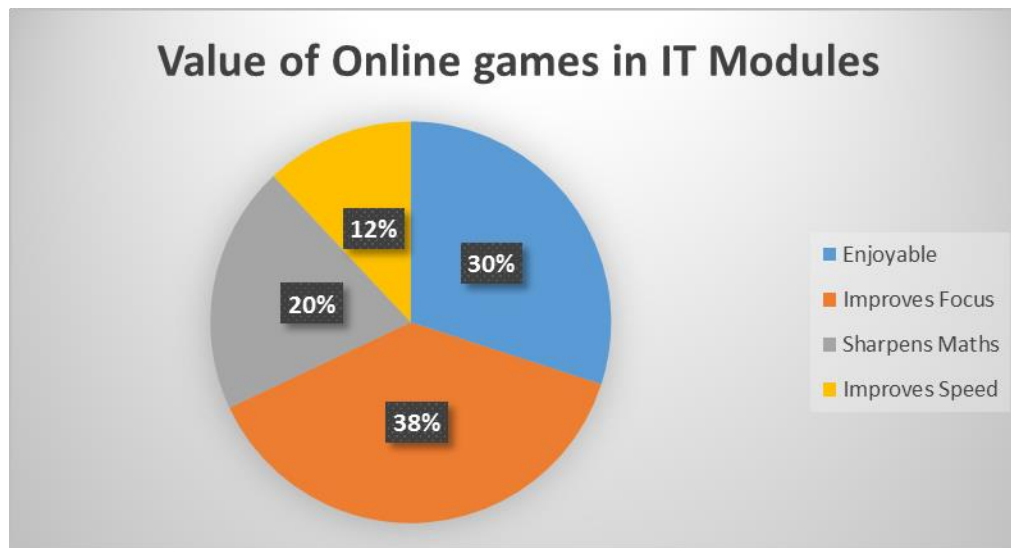


Figure 5.2: Value of Online games in IT Modules.

Based on the above finding, it is clear that online gaming is mainly perceived as enjoyable however a significant proportion of the students believe that it improves their focus. McGonigal (2011) is of the view that focus and engagement have a positive correlation, similarly that can be used to improve the students' engagement in Programming Logic and Design thereby contributing to better performance in the IT module in question. This is view by McGonigal (2011), is supported by Perensky (2012) who state that the cure for lagging engagement lies in gaming.

Related to the respondents' gaming experience, a question was posed on the user friendliness of Tetris. This question sought to establish if students found the game user friendly as that tended to affect choice of the online game and frequency of use (Inaland Kizilkaya ;2009). Findings are shown on Figure 5.3 below.

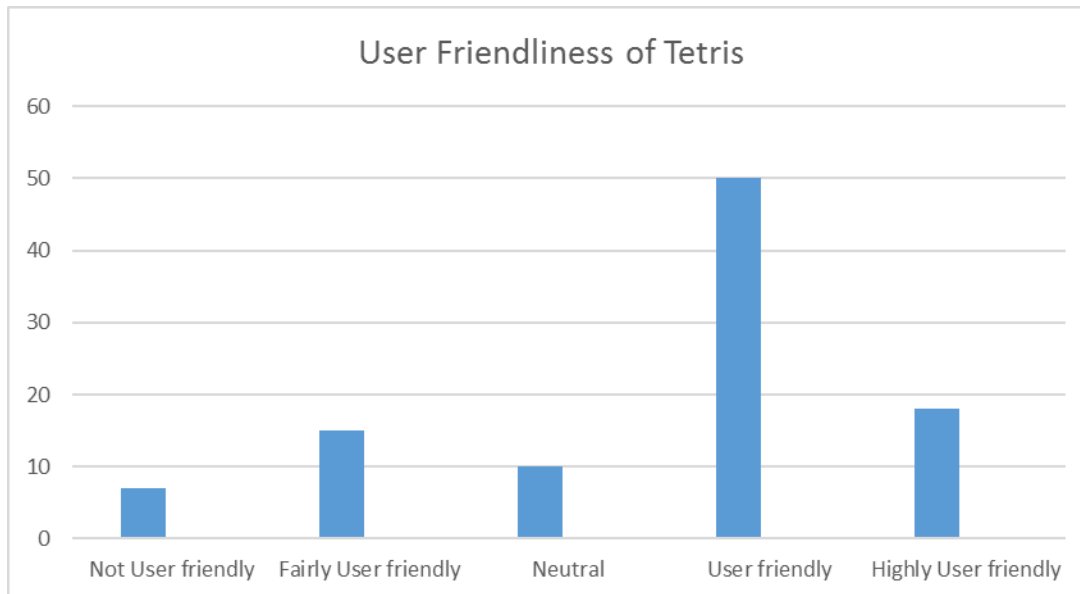


Figure 5.3: Respondents user friendliness of Tetris.

Findings on user friendliness showed that fifty percent (50%) of the respondents found Tetris to be user friendly as instructions to engage in the game were simple and one could easily follow them and play the game.

Related to user friendliness is the question of access. Participants were asked how they had access to the online game. Access is a pull factor in online gaming. Wastiau et al (2009), give credence to this view by asserting that where access is easy, the density of online gaming participants increase. Seventy percent of the students stated that they found it easy to download the game instead of purchasing it online. The remaining thirty percent accessed the game via online stores since they had subscribed to the facility already. Zagal and Rick (2006) assert that accessibility is a key contributing factor to the increase in online users.

5.3 Features of the online game

Respondents were asked their personal experiences when playing Tetris in its various complexity levels. Figure 5.4 below establishes the respondents' personal experiences when engaging with the online game with a view to find out if they stayed on the game in its various complexity level. Based on the findings, it was found that 75% of the students did not find the game complex as the number of tetrads and layers increased. This finding validates Van Horn (2007) who found that in gaming users prolong their time in the game if they find challenge in it. In this research respondents tended to seek challenge in the game which they found as the

layers and tetrads increased. In andragogy, learners become motivated as the level of challenge increases Zhang (2010).

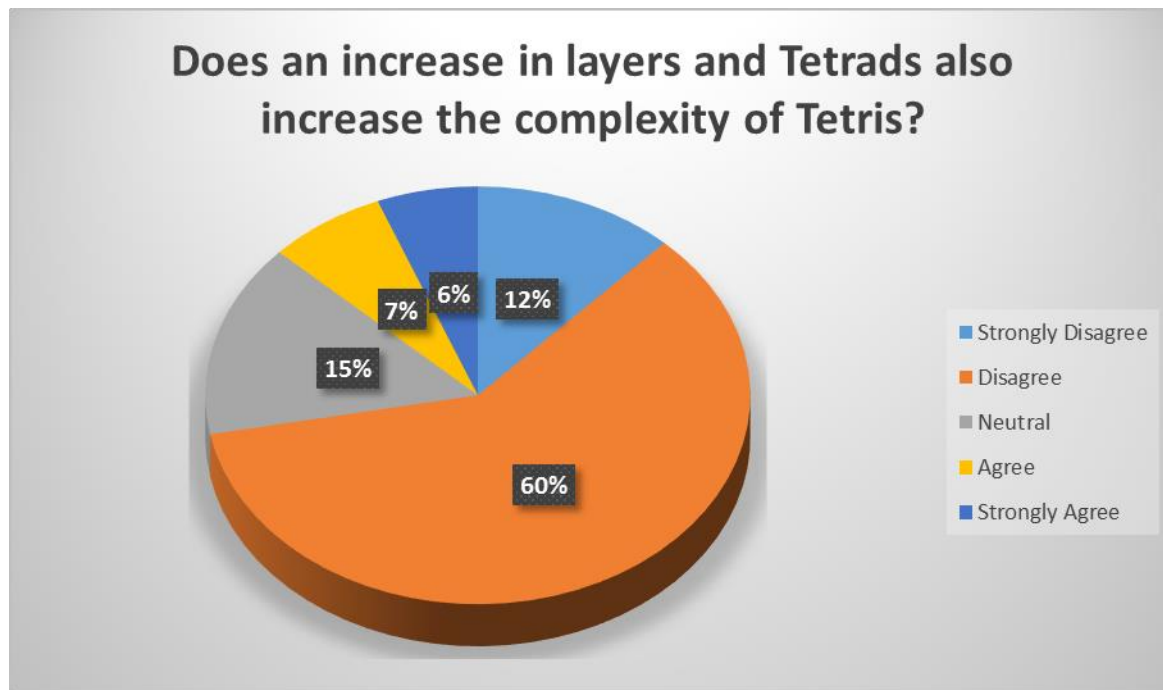


Figure 5.4 Increase in layers and tetrads and game complexity.

5.4 Relationship between the online game Tetris and an IT module Programming Logic and Design

Related to game complexity, a question was asked whether the students found any link between the game and one of their IT module Programming Logic and Design. As indicated in Figure 5.4, there was a 55% affirmation to the question that Tetris improved their understanding of Programming Logic and Design. However a combined 25% were not able to find the relationship between the online game and their IT module. This validates findings by Kinzie and Joseph (2008) who pointed out that players develop familiarity with a game first after which they link it to their other spheres of life.

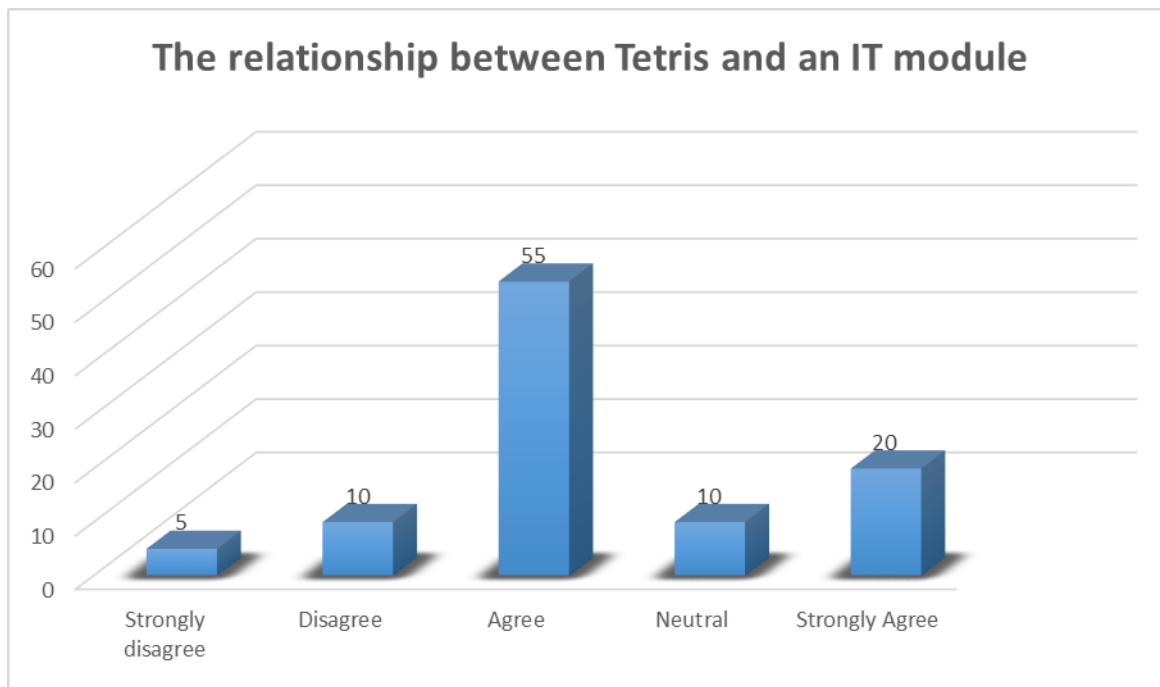


Figure 5.5 The relationship between Tetris and an IT module.

5.5 Collaboration in online games

Lightbown and Spada (1999) pointed out that in collaborative learning, students find themselves involved in requesting, clarifying and negotiating meaning with each other and this forms part of support that improves proficiency. One of the underpinning principles of collaborative gaming is the ability of members to assist each other and jointly progress towards the desired objective. Marschark, (2006) points out that collaborative gaming has an overall effect of minimizing the team's utility thus allowing players to engage more and maximize on each other's' strength. Findings on whether respondents preferred to play the online game as solo player or in partnership is shown in figure 5.5 below:

Table 1: Do you prefer playing the online game as a solo player or in partnership?

Format of playing the online game	Percentage
Solo player	30
Partnership	70

Seventy percent of the respondents stated that they would prefer to play the game in partnership as opposed to 30% who preferred to play as solo players. This finding resonates with Zagal (2008), conclusion that as the gaming fraternity increases there is a shift towards

Massively Multiplayer Online games which give players the opportunity to compete in teams as they strive to reach a target. A follow up question requesting students to substantiate their choice of format revealed that the spirit of competition (50%) was the prominent reason while the opportunity to get assistance in identifying tetrads that would fit in specific positions (30%) was another important justification. Twenty percent of the respondents felt it was more fun playing the game in partnership with a colleague.

5.6 Information Technology skills developed through Tetris

In an attempt to determine the related IT skill most developed when playing Tetris, respondents were asked to identify the Information Technology skill developed most when playing the online game. The responses from the majority of the respondents are shown in Figure 5.6 below.

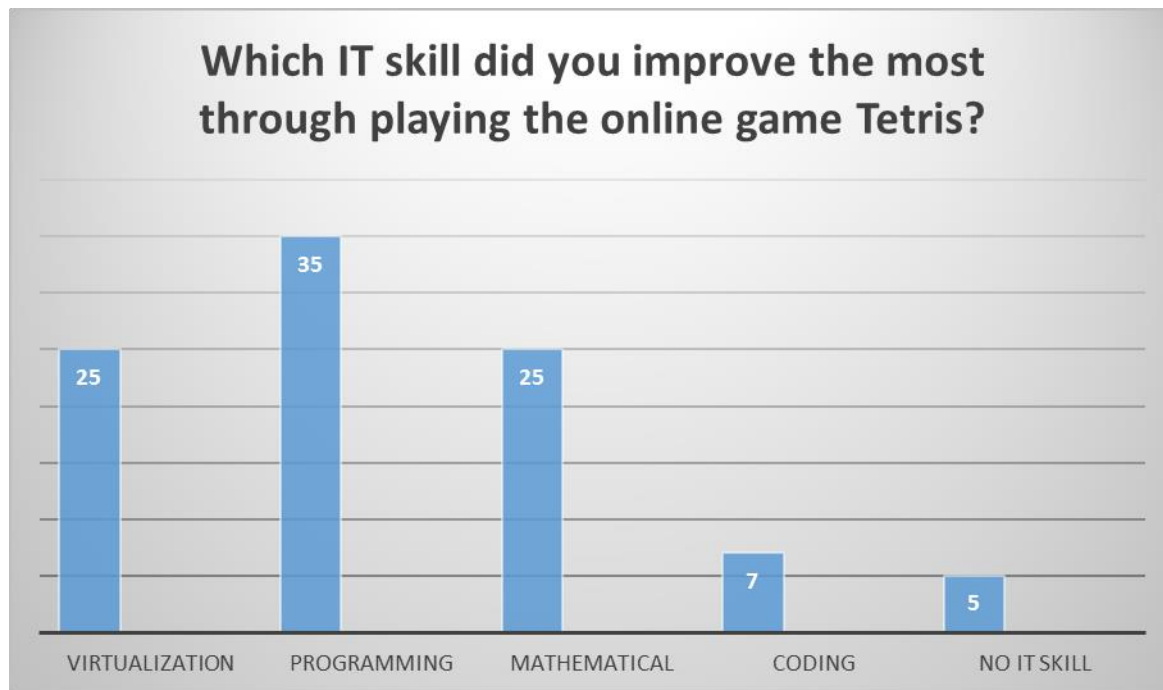


Figure 5.6 Information Technology skills developed through playing the online game Tetris

From the chosen skills, it came out that 38% of the respondents pointed out that Tetris inclined more towards developing programming skills in sense because it taught them how to organize pieces in space and slot them into layers that should be functional. Equally when programming, the code must be tested and it should work. Five percent (5%) of the respondents stated that there was no IT skill developed as they played the game for fun.

5.7 Overall experience of using Tetris in the Information Technology module.

Respondents were asked to detail their overall experiences of using the online game in their learning of Programming Logic and Design. Fifty eight percent (58%) of the respondents pointed out that the online game experience allowed them to develop certain competencies considered to be necessary in IT. These include precision, decision making and programming skills. Thirty percent of the respondents stated that collaboration in online gaming improves the group approach towards understanding complex Information Technology concepts in Programming logic and Design. As stated by Zagal (2008), collaboration reduces lack of familiarity in the gaming world as abstract situations are simplified. The same thought can be extended to demystifying abstract IT modules by using the same principles from online games.

6 Recommendations

From the findings and the analysis of data it can be recommended that further extensive investigation be done on how online gaming can be used to improve collaboration and motivation to improve students' performance in IT modules. This recommendation is based on the view that the study was exploratory in nature and more follow up research could be done in this area. Research could focus on administering the game before and after the IT lecture to determine if there is a causal relationship between frequency of administration and student performance.

As has been evidenced group dynamics in playing online games determines the level of motivation and engagement in learning IT modules. This should prompt further investigation on how to positively tap this potential of online games to all other IT modules.

The research established that online gaming improves important skills such as programming and mathematical skills which are critical in improving students' engagement with the content of IT modules. It is further recommended that online gaming be used as a strategy to improve engagement and classroom interaction in a wide range of IT modules other than programming Logic and Design. Related to game access and availability, it is recommended that the game could be installed on selected computers on campus to increase its user rate.

Further research will need to be done to include gaming in the curriculum of bridging courses for students intending to study Information technology qualifications.

7 Conclusion

The study established that there are benefits for using online games to bridge the gap between high school and tertiary education. Literature has revealed that in the transition from high school to tertiary, engagement in abstract and complex modules is one of the causes of high dropout rates in students first year of study. This research established that online gaming aided in improving the students' engagement in Programming Logic and Design which is an abstract and complex module in the Bachelor of Information Technology in Business Systems. By maximizing students' engagement, educators in HE Institution would be addressing the needs of the 21st Century student thus ensuring effective teaching and learning.

The research also established that online gaming enhances students' analytical skills as well as speed and precision in executing tasks. These are considered as critical success skills in the discipline of Information Communication Technology. The positive feedback on online gaming in this research demonstrates that there is still scope to further investigate how online gaming could be maximized to get the best results in Information technology related modules so as to improve the performance of students in the transition phase from high school to tertiary education. Online gaming could be an initiative that will have a huge impact on solving the problem of poor performance and high attrition rates in IT modules in tertiary institutions.

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Annexure

Exploring the Value of Online Games to Promote Students' Engagement in an IT Module.

Questionnaire for Students

Dear BIT Student

Research is currently being conducted on the value of using online collaborative online games in improving students' motivation and understanding of IT related modules for first year students at a tertiary institution. Collaborative online games are computer games where a player/players use interactive media with dynamic elements that are under user control to enhance learning. This study focusses on the use of Tetris and seeks to establish the role an online collaborative game plays in motivating students to understand IT module contents. In its collaborative format, players work in pairs or other small groups of a maximum of three to play the game.

The purpose of this questionnaire is to explore if collaborative gaming, using Tetris can prepare the ground for improved understanding of modules such as Programming Logic and Design. To guard your privacy, your responses will be treated as confidential and therefore **PLEASE DO NOT WRITE YOUR NAME ON THE PAPER**. Participation in this study is voluntary and you can withdraw from the research at any point. There are no repercussions for not participating in this study and it will not affect your grades. To ensure transparency, the data from this study will be made available to those interested.

Please be honest in your responses. Your cooperation in completing this questionnaire is appreciated.

You are welcome to contact me regarding any information related to the study at:

Instructions: This questionnaire comprises of closed-ended and open-ended questions. Open-ended questions are where you can respond openly without restrictive responses. For open-ended questions, spaces are provided for detailed responses.

Close-ended questions are where you have to choose your response from the suggested alternatives. After reading the closed-ended questions there are alternatives given. Put an **X** on the alternative that you agree with, with YES meaning you agree, NO meaning you disagree and SOMETIMES if you are not sure.

Please complete all the questions.

Question 1: Have you ever played online games? Select ONE choice.

Yes	No

Question 2: Do you think playing online games can prepare you to learn more about the contents of IT subjects? Select ONE option.

Yes	No	Sometimes

Question 3: Please explain your answer to question two (2).

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Question 4: Tetris is one of the online computer games that has been used for educational purposes. Rate the game from one (1) to five (5) according its user friendliness, one being low in user friendliness and five being highly interactive.

1	Not user	2	Fairly user	3	Neutral	4	User Friendly	5	Highly
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Friendly at all	Friendly			Interactive

Question 5: Accessibility to online games is one of the crucial aspects to influencing game usage. Give an explanation of how you accessed Tetris?

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Question 6 – 7 relate to the game layout and your personal experience when using Tetris. Please tell me how much you agree or disagree with each of the following statements.

Question 6: When you increase the number of layers and tetrads, Tetris becomes more complex and less enjoyable.

1: Strongly Disagree	2: Disagree	3: Neutral	4: Agree	5 Strongly Agree

Question 7: Playing the game of Tetris helped me to understand the step by step approach to Programming Logic and Design.

1: Strongly Disagree	2: Disagree	2: Disagree	3: Neutral	5 Strongly Agree

Question 8: Whenever you played Tetris, do you prefer playing it as a solo player or in partnership? Select one of the options

Solo Player	Partnership

Question 9. Briefly comment on your selection for question 8 above.

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Question 10: Which Information Technology (IT) skills, if any, did you improve the most through playing the game of Tetris? Select the two (2) skills most improved from the list below.

IT skill	Selection
Virtualization	
Programming	
Analytics	
coding	
No IT skill improved	

Question 11. How were the IT skills you selected in Question 10 improved through playing Tetris?

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Question 12: Overall, what were your experiences of using Tetris in your learning of module Programming Logic and Design? Give a brief explanation.

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Question 13: Please use the space below to share any other comments or feedback on the use Tetris as an online game in the learning of an IT module.

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Thank you for your participation