Students' Attitudes toward Game-Aided Learning Environment: The Case Study of Eastern Mediterranean Doğa College 6th Grade

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ABSTRACT

Gaming has turned out to be one of the domineering issues in the lives of learners, Scholars and educationists have sought to include computer and other hardware games into numerous fields of education and other curriculum in other to efficiently and effectively influence learners' learning. The significance of this research is aimed to analyze the attitudes of students. This study focused on different variables such as time spent by students on games, factors that motivate the learner and also their general attitude towards digital game used in educational settings. Data was collected from the students via questionnaire and interview questions. The sample of the study consists of 72 students studying at the Eastern Mediterranean Nature College 6th grade. At the same time, the case study was used in this study and the questionnaire was used to collect data from participant and the findings were supported by using interview questions' results. One Way Anova and independent t test have been used to analyze and interpret the data.

Findings of the study showed that, there is a positive attitudinal perception of the students toward the application of games in learning programming algorithm in classroom. It is also observed that male students show more motivation and willingness in the use of game appliance for education purpose in the classroom. Moreover, result shows that no significant difference exist between male and female students towards game utilization for academic purposes in the 6th grade classroom. On the other hand, it is observed that students spent more time on playing games most especially when it has to do with academic activities. Further findings in this study reveal students interest towards computer games. This is because computer

games are very valuable to their academic activities; students saw that computer games are enjoyable, interesting and also exciting when utilized in the classroom. Finally, it was the result of fantastic game and competition activities that made students happy.

Keywords: Game Based Learning, LightBot, Computer Games, Educational Game, Educational Technology, Information Communication Technology.

ÖZ

Oyun oynamak öğrenci ve öğretmenlerin hayatlarının önemli bir parçası haline gelmiştir. Eğitim uzmanları, öğrenenlerin öğrenimlerinin verim ve etkinliğini artırmak için bilgisayar ve diğer donanım oyunlarını eğitimin birçok alanına ve müfredata ilave etmeye çalışıyorlar. Bu çalışmanın amacı öğrencilerin tutumlarını analiz etmektir. Bu çalışma cinsiyete göre algı, öğrenci tarafından oynanan oyun süresi, öğreneni motive eden etkenler ve öğrenimde kullanılan dijital oyuna olan genel yaklaşım üzerinde durulmuştur. Veriler, öğrencilerden anket ve görüşmeyle toplanmıştır. Çalışmanın örneklemini Doğu Akdeniz Doğa Koleji 6. Sınıfta eğitim gören 72 öğrenci oluşturmaktadır. Bu çalışma, durum çalışması olup, anket yoluyla öğrencilerden veri alınmıştır ve görüşme sorularıyla da anket bulguları desteklenmiştir. Tek yönlü Anova ve bağımsız t testi verilerin analizinde ve yorumlanmasında kullanılmıştır.

Çalışma sonucunda sınıfta programlama öğrenme algoritmasının uygulanmasına karşı öğrencilerin olumlu algıya sahip olduğu ortaya çıkmıştır. Aynı zamanda çalışma sonucunda erkek öğrencilerin sınıfta oyun oynayarak öğretim yöntemiyle daha çok motive oldukları ve öğrenim isteklerinin artığı görülmüştür. Yine 6. Sınıf kız ve erkek öğrencilerinin akademik amaç için kullanılan oyuna karşı tutumlarında önemli bir fark görülmemiştir. Öğrencilerin akademik konularla ilgili oyunlar oynarken bilgisayar karşısında daha çok zaman geçirdikleri bulgusuna ulaşılmıştır. Bir diğer bulguya göre; öğrencilerin bilgisayar oyunlarına karşı pozitif bir tutumları vardır, çünkü bilgisayar oyunlarının akademik aktiviteler için önemli olduklarını düşünmektedirler. Ayrıca öğrenciler, bilgisayar oyunları sınıf içinde kullanıldığında

eğlenceli, ilginç ve heyecanlı bulurlar. Son olarak, çalışmada fantastik oyun ve yarış aktivitelerin öğrencileri mutlu ettiğini sonucuna varılmıştır.

Anahtar Kelimeler: Oyun Bazlı Öğrenim, LightBot, Bilgisayar Oyunları, Eğitimsel Oyunlar, Eğitimsel Teknoloji, Bilgi İletişim Teknolojileri

DEDICATION

This thesis is dedicated to my nephew and niece who will join to my life to make it more enjoyable and valuable.

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I want to thank every one of my companions who have upheld me all through this work. I would not be able to complete this work and be successful if it wasn't for them.

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Chapter 1

INTRODUCTION

Currently, in the specialty of technology and science, useful improvements are coming into place. Nations that intends to join with the improvement of technological science are creating and improving the systems that in place already. A part of the creative and inventive system is education. Solving of issues, approaches for thinking creatively, improvement of the areas of education, technology and scientific improvement is now the major concern. In this case, computers have become available in education as well as in all areas of life. Because the use of computers in education increases its effectiveness of education (Tandoğan & Akkoyunlu, 1998). In these reasons, development goals of countries in education includes integration of computer technologies with instructional environments (Çağıltay, Çakıroğlu, Çağıltay & Çakıroğlu, 2001). Researches in the area of technology usage, has shown that technology is a time saver, and helps in the enhancement of thinking creatively and critically in the learner (Jimoyiannis & Komis, 2001). Considering the advancement in digital technology, computer games have developed and have an important place in human life. Many of the youth learners consume a particular time of fun period every week by playing digital game, usually 7 hours and above (Bushman & Anderson, 2001). Looking at the developments in computer science technologies and computer games, the use of computer games in education has become an issue to be emphasized. With the studies to be done in this direction, the tedium of traditional classroom teaching can

be overcome, making the educational process more fun and more attractive for children (Tüzün & Bayırtepe, 2007).

Congrats to the creativity which technology creates, a novel experimental field has surfaced in educational area, which is known as game based learning. Researchers are conducted in this game based educational area discovered that, there are possibility of game based system of education in promoting the thinking faculty of students, likewise interactive and coordinative skill (Sandford, Ulicsak, Facer & Rudd 2006). The larger segment of the analytical assessment is made up of distinct investigation of the game effect on learners' disposition regarding to the course of study and their inspiration to go to and take part in classroom. Games might not be the actual instrument for every element and in every situation (Ke, 2009). Basically, many have propagated that in some field element, such as, math, natural science and language are actually proper for game, still, many are yet to emulate the result (Ke, 2009; Hays, 2005; Randel, Morris, Wetzel, and Whitehill, 1992). Ke (2009) discovered that games seems to plant huge and well organized thoughts reasoning, such as, structuring and thinking above the specific learning element.

Part of the basic important characteristics of game based learning is how it could be obtained via any digital tech platform. Currently, games are played using the simplest technological platform for gaming, which involves movable gadgets. The thought of the youth age, now that involves in game play is very concerning and pertinent. Hence, digital games are very pertinent topic which should be elaborated in the field of education. This could turn a boring classroom environment into a more alluring and fun to be place for learners.

Currently, the globe is quickly improving with the aid of technology. Gaming creates a type of opportunities to assist in the improving pattern, which turns out to be the pattern through which features concerning learners' information and ability are utilized to advise resulting guideline (Heritage, 2010). Technology broadens and affects all structures of globe, as well as in education too. This growing technology fastens up the development of the entire structure of society, which education is a part of it. Fast and effective choices of decision, fast action determination, getting numerous outcomes in very tough settings are the strength which could be obtained via this improvement. Mathematical instruction and programming education that are provided in initial stage have made individuals to gain mathematical thoughts and also the capacity to introduce numerous profiles of individuals that is currently needed.

Today, the basic rationale for education can be to train people that possess the ability to get data, create data, and further tackle the issues (Kesercioğlu, 2001). Looking at education as a process for solving human problems, thence, learners are hoped to become proper problem resolver. It is discovered that, individuals, that believes that they are better in solving problem, tends to be more interactive, possesses high self worth and they adopt better educational teaching methods (Şahin, Şahin, & Heppner, 1993).

The uses of computer technologies in education as well as computer games have revealed the concept of game based learning. When it is thought that the purpose of today's education is problem solving, it can be said that a new opportunity for algorithmic education has emerged game-based learning environments.

In the discovery of appropriate instructional method and tools, there are numerous vital parts which associate to an effective learning and one of the basic is the sustenance of learners' motivation in education. Based on Encyclopaedia (1981), educational psychologies realize that education is better when the student is motivated. A statement also portrays that, a proper motivation is a vital criteria for effective educational system, thus the stronger the level of motivation, the more efficient the learner will assimilate. Game based learning and its tool is one of the approaches which according to evaluation it main purpose is to motivate learners during learning (Ucgul, 2006). Game based learning is very vital as related to learning process, as motivation includes being the major factor for successful learning process, hence, motivation is a vital factor for game based learning. Huitt (2001) stated that, motivation which involves a learner's response will not happen until it is energized. Game based learning are capable of motivating learners in learning, the adoption of completion activities, that brings the learners against one another or to get the learners to challenge one another, so as to inspire them to study properly. According to Tüzün et al., (2009), software in educational games is much more motivating and effective in education as compared to any other software in education that has no game characteristics.

Regarding the results of studies held in the field of the positives effects of programming on children's problem solving abilities, visually rich software were designed to have children understood programming language, and to promote them to solve problems. One of this software is Lightbot, Programming Puzzle game. This software is game based software, and aims to have children carried out through solving task and algorithmic thinking. The reason for this game, which is directly related to the concept of programming, is to guide a robot, to light up all the blue

tiles in each level. To do so, it is necessary to program the robot using a set of instruction.

Game based learning activity engages students in the process of problem solving or knowledge acquisition when facing the challenges presented by the game (Huang et al. 2010b, 2013). It is expected that, by adding instructional objectives and materials into digital games, students' learning motivation would be enhanced because of the challenging and enjoyable nature of the games (Hwang et al. 2012). In recent years, various studies related to game based learning have been reported, revealing the potential of this approach (Hwang et al. 2012; Villalta et al. 2011). For example, the study of Wang and Chen (2010) showed that, with the game based learning approach, students were highly involved in programming activities, which have been recognized as being difficult and boring tasks to most students. Dickey (2011) found that the game based learning approach could promote students' intrinsic motivation. In the meantime, Yien et al. (2011) also reported the positive effect of computer games on students' learning achievement in a nutrition course. The study of Hung et al. (2012) further showed that, with proper design, digital games could improve students' spatial cognition ability. From the literature, it is found that game based learning could be a good approach for improving students' learning motivation and achievement in mathematics.

To comprehend the relationship of programming and Lightbot, the programming should be broadly known. Programming includes algorithmic thinking, and result receiving, which is what Lightbot asks from children to achieve.

1.1 Aim of the Study

The aim of this research is to assess students' attitudes in the gaming-aided learning environment.

1.2 Research Question

This study tends to answer the following research questions:

1. What are the general attitudes of the students towards learning programming in the game-aided learning environment?

1.1 Is there any significant difference of the students' attitudes regarding to gender in the game-aided learning environment?

1.2 Is there any significant difference of the students' attitudes regarding to time spent in playing game, in the game-aided learning environment?

1.3 Is there any significant difference of the students' attitudes regarding to motivation in the game-aided learning environment?

1.4 Is there any significant difference of students' attitudes regarding suitability of games for students in the game-aided learning environment?

1.3 Significant of the Study

Numerous researches in the field of education have led to the creation of more compiling and quality data for educational development; thus, the world of education has been changing and improving drastically. It is very pertinent to note that the aim of education in contemporary era is to provide a better quality learning environment for students and to raise credible solutions and answers to students who are questioning the art of knowledge.

Game-based learning concept is almost new in today's educational environments. There are quite some good researches related with game-based learning environment

in today's literature. Thus this research is also significant because it shows the relationship between the effects of game-based learning environments on students' computer usage and their attitude towards the adoption of LightBot in learning programming in secondary level.

1.4 Limitations

This study limited to;

1. Duration of the research in term of 2016-2017 fall semester
2. The 6th grade Eastern Mediterranean Doğa College students.

1.5 Definition of Terms

Game: Is an organized type of play, more often than not attempted for pleasure and now and then utilized as an instructive device (Dictionary by Merriam-Webster, 2017).

Instructional game: Its software intended to show people about a particular subject and to show them an expertise (International Journal of Game Based Learning, 2017).

Game-based learning: are problem-based learning environments that are embedded within specific problem scenarios (Amanda, 2015).

Chapter 2

LITERATURE REVIEW

This part of the study focuses on exploring and investigating on previously published materials relevant to the title of this work. This chapter also establishes the background on which this study will be based and also validates the newness of this research.

2.1 Gaming in Education

The fast integration of the growing complex technology in all part of the society has caused a remarkable twist in the way, where and when and how people, firms and even as country assimilate and organize their structures. It has also led to how their system of education should be arranged, to get the students efficiently and effectively ready for their future in this contemporary age. School aged kids all over the globe are advancing into a rich-media, universal, and "usually connected" universe. The continuous provision of similar kind of education to the learners as the globe begins to modify will not be very profitable for them. Just as Gate (2005) quoted in his speech in an educational summit "educating tomorrow's workforce based on the college kids of today is just like making an effort to educate children on the computer gadgets of today on an old mainframe of over 50 years. This is the wrong gadget for these times". For advanced countries that have over the times, benefited a good from the good ties between a huge gross domestic product per capita and a positive educational activity. Presentation of PISA (2010) outcomes shows that, America holds an average outcome in science and reading but in mathematics it holds below

average compared to other nations; this appears to be a warning call and also an opportunity. Countries that have high income cannot undermine keeping their comparative advantage in human capital and development for a very long time.

The concerns met due to the fast pace of technology advancement in the globe are quite remarkable. It is considered that the knowledge and techniques provided by the traditional educational system are not adequate enough to prepare an individual to be successful in life. The advancement of the numerous contemporary skills, frameworks and classifications, points out the increasing difference among recent results in education and the set of required skills to be successful in this fast changing universe. Future jobs in the upcoming generation will consist of growth in the utilization of technology, broader salvaging of challenges and complex interaction (Levy and Murnane, 2004). These are skills which are above the usual check, creativity and breakdown of digits of past years. What is changing is not just what students need to know or learn; rather it is the way and time they learn. Contemporary learners are accustomed with portable technological systems, tablets, mobile phones, and video chats as they grow up, and they hope to utilize this innovative technologies in their day by day connective interactions (NCREL and Metiri, 2003).

An angle of significant hope in this manner is a development regarding the utilization of instructive computer games as learning devices in schools. In light of this development, a few business and specially crafted computer games have been utilized as part of K-12 classrooms over the globe to upgrade student's academic background (Wastiau, Kearney, and Van den Berghe, 2009). Horizon report in 2011 proposes that supported simulation and subjects that includes game based learning

will develop without limits in some years to come (Johnson, Smith, Willis, Levine Haywood, 2011). Proponents of game based learning in colleges and advanced educational system refer to the capacity of computerized games to instruct and strengthen abilities essential for future occupations, such as, cooperation, critical thinking, and correspondence. In the old days teachers have been hesitant to utilize computer games or recreational games in class setting. There is an expanding enthusiasm across wide and different segment of the instructional foundation to take a gander at the utilization of computerized games as genuine learning and evaluation apparatuses. The Federation of American Scientists, the Entertainment Software Association, and the National Science Foundation in 2005 united almost 100 specialists to think of approaches to create cutting edge games that helps in learning. They discovered that a large portion of the aptitudes needed for achievement in games, i.e, thoughts, arranging, learning, and specialized abilities are likewise looked for by managers (Federation of American Scientists, 2006). In the National Educational Technology plan (Arne, 2010), summons for an investigation towards the evaluative technological tool the likes of simulative models, interactive surroundings, virtual communities, games and instructional thoughts, could be adopted in inspiring and engaging students when attempting difficult tasks (United States Department of Education, 2010).

There has been assumption that most games, especially digital games are properly prepared to enhance teaching and differentiate assimilation of knowledge while also creating a more efficient and less disturbing calculation than the conventional evaluative offer.

2.2 Digital Games and Its Prospects

An investigation conducted on students of 6th grade, displays that, an instructor of programming is effectively influencing the performance and skills of the learners to solve problems (Yang, 2012). Salen and Zimmerman's (2004) define games as a setting where participants interact and involve in artificial dispute, structured by rules, which leads to a measurable output. A digital game therefore broadens the definition of a game by incorporating technology into the existing gaming system. Replications, extended realism, and customary computer games are all inside this explanation above; be that as it may, purely virtual surrounding, for example, Second Life, cannot be called games due to the fact that there isn't any measurable result. Features of gamification, i.e. the application of instruments that looks like games to conventional classroom to enhance student's willingness or involvement (such as, badges and leader boards) nor the use of games in an extrinsic enthusiastic composition to promote motivation such as, acquiring more gaming time as an incentive for work done; are not also seen as games by this explanation. It is pertinent to note that, the enhancement of student's involvement and willingness through the enhancement of fun during learning are very vital.

Advanced games are thought to be the biggest and quickest developing business sector fragment of the multibillion-dollar media outlet. The worldwide market for games is valued for billions of amount in US dollars (Kirriemuir and McFarlane, 2004), and costs of improvement, income, and collections of people for computerized games are similar—and frequently surpass—the film company (Kirriemuir, 2002). Having 97% of America teenagers playing numerous kind of advanced games all the time (Lenhart, Kahne, Middaugh, Macgill, Evans, and Vitak,

2008), it is not so shocking that there is an expansive and developing enthusiasm for the pertinence of gaming in education. Contemporary researches in America, an extensive and consistent passion for arranging the strength behind creativity to enhance teaching has been in existence (Fladen and Blashki, 2005). A constant flow of technology ranging from Victrolas, movie projectors and slides, TVs and radios, roof attached projectors, the web and PCs, et cetera have been utilized with an end goal to build students involvement and participation, enhance classroom productivity, settle instructor deficiencies, and by and large "combine the frameworks" (Fabos, 2001). Greater part of the predictions of the new technological gadgets and their possible functions to improve training were doubtlessly misrepresented, yet not lacking any advantage.

According to Ginsburg (2007), play appears to be a very vital element for healthily growing a child, as well as the learning development. Children assimilate quick and fast via imaginative play setting (Bodrova and Leong, 2003; Hirshpasek et al., 2003). Due to the fact that digital games can create a chance to be play via simulated surroundings, such games aren’t really a diversion from learning, but instead could be a basic part of understanding and research development (Ke, 2009). Reasoning and assimilation are finest each time we imagine a situation and which prepares us for activity. Similar setting is created by games via modeling, leaving us with chance to reason, comprehend and organize to implement activities (Gee, 2003).

A captivating factor of game knowledge seen as an educative instrument is that it creates chances for an onward improvement since pessimistic results are usually not linked with failure. Or it could be that failure covers for a necessary part of knowledge in education (Gee, 2009). It prompts participants in the game to improve

via continuous exercise either through improving in a game session or repeating most part of the game. Disappointment linked alongside choices is observed as fundamental features of a responsible game background. All things considered, with regards to training where a game may turn into a needed movement attached to genuine results, there might be a drop down in these important features which can lead learners to become not much opened to assimilating and practicing a part of the usefulness of gaming advantages.

Games are created to have glaring objectives and give prompt criticism and feedback (Dickey, 2005). This enables participants to alter their gaming pattern keeping in mind the end goal to enhance their execution and achieve their objectives. The possibility of prompt feedback is additionally conspicuous in great developmental evaluation forms. Learners will enhance their learning and work processes when given valuable criticism and feedback (Black and Wiliam, 1998). It can be troublesome for educators to make an interpretation of student execution into helpful input or to create their curriculum to integrate challenging queries and arising activities (Black et al., 2002). Response circle of this kind, in any case, is featured in properly crafted games.

In as much as a participant's actions might display learning within the gaming surrounding, few thoughts exist in finding out if that kind of learning process might be linked or transmitted to a diverse platform. Such as, Gee (2005) displays the way world of war craft game serves as a reflection of vital contemporary skills, such as, individualized learning within cross-experimental groups carrying out activities together in other to achieve a goal. Nonetheless, this particular kind of specialized and co-operational exercise is very crucial within the game, it is as yet much very

unclear how these practices transfuse out of the gaming world. Obviously there are a few circumstances in which attitudes from games are not expected to transfer to (fun games such as, skiing games), and one cannot modify a game just to suit a particular learning situation (Nagle, 2001).

Although, there is a fact that evaluation has shown to prove that skills, for instance, In spite of the fact that examination has demonstrated that aptitudes, for example, critical reasoning aptitude improves within a game and might clearly alter or grow through games, it is difficult to move that ability externally in a digital gaming setting (Egenfeldt-Nielson, 2006). Curtis and Lawson (2002) established a perfect proof of moving of critical reasoning abilities. Abilities might not be too much needed to move external games compared to a particular substance; nonetheless, substance which is transmitted out of games has a tendency of been restricted and of lesser level (Egenfeldt-Nielson, 2007).

2.3 Individualized Learning and Gaming Opportunities

The chances that instructions should be in line with students need, is not a novel kind, in spite of the fact that it has a few varieties: isolated training (Tomlinson, 1999), entire-individual learning (Snow and Farr, 1987), individualized training (Switzer, 2004), and customized assimilation process (Organization for Economic Co-operation and Development [OECD], 2006). Customized learning is portrayed as the process whereby schools "channel instruction to guarantee that each student accomplishes the most astounding standard conceivable" (OECD, 2006). Report from OECD proposes customized learning in education via 5 procedures:

- Discovering the learners strength and weaknesses
- Improving classroom strategies to suit the desires of learners
- Including the choices of curriculum

- Participatory educative organization
- Support from community, institutions within the locale and social services.

Nonetheless, individualized instruction does not happen only within the level of the school. Games give a chance to customize learning for learners, coming to terms with the initial three procedures. Qualities and shortcomings of students can be induced in view of players' activities amid the game. Kickmeier-Rust et al., (2008) displayed ELEKTRA, a project sponsored by a Commission in Europe. Throughout the game play time, the data through participants' exercise (such as, switching a light bulb on and switching it off) are constantly amassed to make a refreshed photo of the players' capabilities in view of the collected play activities.

Games therefore, could be adjusted in view of meeting students' needs. Proper platform can be given in games using levels. Aids are inserted within games with the end goal of making easier stages become the stages to be attempted first, and then advancing to a much more challenging levels, this is because participants become masters at the games as they progress in play, e.g. structure is integrated inside the adventure of the game Crystal Island through encouraging students to remember the data they assembled and plans they sketched (Ash, 2011). Background of different kind can be accomplished using samples, e.g. navigations that can reduce a participants cognitive load during game play (O'Neil, Wainess, and Baker, 2005). Analysts de Jong and van Joolingen (1998) acknowledged that integrating proper academic background and help to games might assist with issues learners may experience in this kind of disclosure learning.

Additionally, games meet the unusual classroom desires of learners whenever novel reasoning is shown as a proper educational improvement. Educational improvements are often displayed as route learners adopt in assimilating an arrangement of skills or data (Masters and Forster, 1996), that is, the order at which skills and ability are normally produced. Progress in educational are much of the time utilized as a part of instruction. In traditional teaching and learning settings, a learner that doesn't ace an idea may be abandoned to have a hole within their background knowledge for which complex issues and problem tasks tries to create to an extent a much more ideas that are complex. Interestingly, computerized digital games characteristically compel the player to master an idea keeping in mind the end goal to advance to the next level. Participants in a game can practice the same level till they master the knowledge of such level. A similar reasoning could be applied towards the utilization of advanced game in school education. A student can't, basically, open Algebra until the point that an essential learning of past abilities has been learned. The mastery procedural learning, notwithstanding, may expect learners to put plentiful time in acclimatizing all skills before they transfer to the next level.

These circumstances also show that student has many more educational opinion and control above the processes of learning. This emotion of self-sufficiency from the student is essential. The most well-known blunder in e-learning training exercises is an inability to give the student a suitable level of organization. Organization can be linked to the student's capacity to collaborate alongside the instruments and emotions of participatory and socialization in the condition (Jalongo, 2007). Dalton (2000) mentioned also fifty six percent of students who take an interest in online courses detected an absence of intuitiveness; they aren't dynamic students with decision. Properly crafted games, be that as it may, urge learners to modify build educational

and learning procedure mainly useful and proper to them, this therefore connects to a main unique portion in education (Klopfer et al., 2009). For instance, learners who play the science discovery game, *RiverCity*, could investigate their learning surroundings freely. They made their own speculations and directed their own research with the aim of tackling the issue (Ketelhut, Dede, Clarke, and Nelson, 2006).

Generally, properly crafted games—as with properly crafted educational experiences—are demanding yet attainable. Games ought to give participants challenges which are linked to their ability stage so as to expand contribution (Kiili, 2005). “The point is to put the stage of challenges to a level at which student is hoped upon to expand a little and will complete the undertaking with little or no assistance" (Jalongo, 2007). This is like Vygotsky's zone of proximal improvement, which is "the separation between the real formative level as controlled by autonomous critical thinking and the level of potential advancement as decided through critical thinking under grown-up direction, or in a joint effort with more skilled companions" (2006). A game can give that chance for suitable direction or joint effort with a specific goal of helping players to address the upcoming task. The gradual increment in challenges decreases disappointment and enables players to frame ideas and techniques which will be of assistance later (Gee, 2003). A state of interesting displeasure, checking how attainable a proper condition for assimilating numerous contents is segment, for example, science (diSessa, 2000). During games notwithstanding, the consequences of failure is lower (Gee, 2005). Students can basically create risks and quickly learn through their wrong acts. Compelling games give criticism which is (a) apparent and unobtrusive, and (b) quick in participant’s action (Rigby and Ryan, 2007). The criticism likewise strengthens desire and

willingness to participate (Jones and Issroff, 2005). Learners can adapt to disapproval and the game continues to adapt to the learners.

Notwithstanding, knowledge does not simply stop alongside the game. Explanation is important when applying games in educational settings (Lederman and Fumitoshi, 1995), as it provides the association amid assimilating within the game and using all abilities in various situations. Instructors can motivate the interchanging of abilities through conducting before and after games interactions and this bridge the various contents the learners assimilate in classrooms and the game they play (Ash, 2011). Students might be compelled to distribute diverse methods for moving toward an issue. In view of an audit of 17 researches concentrated on game building, Ke (2009) reasoned that educational assist functions are vital so that the knowledge acquired in PC games can be used in different settings. Computer games could be applied to students witness in-depth learning process, still the students do not apply all their total experience. Games works better whenever they are mixed with good educational teaching pattern (Squire, 2002). All things considered, Steinkueler and Chmiel (2006) propose that games won't supplant instructors and classrooms, yet they may supplant a few reading material and research facilities.

2.4 Games Activity and Student Involvement in Education

Conventional tutoring has frequently been marked as exhausting for some learners. Truth be told, about portion of secondary school dropouts said a noteworthy explanation behind leaving school was that class setting weren't fascinating, and seventy percent mentioned that they weren’t persuaded or propelled to thrive more (Bridgeland, Bilulio, and Morison, 2006). Educators have since quite a while applied various techniques as well as 21st century media to broaden learners’ involvement

and passion within teaching and learning setting. Digital games might be much more intriguing than regular classroom activities (Malone, 1981; Rieber, 1996). Although, engagement might me just a part, Kirkpatrick and Kirkpatrick (2006) noted, "successful feedback may not assure adaptation, but instead unsuccessful replies in all likelihood decreases the chances of its occurrences".

Students' interactions with game situation are modifying the student's interest in learning occasions. Learners tend to select quality designs and interfaces with numerous challenging tasks (Prensky, 2001). Learners aspire tasks that are fast, unique and explorative with, data provided in numerous similar structures" (Kirriemuir et al., 2004). The story is adopted to deal with the various game tasks in a clear segment.

Games have the section vital to connect with learners and enable them to go into a condition of stream (Csikszentmihalyi, 1990) the learners are totally involved in the education situation and concentrates on actions they are integrated with. Games enables a huge amount of the section of stream, e.g., broad aims, instant and fast input, modify across challenges and capacity stage and emotional control. Sections like these could create involvement of the students which is unequivocally linked with students' achievements (Shute et al., 2009). Truthfully, Naceur and Schiefele (2005) established the passion of students is the greater evaluator compared to students enablement in challenging, assimilating, controlling and the interest was also connected consistency in solving challenging tasks.

Inspiration is another advantage of game. It is pursued from our conviction about how great we will be and our enthusiasm for and the estimation of the objective

(Jalongo, 2007). Players are more spurred when they feel an individual connection to the objective (Gee, 2009). A few games depend on outside inspiration, where students get specific prizes for playing the game to attract them to keep working on learning. These sorts of games have had some accomplishment in the social insurance industry and with temporal content retention (Egenfeldt-Nielsen, 2006), yet they have a tendency to strengthen repetition memory of low level substance instead of profound comprehension. In any case, if the aim of the game and outcomes of the learning are tightly mixed, students have a chance of been more enticed and the gains are basically in tackling issues in the games and in education.

A study conducted by pan European examination over a year now, which involved more than five hundred educators found that the considerable larger part of the researcher evaluations noted that motivation is fundamentally more significant anytime PC games are incorporated within the instructive procedure" (Joyce, Gerhard, and Debry, 2009, pp.11). Scotland educators provided comparative evaluations where the application of game supported education promoted in the classroom basically broadened students' motivation and involvement (Groff et al., 2010).

In as much as motivation obviously is very vital, there is not clear concession to what makes a game. Fladen (2005) recorded the 3 important components of inspiring games to be intelligence, organize, and captivating. Rigby and Ryan (2007) made an alternate arrangement of requirements that are fulfilled by drawing in games via Player Experience of Need Satisfaction (PENS) theory: aptitude, self-sufficiency, and relatedness. All these theory can be utilized to assess games, learner inspiration, and the effects on future learning and accomplishment.

2.5 Games Inculcate New Generational Skills

Game creators and designers contend that games grab attention of the players and hold them in difficult thinking and task tackling journey (Barab & Dede, 2007). Games need the sort of thought that we require in this new age since they utilize real learning as the reason for appraisal. Current knowledge and aptitudes are been tested, as well as arrangement for next learning phase. Games evaluates 21st Century aptitudes like group-work, development, creation, and configuration by following a wide range of sorts of data about a student, after some time".

Games are every now and again referred to as imperative systems for instructing 21st century aptitudes since they contain a large assortment of educative patterns within a perplexing basic leadership environment (Squire, 2006). The aptitudes of many games adopts' innovative trends which is known to learners and utilize related conditions (Gee, 2003). These would be applied to feature the contemporary abilities which are important for achievement in a worldwide market (Spires, 2011).

Games cultivate coordinated endeavor, critical reasoning, and patterned thought (Johnson et al., 2011) that are imperative contemporary skills. Multi-participant section can likewise enable training that tend to be in line with problem based, enabling participants to view the outcomes of their actions turn out significantly faster than it would in reality (Khoo and Gentile, 2005) and enabling them to encounter situations as opposed to only evaluating illustrations (Shaffer, 2004). As proposed by Gee (2007), fantastic captivating games expect participants to reason structurally and think of links instead of secluded situations or actualities. The numerous options and feasible options and also to modify their experience to

alternating situations, they should reason systematically in light of the fact that they are playing dynamically. This builds up their abilities in basic leadership, development, and crucial reasoning (Johnson et al., 2011). Meanwhile, games could produce education of these critical contemporary aptitudes, educators might be less keen on applying them in the school in light of the fact that those abilities are not right now tried or expressly esteemed in an instructive setting (McFarlane, Sparrowhawk, and Heald, 2002).

2.6 Game Based Learning for Educational Assessment

Games and customary appraisals share fundamental attributes that give a way to examining learning and aptitudes. The two circumstances utilize complimentary advancements that can consolidate to produce a more accurate sample of learner's data, skills and practices. For instance, games creates opportunities to valid and proper educational display of intense reasoning, a huge amount that seem to be under-displayed to in traditional evaluations (Behrens, Frezzo, Mislevy, Kroopnick, and Wise, 2007). In games, the assessment process occurs as the game speed evaluates participants' actions and provides quick response. Participants gain ground or they don't; they progress to the subsequent stage or struggle one more time. Evaluation occurs normally in a game. The challenge is appraising the suitable learning, skills or capabilities (Ash, 2011).

Strategies have erupted as methods for crafting games for evaluation and estimating the learning and capabilities within gaming surroundings and conditions. Evidence Centered Design (ECD); (Mislevy et al., 2010) makes a system for evaluation by consolidating experience, proof, and assignment representations. This structure characterizes the traits being surveyed and practices which speak to those properties,

and vitally, it distinguishes the exercises which associate that which is evaluated to that which players' carry out within game (Rupp et al., 2010). This association amid education and conduct offers help for the legitimacy of what is evaluated.

Any experience players have in game can be adjusted in light of this data. Kickmeier-Rust, et al., (2008) discovered that incorporating adjustable elements in games led to proper educational implementation and more so, higher game platform than non-adjustable manipulative groups. Quellmalz, Silberglitt, and Timms (2011) produced simulative scientific program and displayed its activeness in 6 regions. The outcomes via the assessments were relied on, legal, of appropriate specific standard and were reasonable for consideration in a multi-level region responsibility structure. The chances for games to be applied as appraisals is extraordinarily improved on account of their aptitude to collect reflective, wealthy data regarding learners and after that to assess—via cutting edge strategies (Baker and Yacef, 2009)— their well polished communications. Games can in this manner fill in as "non-interfering assessments" which creates data which are reliable which can be broken down as shown by a little random procedure (Kickmeier-Rust et al., 2008).

Shute (2011) suggests that implanted gathering of information regarding participants is a "stealth assessment process", a verification based protocol via which assessment might be organized straightforwardly with learning surroundings. Shute and Kim (2011) display the way appraisals can be embellished within a commercial selling game to analyze assimilation of significant instructional data and abilities. Within this investigation, the producers modify ECD to the game surrounding and utilize it to examine crucial reasoning and fundamental logic skills displayed in between the sessions of the game.

Use of games may energize—or expect—learners to put in in-depth stages of information and abilities (Bloom et al., 1997). As compared to customary appraisals, which normally tap learners' remembrance or essential showing of aptitudes, games and simulations can provide learners with more credible circumstances to show vital and basic thought. E.g., Millis, et al., (2012) have built up a game structured, knowledgeable education structure planned to instruct scientific demand abilities to high school and colleges. Learners per take in normal dialect "trialogs" with non-natural intelligence specialist and persistently assess their use of higher range thinking abilities as exhibited by their reactions to the specialists.

The significance of the game circumstance could additionally be improved by altering the perspective (Dickey, 2005). Through making learners encounter the game first, as though they were really in the circumstance or by having a coach talk straightforwardly with them, learner could assimilate more than being in unbiased, third person circumstances (Moreno et al., 2000). Pertinence can likewise be expanded by creating reasonable behavior (Dickey, 2007) or setting the game inside a well-known situation (Warren, Dondlinger, and Barab, 2008).

Gaming provides different type of opportunities to help in the improvement procedure, this is the process through which data regarding the learners' idea and skills are applied to advise resulting steps (Heritage, 2010). All together for improving evaluations to be assistive to the instructors and students, the appraisal data should be substantial. Be that as it may, in lower assessment process learners are ordinarily not much aroused. Therefore, information gathered regarding learners' and their skills based on such conditions are likely to be illegitimate (Sundre et al., 2003). The extended enthusiasm realized by game might probably build the legality of

improving assessments. Delacruz (2011) evaluated games as apparatuses to assist in the improvement of evaluation and inspected how shifting the stages of experience about games scoring rules affected education and its implementation in arithmetic.

2.7 Related Research

Notwithstanding the solid verbal confrontation on the way games can influence education and how helpful they can be for showing compound thoughts and aptitudes, less investigation has been conducted on the connection amongst games and educational activities (Ke et al., 2009;). The greater part of the accessible evaluation comprise of distinct investigation of the effect games have on learners' disposition regarding the course of study and their inspiration to go to and per take in classroom. The data via these investigations are commonly restricted to studies curved out by educators and learners for the purpose of applying games in school setting for half a month or months.

In uncommon settings when investigators tried to explore the connection amid education in advanced games and educational activity, the outcomes are juxtaposed as a result of difference in explanations and techniques. The best device might not be game for every learning situation (Ke, 2009). Nonetheless, many have propagated that substance parts, such as, arithmetic, sciences, and idiom expressions are appropriate for games (Hays et al., 2005), still this outcome hasn't been copied by others (Ke, 2009). Ke discovered that games seem to build high organized-arrange thinking skills.

So as to truly assess the adequacy of games, scientists should to think of extra nuanced components, for example, the extentof playing game and the substance,

framework, and technicalities of the games (Khoo and Gentile, 2005). Distinguishing an endless supply of components, for example, game kinds, trouble stages, conveyance stages, and conveyance conditions would be an enormous stride progress. Moreover, making descriptions and representations for huge numbers of the qualities that are viewed as basic portions of the energy of games (e.g., inspiration, involvement) would, working together with the clearing up standards above, take into account a more rational research procedure.

Accordingly, just measuring increments in state administered test scores or comparative conventional measures of accomplishment after the presentation of computerized games may miss a portion of the more extensive learning openings that diversions show (Shaffer, Squire, Halverson, and Gee, 2005). While there may well be some impalpable advantages of computerized games in the classroom, unless there is an "interest in assessment and the amassing of clear proof of effect, there will be an inclination to expel amusement conditions as motivational cushion" (O'Neil et al., 2005).

In general, the exploration bolsters that advanced games can encourage adapting, yet it is hard to make more grounded deductions regarding the informative influence of computerized games now in light of the fact that generally little games have been tried alongside other educating and processes to learning (Egenfeldt-Nielsen, 2006). Investigation, nonetheless, should keep on exploring the adequacy of computerized games for education and guideline. Assessments should never again concentrate on if games could be utilized in education. In light of important contrasts in particular elements among games; endeavors to sum up the impact of a game to other games

might not be helpful (Kirriemuir et al., 2004). Rather investigation ought to organize the way games should properly be utilized for education.

Chapter 3

METHODOLOGY

This part of this research explains the methodology, such as sampling techniques, data collection method and tool, design of the research the analysis of the data collected and used for this research investigation.

3.1 Research Design

Qualitative research investigation gathers idea and knowledge regarding human cluster in social arrangements; it relies on gathering accurate and proper understanding through direct witness, it also concentrates in understanding the way and manner participating individual derives meaning from their surroundings and also how the meaning they acquire influences their nature as a person (Caleb, 2011). Qualitative investigation uses observational tool as a data collection means, it is the collection and storing of individual record of their attitudes and manner in each of their various environments. Craig (2004), states that it is pertinent for creating deep and meaningful explanation regarding events and data which are almost impossible to access.

In numerous huge field of study observation is used and a direct observation limits distortion between what is observed and an observer (Nwapka, 2014); this occurs in a surrounding that is not manipulated or controlled. The behavioral context is interwoven in observing of both the sampled individuals and their various environs.

This is most functional in settings and contexts that are inexpressible such as kids or people that won't say their minds out.

Quantitative research is a type of investigative research applied majorly for deductive investigations, specifically aims to explore hypothesis or research question, gather exploratory data or analyze interlinks between variables (Johnson et al., 2007). This research study will adopt both qualitative and quantitative method of research via the collection of information through questionnaire and a direct interview process.

Convenience sampling pattern will be applied in collecting information from the case of this study. The researcher sampled all six grade students within their normal school setting and during their normal classroom hours, so as to gather needed responses needed for the investigation aim, via questionnaire and interview question respectively.

Thus this research study adopts a case study approach. Mixed methods purposely link various research techniques so as to discover the strengths and quality of each other; by adopting several approaches (Johnson et al., 2007).

3.2 Case Study

Creswell (2003), explains a case study to be any inquiry that is experimental and also analysis within a realistic context of life. The study adopted students of Eastern Mediterranean Doğa College as the case study of this research investigation.

Best and Khan (1993) state also that any group of people who appears to have similar feature and also who appears to be of a researchers' interest is likened to be called a research group. Also, Gay and Airasian (2000) describe a target research group as a

group by which a researcher would usually like to generalize to. The target sample for this study is 6th grade student of Eastern Mediterranean Doga College, Magusa, Northern Cyprus; for fall semester 2017 session. The total population for the 6th grade students are 72.

The participants in this research are summed up to be 72 6th grade students, in Eastern Mediterranean Doğa College whom filled in questionnaires for this study. Also, 16 students were chosen for the purpose of answering interview questions to support the claims received in the questionnaire data set.

Table 1: Demographics Information of Participants

		Frequency	Percent
Gender	Male	35	51.4
	Female	37	48.6
	Total	72	100.0
Time of play	2-5 hrs	24	33.3
	>5 hrs daily	7	9.7
	Few times a week	18	25.0
	Few times a month	23	31.9
	Total	72	100
Best choice	Enjoyable	9	12.5
	Interesting	8	11.1
	Exciting	19	26.4
	Consuming	3	4.2
	An activity	3	4.2
	Worthwhile activity	9	12.5
	Helping develop useful skill	9	12.5
	Valuable activity	3	4.2
	A lonely activity	1	1.4
	A waste of time	8	11.1
	Total	72	100
Suitability of play	Challenge	24	33.3
	Fantasy	17	23.6
	Curiosity	10	13.9
	Control	6	8.3
	Competition	11	15.3
	Recognition	4	5.6
	Total	72	100

The Table 1 above displays the variables of the questionnaire adopted for the study, in all the 72 participants who were randomly selected for the study, 37 were female and 35 were male, which is 51.4% and 48.6% of the sampled participants. According to the time of play variable, 24(33.3%) students admits that they play game for 2-5hrs daily, 7(9.7%) of the students admits that they play more than 5hrs daily, 18 of the students which are approximately (25.0%) and 23 which are (31.9%) admits that they play game few times a week and few times a month respectively.

According to the best choice of the student whenever they play game, 9(12.5%) admits that they enjoy playing game, 8(11.1%) admits that it is interesting for them playing game, 19(26.4%) admits that playing game is exciting for them, while 3(4.2%), 3(4.2%), 9(12.5%), 9(12.5%), 3(4.2%), 1(1.4%) and 8(11.1%) all admits that playing computer game is consuming, an activity, worthwhile activity, helps in developing useful skills, valuable activity, a lonely activity and a waste of time respectively.

According the variable of suitability of play, 24(33.3%) believes that playing computer game is challenging for them, 17(23.6%) also believes that playing computer games is a fantasy, 10(13.9%), 6(8.3%), 11(15.3%) and 4(5.6%) all believes that playing computer game is being curios, being in control, like a competition for them and some like the recognition about completing a task respectively.

3.3 Data Collection Tools

For the purpose of data collection in this research work, quantitative and qualitative method was adopted. Data were elicited from 6th grade secondary school students in Eastern Mediterranean Doga College.

3.3.1 Questionnaire

The questionnaire used for this research was adopted from the combination of (Thomas Hainey et al., 2013) and the works of (Aristea Theodoraki and Stelios Xinogalos, 2014). 72 questionnaires were distributed to 72 6th grade students in the process of data collection process.

Questionnaire was constructed into two sections, one of which consisted of the variable section and the remaining section contained 16 questionnaire items which suits the research question and built in tabular form. The second part of the questionnaire applies five point rating scales which are strongly disagree, disagree, not sure, agree and strongly disagree, these are the Likert Scale to evaluate the degree of responsiveness of the various participants of the study.

Data collected from the respondents will be organized and subsequently collated in a database called Statistical Package for the Social Science (SPSS) and this will later be analyzed based on the descriptive assessment. Descriptive examination pattern is applied whenever data are gathered into an important report for proper understanding (Thompson, 2009).

3.3.2 Interview

The interview is a statement that an attempt is made to seek answers by asking previously prepared questions (Kuş, 2003). The question and answer method used in

the interview can also be considered as a way of establishing a relationship and accessing the data when collecting data (Yıldırım&Şimşek, 2005). The response gathered from this section allows for a qualitative and explorative assessment of result in the study. The interview questions prepared for this work was uniquely crafted from various studies and related surveys pertinent to this work; thus, 14 questions were organized for validating the responses gathered via questionnaire prepared by 3 different expert opinions and applied in 2016-2017 Fall Semester to all six grade students in Eastern Mediterranean Doğa College.

3.4 Data Analysis

Quantitative and qualitative analysis will be applied in displaying the whole assessment of the entire data, through finding out the frequency and percentage, mean and standard deviation, average mean scores of variables based on gender demographic. Analysis of this research will be made using SPSS v.21.0. One Way Anova and independent t test have been used to analyze and interpret the data.

3.5 Validity and Reliability

It is true that in the absence of a repeated statistical correlation outcome, the investigation and experimental study have not accomplished all the prerequisites of testability. The reliability of this study was therefore based on analysis by adopting the Cronbach's Alpha. The Cronbach's Alpha for this study was place at 0.81, this significantly mean that the questionnaire is reliably approved in terms of reliability, because it is bigger than 0.70.

The validity of this study also was proofed on the significant results achieved and not an absolute truth. And also based on the use of questionnaire as instrument and further reusing of interview questions to validate responses of the sample groups.

Further validity was made by ensuring that respondent to interview questions was made on purposive selections, as to obtain purposeful responses that would be valid for the investigation onwards.

Preparing the interview form is very important for the opinion to be valid and reliable and to be able to be carried out healthily. In the preparation of the interview form;

- Writing of easily understandable questions,
- Focused questions preparation,
- Preparing open ended questions,
- Avoidance of directing the person,
- avoidance from Multidimensional questions include ,
- Preparing alternative questions,
- To include different kinds of questions,
- Arranging questions in a logical way

has been taken into consideration (Yıldırım & Şimşek, 2005).

Chapter 4

FINDINGS AND DISCUSSIONS

This chapter seeks to find, interpret and describe the data gathered for this research. Analysis in this study will be carried out in accordance to finding answers to the research questions selected for the study.

4.1 General attitudes of the students towards learning programming in the game-aided learning environment

This section is focusing on analyzing the general perception of students on their attitude, desire, interest and the impact of playing game and it affects their academic performance.

The intervals were used in the evaluation of the responses to the questionnaire. It is assumed that the intervals are equal and the arithmetic mean is calculated as 0.80. Arithmetic mean is for "Strongly agree" 5.00-4.21, "Agree" 4.20-3.41, "Not Sure" 3.40-2.61, "Disagree" 2.60-1.81, "Strongly Disagree" 1.80-1.00 (Kaplanoğlu, 2014).

Table 2: General attitude of students on game play

	ITEMS	**SD**		**D**		**N**		**A**		**SA**		**Mean**
		n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	
Q1	Game-based projects (e.g. Lightbot) affect me positively	2	2.8	6	8.3	24	33.3	23	31.9	17	23.6	3.65
Q2	Learning programming concepts through	3	4.2	9	12.5	21	29.2	28	38.9	11	15.3	3.48

	analysing simple 3D games is my preference											
Q3	I am keen on using simple games in terms of learning programming concepts in the future	3	4.2	16	22.2	19	26.4	20	27.8	14	19.4	3.36
Q4	I am keen on using simple games in terms of learning other subjects in the future	4	5.6	10	13.9	25	34.7	16	22.2	17	23.6	3.44
Q5	I prefer to solve simple 3D game programming exercises	4	5.6	11	15.3	15	20.8	31	43.1	11	15.3	3.47
Q6	This subject becomes more interesting through the usage of computer games	1	1.4	6	8.3	16	22.2	31	43.1	18	25.0	3.81
Q7	If I were taught programming with simple games I would perform better in relevant courses	2	2.8	10	13.9	14	19.4	26	36.1	20	27.8	3.72
Q8	This sort of games helps me develop critical thinking	2	2.8	11	15.3	12	16.7	25	34.7	22	30.6	3.75
Q9	Solving problems of simple games (e.g. Lightbot) is very interesting	7	9.7	11	15.3	18	25.0	24	33.3	12	16.7	3.31
Q10	It's worthy to try using games to learn new programming concepts in the future	3	4.2	7	9.7	23	31.9	27	37.5	12	16.7	3.52
Q11	Finding answers to exercises based on games is an	4	5.6	13	18.1	21	29.2	27	37.5	7	9.7	3.27

	encouraging activity											
Q12	This game strengthens my comprehension of the programming concepts	3	4.2	7	9.7	18	25.0	27	37.5	17	23.6	3.66
Q13	I would like to have more occasions to learn usage of game-based learning approach	4	5.6	14	19.4	19	26.4	15	20.8	20	27.8	3.45
Q14	I prefer using games to learn instead of traditional methods in class	6	8.3	21	29.2	21	29.2	12	16.7	12	16.7	3.04
Q15	I would like to be taught all informatic courses using educative games	2	2.8	9	12.5	14	19.4	24	33.3	23	31.9	3.79
Q16	I would like to have easier online access to this kind of games	5	6.9	6	8.3	18	25.0	26	36.1	17	23.6	3.61

**n=72, *%=100,*

Rating scale: SD-strongly disagree, *D-disagree, *N-not sure, *A-agree, *SA-strongly agree*

Table 2 above showed the general level of the students' perception towards the application of games in their academic practices. The mean scores of the items are different each other's. "Game-based projects (e.g. Lightbot) affect me positively" item's mean score is 3.65. "Learning programming concepts through analysing simple 3D games is my preference" item's mean score is 3.48. "I am keen on using simple games in terms of learning other subjects in the future" item's mean score is 3.44. "I prefer to solve simple 3D game programming exercises" item's mean score is 3.47. "This subject becomes more interesting through the usage of computer games" item's mean highest score is 3.81. "If I were taught programming with

simple games I would perform better in relevant courses" item's mean score is 3.72. "This sort of games helps me develop critical thinking" item's mean score is 3.75. "It's worthy to try using games to learn new programming concepts in the future" item's mean score is 3.52. "This game strengthens my comprehension of the programming concepts" item's mean score is 3.66. "I would like to have more occasions to learn usage of game-based learning approach" item's mean score is 3.45. "I would like to be taught all informatics courses using educative games" item's mean score is 3.79. "I would like to have easier online access to this kind of games" item's mean score is 3.61.

"I am keen on using simple games in terms of learning programming concepts in the future" item's mean score is 3.36. "Finding answers to exercises based on games is an encouraging activity" item's mean score is 3.27. "I prefer using games to learn instead of traditional methods in class" item has lowest score. The score is 3.04.

The mean representation on the table displays huge and positive reaction of students on the usefulness and influence of game to their academic and daily life activities.

> 6th grade male student M: "*Yes, I would prefer games for some topics; it would raise the tempo of the lesson".*
>
> 6th grade female student N: "*Yes game based project motives me, but if the genre of the game is something that we like that would be more positive*".
>
> 6th grade male student O: when asked if he prefers learning programming concept through games? "*It would be better if we had lessons as well,*

because a game cannot provide everything to us but you can. Maybe afterwards, we can play games to practice. We cannot learn everything through an only game based learning system but, you can teach as we keep them in mind and then we play games and keep something more in mind".

In the light of social changes of game based learning, a popular theme is that via computer games youths build passion and unite with groups which work across contexts, as a kind of their individual improvement (Gee, 2003).

Another study has proven a high attitudinal perception rate of the 6th grade student toward the application of games in programming algorithm in classroom based on research conducted on students in China, they conducted research on the gaming background of school students; most especially they evaluated the students familiarization of the students with games and how the games influences their perception. Their result showed a positive response and high students acceptance of the introduction of game based program into their school, (Bakar et al., 2006).

Computerized games can be more captivating than consistent classroom exercises (Malone et al., 1987; Rieber, 1996).

They crave assignments that are "quick, dynamic and investigative, with data provided in numerous structures in parallel" (Slater, 2003).

This basically portrays that, students through their positive comments showed huge interest in the adoption and participation in the game-aided learning environment.

Related studies portrays similar findings, stating that both girls and boys pupils consented that games may be very useful for the purpose of passing instruction in education, for example, in math, critical thinking and history (Kennedy et al., 2009). Sobkin et al., (2004), reported insightfully that both male and female are highly motivated on the playing of video based on the research he conducted on 796 Russian kids.

4.1.1 Analysis of the students' attitudes regarding gender, in the game-aided learning environment

This section analysis the gender perception of the 6th grade students on the application of games for learning programming courses in classroom by displaying the mean score and P score of the analysis.

Table 3: Gender Perception of Game Based Learning for Programming Contents

	Gender	**N**	**X**	**SS**	**Sd**	**t**	**p**
Q1	Female	37	3.51	.98	70	1.19	.238
	Male	35	3.80	1.05			
Q2	Female	37	3.10	1.02	70	3.41	**.001**
	Male	35	3.88	.90			
Q3	Female	37	3.00	1.08	70	2.86	**.006**
	Male	35	3.74	1.12			
Q4	Female	37	3.35	1.05	70	.69	.488
	Male	35	3.54	1.26			
Q5	Female	37	3.24	1.11	70	1.84	.069
	Male	35	3.71	1.04			
Q6	Female	37	3.45	1.01	64.946	3.58	**.001**
	Male	35	4.20	.71			
Q7	Female	37	3.48	1.09	70	1.89	.062
	Male	35	3.97	1.07			
Q8	Female	37	3.48	1.14	70	2.072	**.042**
	Male	35	4.02	1.07			
Q9	Female	37	3.05	1.10	70	1.95	.055
	Male	35	3.60	1.26			
Q10	Female	37	3.32	1.02	70	1.76	.082
	Male	35	3.74	.98			
Q11	Female	37	3.35	.94	70	.60	.545
	Male	35	3.20	1.15			
Q12	Female	37	3.62	1.16	70	.36	.717
	Male	35	3.71	.98			

Q13	Female	37	3.16	1.14	70	2.12	**.037**
	Male	35	3.77	1.28			
Q14	Female	37	2.94	1.24	70	.68	.496
	Male	35	3.14	1.19			
Q15	Female	37	3.72	1.12	70	.483	.631
	Male	35	3.85	1.11			
Q16	Female	37	3.51	1.12	70	.741	.461
	Male	35	3.71	1.17			

The Table 3 above displayed the Mean Score of the different gender perception in the study. There was no significant difference between gender and in perception of Game Based Learning for Programming Contents according to Q1, Q4, Q5, Q7, Q9, Q10, Q11, Q12, Q14, Q15 and Q16. There was significant difference between gender and in perception of Game Based Learning for Programming Contents according to Q2, Q3, Q6, Q8, and Q13. Statistically, this implies that male students showed a little bit more motivation and willingness in the use of game applications for the purpose of learning in the classroom.

From the mean score of Q2 item, it can also be seen that male has a score of 3.88 and female has a score of 3.10, this means that male prefers to learn with programming concepts more than female students.

The Q3 item also showed score of 3.00 for female and 3.74 for male, this means that male students are more concerned in adopting easy games for learning programming concepts in the future.

Through the mean score of Q6 item, male students believe that adopting computer games makes subject learning more interesting.

The mean score of Q8 item shows that male has 4.02 which is higher than that of the female students of 3.48. This goes to show that male students believe that game improves their critical thinking more than that of the female.

Through the mean score of Q13 item, male students believe that have more occasions to learn usage of game-based learning approach.

In an interview conducted during the data collection phase of this research revealed some opinion of the students which are similar to the quantitative results of the study are as follows:

> 6th grade male student C: "*everyday about an hour I play game with my friends both boys and girls. It doesn't matter for us"*.

> 6th grade female student D: "*Sometimes I need assistance from my male friends or female friends, when playing with a friend we play and learn at the same time, no differences*".

From the student's response above, they showed no significance in gender participation and adoption of gaming to for learning purposes. The students believe that either being a male or a female does not determine student's interest in the adoption of game during learning.

Miller and Robertson (2011) found no significant difference in their results for male and female school students.

Some related works have shown that gender issues have been extensively studied, in relation to their bias in playing game. Ogletree et al., (2007) studied 206 learners in the United States and found that male is more attracted to games especially during study compared to female students.

An outcome from another study tallies with the result gotten from this investigation as related to gender, Bourgonjon et al., (2010) discovered that boys students have a more accepting behavior to game than female learners. Also, another found that much more positive influence of computer games effects male students (Brom et al., 2011).

4.1.2 Analysis of the students' attitudes regarding time spent on playing game, in the game-aided learning environment

This section displayed the mean and standard deviation score point for the time spent by the students on game play.

Descriptive statistics of Students' Attitudes Regarding Time Spent on Playing Game is shown in Table 4 below:

Table 4: Descriptive Statistics of Students' Attitudes Regarding Time Spent on Playing Game

Play Computer Game	N	X	Std. Deviation
Between 2 and 5 hours a day	24	3.87	.94
More than 5 hours a day	7	3.71	.75
A few times a week	18	3.55	.85
A few times a month	23	2.95	1.14
Total	72	3.48	1.03

Students' Attitudes Regarding Time Spent on Playing Game is shown in Table 5 below:

Table 5: Students' Attitudes Regarding Time Spent on Playing Game

Variance Source	Sum of Squares	sd	Mean Square	F	p
Between Groups	10,532	3	3,511		
Within Groups	65,455	68	,963	3,647	,017
Total	75,986	71			

As it seen from Table 4 and 5, a one-way ANOVA between subjects was conducted to examine students' attitudes and time spent on playing game. The results of the analysis, there was a significant at the $p<0.05$ level by playtime [$F(3.68)=.3.647$, $p=0.017$]. Post hoc comparisons using the Tukey test indicated that the mean score for the between 2 and 5 hours a day group ($X=3.87$, $SD=.94$) was significantly different than the a few times a month group ($X=2.95$, $SD=1.14$).

Descriptive statistics of Students' Attitudes Regarding Time Spent on Playing Game is shown in Table 6 below:

Table 6: Descriptive Statistics of Students' Attitudes Regarding Time Spent on Playing Game

Play Computer Game	N	X	Std. Deviation
Between 2 and 5 hours a day	24	3.83	1.67
More than 5 hours a day	7	3.57	1.51
A few times a week	18	3.50	.92
A few times a month	23	2.69	.92
Total	72	3.36	1.54

Students' Attitudes Regarding Time Spent on Playing Game is shown in Table 7 below:

Table 7: Students' Attitudes Regarding Time Spent on Playing Game

Variance Source	Sum of Squares	sd	Mean Square	F	p
Between Groups	16,194	3	5,398		
Within Groups	78,417	68	1,153	4,681	,005
Total	94,611	71			

As it seen from Table 6 and 7, a one-way ANOVA between subjects was conducted to examine students' attitudes and time spent on playing game. The results of the analysis, there was a significant at the $p<0.05$ level by playtime [$F(3.68)=4.681$, $p=0.005$]. Post hoc comparisons using the Tukey test indicated that the mean score for the between 2 and 5 hours a day group ($X=3.83$, $SD=1.67$) was significantly different than the a few times a month group ($X=2.69$, $SD=.92$).

It has been not found the significant results for other items.

In an interview conducted during the data collection phase of this research revealed some opinion of the students which are similar to the quantitative results of the study:

6th grade male student D: "*No, I think it was a loss of time. I play a few games though*".

6th grade female student E: "*Negatively I get affected by games. For example, if i play too much of computer games that can harm my eyes. Thinking that it is a loss of time it affects me negatively*".

6th grade male student F: "*I spend 2 hours daily playing computer games. Sometimes, when I lose I get angry. When I win, it makes me happy*".

It is understood from this that students spend more time in adopting games and participating in game-aided learning environment as it suits their various learning styles

Another related article that has similar finding to this outcome is (Squire, 2008), found out that student that do not play video game tends to see the games as waste of time and as a distraction.

Lenhart et al., (2008) states that it is mind blowing on the amount of time youths spend on playing video games, scaling to closely 7-10 hours a week. And even more reports has argued that the number of hours has risen beyond that (Homer, Hayward, Frye and Pass, 2012).

4.1.3 The students' attitudes regarding gaming motivation, in the game-aided learning environment

This section shows the mean score analysis and standard deviation of the students attitudes regarding gaming motivation.

Table 8: Description Statistic of Students' Attitudes Regarding Gaming Motivation

Which of the following considerations is the best choice for you?	**N**	**Mean**	**Std. Deviation**
Enjoyable	9	3.44	1.34
Interesting	8	4.00	.92
Exciting	19	4.15	.83
Consuming	3	2.67	.57
An Activity	4	3.75	1.25
Worthwhile Activity	9	4.12	.78
Helping to Develop Useful Skills	9	3.00	1.00
Valuable Activity	3	3.67	1.15
A Waste of Time	8	2.87	.35
Total	**72**	**3.65**	**1.02**

Table 9: Students' Attitudes Regarding Gaming Motivation

Variance Source	**Sum of Squares**	**Df**	**Mean Square**	**F**	**P**
Between Groups	19,724	8	2,465	2,845	,009
Within Groups	54,596	63	,867		

Total	74,319	71

As it seen from Table 8 and 9, a one-way ANOVA between subjects was conducted to examine students' attitudes and gaming motivation. The results of the analysis, there was a significant at the $p<0.05$ level by playtime [$F(8.63)=2.845$, $p=0.009$]. Post hoc comparisons using the Tukey test indicated that the mean score for the exciting group ($X=4.15$, $SD=.83$) was significantly different than the waste of time group ($X=2.87$, $SD=.35$).

Table 10. Description Statistic of Students' Attitudes Regarding Gaming Motivation

Which of the following considerations is the best choice for you?	**N**	**Mean**	**Std. Deviation**
Enjoyable	9	3.77	1.20
Interesting	8	3.37	.74
Exciting	19	3.94	.70
Consuming	3	1.67	1.15
An Activity	4	3.75	.50
Worthwhile Activity	9	3.34	1.00
Helping to Develop Useful Skills	9	3.78	.97
Valuable Activity	3	3.67	1.52
A Waste of Time	8	2.50	.75
Total	**72**	**3.48**	**1.03**

Table 11. Students' Attitudes Regarding Gaming Motivation

Variance Source	**Sum of Squares**	**df**	**Mean Square**	**F**	**P**
Between Groups	23,969	8	2,996	3,629	,002
Within Groups	52,017	63	,826		
Total	75,986	71			

As it seen from Table 10 and 11, a one-way ANOVA between subjects was conducted to examine students' attitudes and gaming motivation. The results of the analysis, there was a significant at the $p<0.05$ level by playtime [$F(8.63)=3.629$, $p=0.002$]. Post hoc comparisons using the Tukey test indicated that the mean score for the exciting group ($X=4.15$, $SD=.83$) was significantly different than the waste of time group ($X=2.87$, $SD=.35$) and consuming ($X=1.67$, $SD=1.15$), helping to develop useful skills group ($X=3.78$, $SD=.97$) was significantly different than the consuming group ($X=2.87$, $SD=.35$) and enjoyable group ($X=3.77$, $SD=1.20$) was significantly different than the consuming group ($X=2.87$, $SD=.35$).

Table 12. Description Statistic of Students' Attitudes Regarding Gaming Motivation

Which of the following considerations is the best choice for you?	**N**	**Mean**	**Std. Deviation**
Enjoyable	9	3.77	.97
Interesting	8	4.00	.92
Exciting	19	3.42	1.01
Consuming	3	2.00	.00
An Activity	4	3.00	1.41
Worthwhile Activity	9	3.44	.88
Helping to Develop Useful Skills	9	3.11	1.45
Valuable Activity	3	5.00	.00
A Waste of Time	8	2.37	.91
Total	**72**	**3.36**	**1.15**

Table 13. Students' Attitudes Regarding Gaming Motivation

Variance Source	**Sum of Squares**	**df**	**Mean Square**	**F**	**P**
Between Groups	23,969	8	3,430	3,217	,004
Within Groups	52,017	63	1,066		
Total	75,986	71			

As it seen from Table 12 and 13, a one-way ANOVA between subjects was conducted to examine students' attitudes and gaming motivation. The results of the analysis, there was a significant at the $p<0.05$ level by playtime [$F(8.63)=3.629$, $p=0.002$]. Post hoc comparisons using the Tukey test indicated that the mean score for the valuable activity group ($X=5.00$, $SD=.00$) was significantly different than the waste of time group ($X=2.37$, $SD=.91$) and consuming ($X=2.00$, $SD=.00$).

Table 14. Description Statistic of Students' Attitudes Regarding Gaming Motivation

Which of the following considerations is the best choice for you?	**N**	**Mean**	**Std. Deviation**
Enjoyable	9	3.44	1.42
Interesting	8	3.75	1.03
Exciting	19	3.73	.80
Consuming	3	2.67	2.08
An Activity	4	3.75	.50
Worthwhile Activity	9	3.00	.86
Helping to Develop Useful Skills	9	2.78	1.56
Valuable Activity	3	4.67	.57
A Waste of Time	8	2.25	1.03
Total	**72**	**3.31**	**1.20**

Table 15. Students' Attitudes Regarding Gaming Motivation

Variance Source	**Sum of Squares**	**df**	**Mean Square**	**F**	**P**
Between Groups	25,107	8	3,138	2,517	,019
Within Groups	78,545	63	1,247		
Total	103,653	71			

As it seen from Table 14 and 15, a one-way ANOVA between subjects was conducted to examine students' attitudes and gaming motivation. The results of the analysis, there was a significant at the $p<0.05$ level by playtime [$F(8.63)=3.629$, $p=0.002$]. Post hoc comparisons using the Tukey test indicated that the mean score for the exciting group (X=4.15, SD=.83) was significantly different than the waste of time group (X=2.87, SD=.35) and consuming (X=1.67, SD=1.15), helping to develop useful skills group (X=3.78, SD=.97) was significantly different than the consuming group (X=2.87, SD=.35) and enjoyable group (X=3.77, SD=1.20) was significantly different than the consuming group (X=2.87, SD=.35).

Table 16. Description Statistic of Students' Attitudes Regarding Gaming Motivation

Which of the following considerations is the best choice for you?	**N**	**Mean**	**Std. Deviation**
Enjoyable	9	3.00	1.34
Interesting	8	3.00	.92
Exciting	19	3.94	.83
Consuming	3	3.34	.57
An Activity	4	2.00	1.25
Worthwhile Activity	9	3.45	.88
Helping to Develop Useful Skills	9	3.00	1.50
Valuable Activity	3	3.67	1.15
A Waste of Time	8	2.27	1.05
Total	**72**	**3.65**	**1.02**

Table 17. Students' Attitudes Regarding Gaming Motivation

Variance Source	**Sum of Squares**	**df**	**Mean Square**	**F**	**P**
Between Groups	19,067	8	2,383	2,529	,019
Within Groups	59,378	63	,943		
Total	78,444	71			

As it seen from Table 16 and 17, a one-way ANOVA between subjects was conducted to examine students' attitudes and gaming motivation. The results of the analysis, there was a significant at the $p<0.05$ level by playtime [$F(8.63)=2.259$, $p=0.019$]. Post hoc comparisons using the Tukey test indicated that the mean score for the exciting group ($X=3.94$, $SD=.83$) was significantly different than the enjoyable group ($X=3.00$, $SD=1.34$), the interesting group ($X=3.00$, $SD=.92$), an activity group ($X=2.00$, $SD=1.25$) and the waste of time group ($X=2.27$, $SD=1.05$).

Table 18. Description Statistic of Attitudes toward Gaming Motivation

Which of the following considerations is the best choice for you?	**N**	**Mean**	**Std. Deviation**
Enjoyable	9	3.44	1.34
Interesting	8	3.75	.70
Exciting	19	4.21	.71
Consuming	3	3.00	1.00
An Activity	4	2.50	1.29
Worthwhile Activity	9	3.67	1.00
Helping to Develop Useful Skills	9	3.55	.88
Valuable Activity	3	4.67	.57
A Waste of Time	8	3.12	1.45
Total	**72**	**3.67**	**1.07**

Table 19. Student Aggregate Attitude on Gaming Environment

Variance Source	**Sum of Squares**	**df**	**Mean Square**	**F**	**P**
Between Groups	18,356	8	2,294	2,271	,033
Within Groups	63,644	63	1,010		
Total	82,000	71			

As it seen from Table 18 and 19, a one-way ANOVA between subjects was conducted to examine students' attitudes and gaming motivation. The results of the analysis, there was a significant at the $p<0.05$ level by playtime [$F(8.63)=2.271$, $p=0.033$]. Post hoc comparisons using the Tukey test indicated that the mean score for the exciting group ($X=4.21$, $SD=.71$) was significantly different than an activity group ($X=2.50$, $SD=1.29$) and the waste of time group ($X=3.12$, $SD=1.45$). Also worthwhile activity group ($X=3.67$, $SD=1.00$) was significantly different than consuming group ($X=3.00$, $SD=1.00$).

In an interview conducted during the data collection phase of this research revealed some opinion of the students which are similar to the quantitative results of the study:

6th grade male student G: "*I generally play 2-3 hours. If I can't pass a level I can play 4-5 hours. It affects my attitudes positively, because, I feel like a person who thinks a lot*".

6th grade female student H: *"I don't play computer games that often. I prefer playing with friends. I play when I get bored. When I lose, I get angry and upset".*

6th grade female student I: "*Yes, everyday, about an hour. Then, I play football with my friends it has no effect on my attitudes, they stay the same*".

It can be understood that students posses different attitudes regarding gaming participation towards learning and its further application in the academic activities

Most articles have found similar result as regards students' attitude towards game play. Fengfeng (2008a and b) discovered that games supported a much more positive behavior towards learning math subject.

Additionally, Vogel et al., (2006) stated that meta-analysis discovered that significant proper attitudes related to education were used for courses applying interlinked games or virtual creations in comparison to the ones utilizing conventional approach for teaching.

4.1.4 Analysis of the students' attitudes regarding suitability of games for students, in the game-aided learning environment

This section shows the mean score analysis and standard deviation of how suitable it is for student in playing video games. This section will further display the range of

the mean score as it represents students' suitability level of display in relation to playing educational video games.

Table 20: Suitability level of students in playing video games

Which of the following game types is the most suitable to you?	**N**	**Mean**	**Std. Deviation**
Challenge	24	3.75	.89
Fantasy	17	3.76	.83
Curiosity	10	2.70	.94
Control	6	2.84	1.16
Competition	11	3.90	.94
Recognition	4	2.50	1.29
Total	**72**	**3.48**	**1.04**

Table 21: Students aggregate suitability level on gaming environment

Variance Source	Sum of Squares	df	Mean Square	F	P
Between Groups	17,585	5	3,517	3,975	,003
Within Groups	58,401	66	,885		
Total	75,986	71			

As it seen from Table 20 and 21, a one-way ANOVA between subjects was conducted to examine students' attitudes and gaming motivation. The results of the analysis, there was a significant at the $p<0.05$ level by playtime [$F(5.66)=3.975$, $p=0.003$]. Post hoc comparisons using the Tukey test indicated that the mean score for the challenge group ($X=3.75$, $SD=.89$) was significantly different than the curiosity group ($X=2.84$, $SD=1.16$). Also competition group ($X=3.90$, $SD=.94$) was significantly different than the curiosity group ($X=2.84$, $SD=1.16$).

In an interview conducted during the data collection phase of this research revealed some opinion of the students which are similar to the quantitative results of the study:

6th grade male student J: *"Yes am motivated. And for the other lessons, if teachers made us play games that would be challenging for me as well*".

6th grade female student K: "*Yes am motivated, for example it teaches something new in the game, and we won't be bored and can be curios and motivated even more*".

6th grade female student L: "*Yes, if I don't get it, I am strained. Either way it is nice. It would be nice having an actual lesson and sometimes having a game to control".*

It can be understood that there are various game suitability level that motivates learners to engage in gaming education and also participate in game activities.

A related work such as Hainey, Connolly, Stansfield, and Boyle (2011b) they conducted a research that focused on the variances in motivation of internet game and offline games. The investigation was a combo evaluation of 3 studies at college institutions; it further includes 2226 sample participants within the range of 2005, 2007 and 2009. There investigation discovered that challenge was the highest motivational factor and recognition was the least in the ranking for motivation.

Chapter 5

CONCLUSION

5.1 Conclusion

This thesis study concentrated on the students' attitudes of using computer game (LightBot) for academic purpose i.e. utilizing the computer game in classroom setting, such as teaching and learning programming language. Also, the study concentrates on how the students are influenced, motivated, the number of hours they play computer games, how suitable is it to indulge in game play and whet factor drives the student into playing computer games. Data was collected from the students via questionnaire and interview questions. Analysis for the work was conducted in Eastern Mediterranean Doga College, Famagusta, North Cyprus.

Discoveries in this investigation state thus, that there is generally a high attitudinal perception rate of the 6^{th} grade student toward the application of games in learning programming algorithm in classroom.

According to gender perception on the application of computer games into academic activities, findings in this study showed that male students showed a little bit more motivation and willingness in the use of game applications for the purpose of learning in the classroom.

Also, results showed that no significant difference existed between male and female students towards game utilization for academic purposes in the 6th grade classroom. This study also showed outcomes on the amount of times spent on game by students. The findings thus showed that students spent more time on playing games most especially when it has to do with academic activities.

Further investigation in this study showed that students all have positive attitudes towards computer games believing that computer games is very valuable to their academic activities, they saw that computer games are enjoyable, interesting and also exciting when utilized in the classroom. Futher findings shows that negative factors such as, lonely activity, waste of time and time consuming which studies have argued about to have affected students output and activities in school; all has a low score in the analysis of the study. This proves that the 6th grade student don't believe that game play in classroom activities affects their studies and educational improvement holistically.

The study also showed an outcome on the motivational and suitability of factors that influences students to play video games. Thus, the study shows that students most probably like games and educational activity which is much more competition and which pleases there fantasy, more so, they appreciate subjects they are much more in control of and not dominating.

Other factors such as recognition, curiosity and challenge possess less score, meaning that students do not see these factors as the major compelling factors towards utilizing computer games.

Subsequent findings in this study shows that, more than half of the participants in the research agreed and strongly believes that computer games and positively influences students attitudes for better educational improvement and development.

The outcomes of this research possesses implications which are practical for the instructors of education, this is because it will improve our knowledge on the manner game based learning (i.e. using commercial video games) should be incorporated in the training programs of teachers. Since, it is the teacher that will be the person who introduces topics and program to the students it is therefore important for the teachers to have the required information at first before any practical introduction would be made to the students during class activities. Teachers needs to be predisposed and acquainted with technological advancement and most probably have proper gaming background in other to appreciate the impact of utilizing games during teaching and learning to the students.

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APPENDICES

Appendix A: Questionnaire

The purpose of this questionnaire is to collect information about using game based learning system. If it enhances 6th grade students' motivations to learn programming, supports them in comprehending complex contents, and engages them in carrying out programming activities. We would be very grateful if you could complete this questionnaire by ticking the boxes, correspond to your answer or entering an appropriate response when indicated. Your participation is entirely voluntary. Completing this questionnaire will not benefit you directly, may have positive influences on the future uses ofLightbot in programming language courses.

1. **Gender**: ( )Male ( ) Female
2. **How long do you play computer games?**

   ☐ Between 2 and 5 hours a day

   ☐ More than 5 hour a day

   ☐ A few times a week

   ☐ A few times a month
3. **Which of the following considerations is the best choice for you?**

   To me, playing computer games is

   ☐ enjoyable

   ☐ interesting

   ☐ exciting

   ☐ consuming

- ☐ activity
- ☐ worthwhile activity
- ☐ helping to develop useful skills
- ☐ valuable activity
- ☐ a lonely activity
- ☐ a waste of time

4. **Which of the following game types is the most suitable to you? Pick only one.**

   - ☐ **Challenge** – an appropriate level of difficulty and challenge, multiple goals for winning, constant feedback and sufficient randomness
   - ☐ **Fantasy** – an appropriate level of immersion by assuming a particular role and dealing with related responsibilities
   - ☐ **Curiosity** – providing sensory stimulation to ensure prolonged participation
   - ☐ **Control**- The ability to select choices and observe the consequences of these choices
   - ☐ **Competition** – compare their performance to the performance of other players
   - ☐ **Recognition** – a sense of satisfaction when accomplishments are recognised.

	In this section, please put "x" on the box which best describes your attitudes and feelings on the following statements. Please try to answer each statement as fast as possible.	Strongly Disagree	Disagree	Not sure	Agree	Strongly Agree
1	Game-based projects (e.g. Lightbot) affect me positively.					
2	Learningprogramming concepts through analysing simple 3D games is my preference.					
3	I am keen on using simple games in terms of learning programming concepts in the future.					
4	I am keen on using simple games in terms of learning other subjects in the future.					
5	I prefer to solve simple 3D game programming exercises.					
6	This subject becomes more interesting through the usage of computer games.					
7	If I were taught programming with simple games I would perform better in relevant courses.					
8	This sort of games helps me develop critical thinking.					
9	Solving problems of simple games (e.g. Lightbot) is very interesting.					
10	It's worthy to try using games to learn new programming concepts in the future.					
11	Finding answers to exercises based on games is an encouraging activity.					
12	This game strengthens my comprehension of the programming concepts.					
13	I would like to have more occasions to learn usage of game-based learning approach.					
14	I prefer using games to learn instead of traditional methods in class.					
15	I would like to be taught all informatic courses using educative games.					
16	I would like to have easier online access to this kind of games.					

Appendix B: Interview Questions

1) Do you like playing online games? Why?
2) Which games are educative and which ones are confusing?
3) Do playing online games affect you positively or negatively?
4) How often do you play this sort of games? What sort of impact do they have on your behavior?
5) Is it easy to have access to an online game for you?
6) Do you need help when playing this sort of online games?
7) Do you think that this sort of games is boring or fun?
8) Do you take a lesson which is taught through online games?
9) Are you being motivated by a game based education wherever it is taught?
10) Do know Lightbot game? Can you please speak of an online game that you know?
11) Do game based projects motivate you?
12) Do you prefer learning programming concept through games?
13) Do some games like Lightbot improve your critical thinking?
14) Would you prefer more games to be used during the lessons? Or, would you prefer classical education system?