

# An Assessment of the Mobile Games Utilization and It's Effect to One's Computational Thinking Skills

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**Abstract**— Transformation of knowledge can be obtained anytime anywhere but where and how you learn make all the difference. The increased number of different online games attract young people that can turn to addiction or cause dropout or sometimes makes them inspired. On the other hand, computational thinking skills are vital skills for the students in order to reduce the skills gap between education and the workplace. Computational thinking skills shall help the students become problem solver and innovator, when students have the capacity to determine what to extract from a system or problem in order to create a solution they are forced to think differently about the most important elements of what they are working with and remove irrelevant factors. The main purpose of this study is to assess the computational thinking among students on the mobile games utilization. The researcher employed quantitative data analysis and documentary analysis was used to measure the effect of mobile games utilization using Scholastic Abilities Test for Adults(SATA).The result of the study have average effect to enhance computational thinking. It also reveals that mobile games utilization such as collaboration actions provide incentives to engage with learning.

**Keywords**— computational thinking skills, mobile games, mobile games utilization

## I.INTRODUCTION

Computational thinking is used in our everyday lives to solve a certain problem and runs through every function of a modern business. One solution in solving a problem from difficult into a simple form is to utilize the computational thinking [7].The outcome of computational thinking is a combination of humans and machines and it is not a mastery but it is more on the calculation techniques to solve difficult problem[8].

Moreover, With the rapid development of information technologies, the needs of the community have changed [13]. According to The International Society for Technology in Education (ISTE) to improve the problem solving skills of the students the use of new technology will be a big help in developing a computational thinking skills and creativity [9].They also said that digital games are effective in developing the problem solving, creativity and reflective thinking skills of individuals because of their active participation in providing solutions and immediate result [2]. In relation to this, students would live and work with the

big influence by computing values [16] Furthermore due to increasingly information-based society computational thinking are necessary skills for the students that can help them solve problems and create effective solutions in order to lessen the skills gap between education and the workplace[18].

With the increase number of different mobile games, students are more engaged as one way of getting fun thus, others result to drop outs or addiction. Using games with computer generated agents are is of the alternative ways to help the perception of individuals because games also design to create challenges in every level, Gamers will face a lot of problems but solutions are formulated with strategies and algorithmic in nature [17]. In the light of this opinion, it can be stated that computational thinking is related to various factors. One of this factor is the mobile games that is another approach in developing the problem solving skills of students and discover some techniques or strategies in creating certain solution [5]. Teens who play online games are just having enjoyment because they want to feel relief during school hours and students also tend feel stress due to loads of school work like quizzes, reviewing for examination and doing case studies and through playing it will relieve their stress [10]. It is undeniable that playing online games provide them something that no one can provide and according to some researchers it enables the mind of players to be more active and also help them improve their decision making especially those adventure games that keep the players to be alert, active and strategic.

Computational Thinking is a fundamental skill that opens students minds in using data, technology, resources and people in a manner which shifts us from technology consumers to creators .

### A.Mobile Games Advantages

Mobile gaming is one of the widely used leisure activities by many people. With this fast development online gaming was also created to give entertainment to people regardless of age, gender and status of life.

As of now internet is necessary because people rely on one click away for searching information but the influence on youth is undeniably questionable. Technologies has advantages and disadvantages.

According to the study "Regardless of the format of the game, students can simultaneously build their problem

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solving skills while having fun throughout the process if an instructional game is well-designed"[11].

It has been observed by some researcher that games bring about positive learning to students if it is always being utilized inside the classroom[10].

Nowdays, digital technologies has played a vital role inside the classroom and as years pass by it will become useful or is embed in the instructional materials as another digital method of teaching[15].

This study shall also help the students have an awareness on the effect of mobile games utilization towards computational thinking skills. To the parents, it will serve as basis to help share with other parents some information about certain games or concepts or ideas to help each other in parenting and also it will help them understand the study habit of their children when they're engaged into such activity and to the teachers, it will provide additional knowledge on what strategy to use in teaching problem-solving and decision-making and to educate students about the well-known effects of mobile gaming.

This study looks into the mobile games utilization and its effect to computational thinking skills and the preferred mobile game types and while attempting to provide a different perspective to the development of these computational thinking skills.

In the light of the above mentioned, the researcher intends to study the mobile games utilization of students of Panpacific University.

## B. Challenges

Challenges are also felt by other parents, friends or students. As of now people are more engaged with the use of new technology like smart phone for gaming ,communicate with their love ones and for educational purposes but lack of monitoring or improper use of technology will distract the learning activities of students. 3]. Moreover, studies found out that the increased time spent on the internet can lead to negative impact and also studies revealed that human brain is easy to destruct and one reasons is using technology when it is not properly monitored[1].

However, in line with this opinion, the result of the study revealed that even if the respondents play online games still the personal interaction with others is not affected and the academic performance are still good enough even if they spent time for playing[3]. Games has an important role in the development of cognitive, physical, social, and emotional well-being of children and youth[4].

Moreover, action game players can think quickly or make decision easily especially in the middle of a battlefield and also the brains of action video game players can collect information more efficiently compared to non-gamers [22].

With the use of mobile devices, it support students to process and locate information and also one of the practices of teachers[14] and students nowadays utilize mobile devices as part of the resources for learning[19]. Computational thinking is part of analytical thinking together with mathematical thinking that is a necessary skill to solve a problem 17].

## C. Related Works

Computational thinking is the entire knowledge which an individual must possess in order to handle problems and make possible solutions[21]. Computational thinking is incorporated in the development of educational environment [12]. Also applications like social networks and cooperative technologies and digital world play a vital role in the development of computational thinking skills[20].

Critical thinking is one of the most important characteristics in education to reduce the skills gap in the workplace today. Critical thinking is acknowledged in every 21st-century learning framework, assessed as one of the most important super skills to have[6].

## D. Project Scope

The research study focuses on the mobile games utilization of students and the effect of mobile games to one's computational thinking. One of the goals of the study is to measure the effect of mobile games utilization to one's computational thinking skills in terms of problem solving, critical thinking and logical thinking

## METHODOLOGY

### Research Design

The researcher used descriptive research design in undertaking the project. The researcher employed quantitative data analysis in determining the experiences in playing mobile games. Documentary analysis was used to measure the effect of mobile games utilization to one's computational thinking skills as the main data gathering tool using scholastic abilities test for adults (sata). In order to measure the effects of mobile games utilization sata was utilized. Sata is a nine-subtest battery that examines competence in abilities related to academic success. Three subtests assess scholastic aptitude and six subtests measure skills related to academic achievement. The subtests include verbal reasoning (logical thinking) to measure the ability to recognize relationship among words, non-verbal(critical thinking) reason uses geometric forms to assess nonverbal problem solving abilities and quantitative reasoning(problem solving) to measure a person's ability to recognize the meaningful relations between words.

The Psychometrician administered the test, checked and analyzed the result. The researcher also fielded a questionnaire about the demographic profile of the respondents and questions on the extent of mobile games utilization. The researcher then tabulated the data; interpreted the data. Response to the questionnaires by the respondents were statistically analyzed using descriptive statistics which is the frequency count and percentage distribution to quantify the mobile games utilization and the effect of mobile games to one's computational thinking skills. Distribution of the respondents is illustrated in table 1.



**Table 1. Distribution of Respondents**

Respondent	Number
Senior High School	66
College	30
Total	96

The respondents are all from the panpacific university, urdaneta city pangasinan. The respondents were composed of students of college and senior high school.

### III. RESULTS AND DISCUSSION

**Table 2: Demographic Profile**

Extent of Mobile Games Utilization	Result
Age of the respondents who are playing mobile games	83.3% from age 16-20 are playing mobile games
Types of mobile games that the respondents are playing	71.9% are playing war or adventure games
Play time of the respondents	34.38% are playing mobile games from 8:00 to 10:00 o'clock in the evening
Time per day they spent for mobile games	63.54% from 1-3 hours per day they spent for playing mobile games
Frequency of playing mobile games	38.54% are playing mobile games for 2 hours
Number of years playing mobile games	56.25% are playing mobile games for 1-2yrs.

Table 2 shows the result of the demographic profile and the extent of mobile games utilization of the respondents.

#### *Effects of Mobile Games Utilization to One's Computational Thinking Skills*

**Table 3: Critical Thinking(Non-Verbal)Reasoning**

Descriptor	F	%
Very Superior	1	1.04
Superior	2	2.08
Above Average	7	7.29
Average	71	73.96
Below Average	11	11.46
Poor	3	3.13
Very Poor	1	1.04

Table 3, shows the result is 73.96 % with Average descriptor for 71 respondents. The critical thinking or non-verbal reasoning of the respondents capability to learn new skills, think strategically, and analyze quickly have an average result. The results give an overview of the respondent's ability to apply these to solve the problem at hand.

In the recent study, findings recommend that "teachers could use games as tool for problem solving to

contribute to their students' learning outcomes and developing critical thinking" [26].

**Table 4: Problem Solving(Quantitative Reasoning)**

Descriptor	Frequency	%
Very Superior	1	1.04
Above Average	4	4.17
Average	62	64.58
Below Average	21	21.88
Poor	7	7.29
Very poor	1	1.04

table 4 shows the effect of mobile games utilization to one's computational thinking skills for problem solving. the result is 64.58 % with average descriptor. however, one (1) respondent shows that the result is very poor with 1.04 percent. in the recent study, with the use of instructional activities like game-design process could be effective in teaching multiple types of problem solving and improved decision making through game-design task[25].

**Table 5: Logical Thinking (Verbal Reasoning)**

Descriptor	F	%
Average	49	51.04
Below Average	41	42.71
Poor	6	6.25

Table 5 shows that the result of logical thinking (verbal reasoning) subtest gives an indication to the respondents that mobile games utilization have an average effect for reasoning and vocabulary and also assess one's understanding and comprehension skills and identifying critical issues, logically draw conclusions, produce clearly written outputs, and give clear articulation of ideas. The result is 51.04 % for 49 respondents with Average descriptor.

It implies that individuals computational thinking is to utilize different algorithms to solve a certain problem and different solution methods. With the use of technology like playing mobile games. Computational thinking skills and problem-solving skills are developed at their young age[24].



**IV. CONCLUSION**

Based on the findings presented and the data gathered through interpretation of the result of Scholastic Abilities Test for Adults (SATA ) to test the effect of mobile games utilization to one's computational thinking skills like critical thinking, logical thinking and problem solving. The average score of the respondents in all three scholastic aptitude subtests and General Average quotient (GAQ) is in the average range when compared to the scores of others of the same age group. Generally, scores on aptitude tests have a linear relationship with achievement test scores. An average aptitude test score is accompanied by an average achievement test score. Moreover, playing mobile games like war games , puzzle games and car racing or sports games have the potential to bring about cognitive learning outcomes. It implies that mobile games can help increase the motivation to engage in learning activities. and also prepares people to make decision faster. Example of games that requires the player to think faster is the adventure games which have frequently being played by the respondents.

Furthermore, the researcher found out that mobile games utilization has an average effect on the development of their problem solving skills, critical thinking and logical thinking. These findings play a vital role in education that incorporating computational thinking has important implications for other subject areas. Nowadays, computational thinking is becoming a fundamental skill for the 21st century, to be able to compete globally. It is important to introduce these concepts in content areas. Specifically, computational thinking must be introduce as early as the primary grades and then continue through secondary grades and beyond [23].

For further work from what was mentioned above that there is a need for the researcher to design a framework with cognitive learning outcomes and develop a mobile games application for math subjects as part of their instructional materials to foster computational thinking skills of the students.

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