

# Using Handheld Gaming Device to Increase Multiple Intelligences with Digital Puzzle Game

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**Abstract:** Today, video game has become an indispensable entertainment to children, and the theory of Multiple Intelligences is popular in Education, too. But so far, there are no researchers focused their studies on relation between video game and Multiple Intelligences in education. In this study, the researcher explored that students' change after utilizing video game into the curriculum of Multiple Intelligences. According to the theory of authentic assessment, there were four fifth grade students participated in this study, the researcher tried to investigate the effect of Multiple Intelligences when students played video game. The researcher used hand-held device: Nintendo Dual Screen and puzzle game software: Big Brain Academy for this experiment, and adopted observation and interview for data collection to understand students' change of Multiple Intelligences. The researcher discovered that he could assess students' spatial intelligence and logical-mathematical intelligence during the game. At the same time, students also enhanced their spatial intelligence, logical mathematical intelligence, interpersonal intelligence and bodily-kinesthetic intelligence.

**Keywords:** Multiple Intelligences, handheld game, Game-Based Learning

## Introduction

Prensky states that the 21<sup>st</sup> century is the generation of Digital Game-Based Learning [1]. Prensky names the new generation born after year 1975 and growing up with technologies as Generation G, who has contributed to the prevalence of digital simulation games. An increase in the average intelligence quotient (IQ) test scores over generations [2][3]. Furthermore, past educators emphasized that games are beneficial to students' learning and should be integrated into the teaching objectives. In combination of game-like teaching, learning in the classroom can be less dull. And Professor Gardner at Harvard University states in his Theory of Multiple Intelligence that human can have various types of intelligence. He argues that the concept of traditional intelligence test is narrowly defined, so a macroscopic view is proposed, encompassing the interpersonal ability and special abilities in the range of intelligence. The essence of mobile learning is to add mobile elements into digital learning. Learners can reach the goal of learning anytime, anywhere and all around through mobile devices. With the above-mentioned views in mind, this research, based on the conception of Authentic Tests from multiple intelligences, used qualitative research methods of observing and interviewing, to find out the changes and learning effects in students' multiple intelligences through portable puzzle games. The following are the key questions for this study:

- Do students appear to have improved multiple intelligences in problem solving when playing handheld puzzle games?
- Can the development level of students' multiple intelligences in problem solving be assessed when students are playing handheld puzzle games?

## **1. Literature Review**

Gardner defines intelligence as “an ability to solve problems in real life, an ability to produce new problems, and a person's ability to create a product or offer a service that is valued in the culture he or she is in.” That is, he thinks that human intelligence must include problem solving skills, allowing individuals to solve the problems or difficulties they encounter and creating fruitful results at appropriate timing [5]. And the potential to seek or create problems also has to be included to be part of human intelligence, as the basics for humans to gain new knowledge. In other words, the intelligence defined by Gardner is an ability to solve problems or fashion a product, and it has to be valued by one or more cultural settings.

## **2. The study**

Osborne indicated that multiple intelligences measurement tool is not easy to establish. Multiple intelligences place a great emphasis on the so-called authentic tests. The best way to assess students' multiple intelligences is to put students in the real situations and take the students' performance during problem solving and final results as references for evaluation [8]. This study used NDS as research tool and chose puzzle games as its main content, using the following criteria for game analysis.

- I. Children-appropriate software rating.
- II. No difficult operation skills required.
- III. Low demand on language ability.
- IV. No apparent educational aim.

Based on the criteria above, this study decided to use “Big Brain Academy”.

### *2.1 Sample*

Because the language the software used is all English, 5<sup>th</sup> and 6<sup>th</sup> graders were targeted to be the subjects of this study. As 6<sup>th</sup> graders would graduate in June, we conducted this study with the 5<sup>th</sup> graders, so that when analyzing data, re-observation can be done in the field.

### *2.2 Design*

The observation time of this research was the lunch break during school days in an elementary school (approximately 40 minutes). During the lunch break, 4 students were gathered to play group games. After school or on holidays, students took NDS game consoles home with them for practice, in order to improve students' scores in playing games through intensive practices and to increase the game's influence on students. During class hours, NDS were returned to the researchers to record game scores, and interviews were conducted if needed.

### 3. Results

The researchers then took on the formal testing. The testing dates were between May 18<sup>th</sup> and June 4<sup>th</sup>, 2009, totaling 19 days. The following is the analyses of students' performance based on observation and interviews, taking into consideration the spatial, logical-mathematical, linguistic, bodily-kinesthetic and interpersonal intelligences among the multiple intelligences.

### 4. Conclusion

With the belief of multiple intelligences, all the activities students participate in should carry the objective of cultivating multiple intelligences. And the courses and results of activities they participate in can all be assessed for multiple intelligences. Based on this belief, this study invited students to play video games, hoping that they could grow happily in play and pleasure while being stimulated for multiple intelligences, improving students' performances in schoolwork.

For the assessment of multiple intelligences, it is uppermost to put the students in a real situation, in which the skills developed can be assessed for multiple intelligences. In this study, we put the students in the setting of video games, and assessed the students' tendency in multiple intelligences and explored the development of students' multiple intelligences through the process of students playing games. Due to the limitation of the used software, not all the various intelligences could be detected in this study, and the observed items were limited to the spatial, logical-mathematical, linguistic, interpersonal and bodily-kinesthetic intelligences only. These intelligences were observed to have positive growth, while the levels of development were not identical.

Playing video games stimulates the cultivation of multiple intelligences, affecting the students' performances in schoolwork, as shown in the regular class. This study found that after the subjects had played video games, they showed significant progress in the math tests, especially the students originally with lower achievements. As for students originally with better grades, since they had had good performances, it was a great challenge to draw more improvements. Therefore, though their progress was marked, the degree of progress was limited.

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