Chapter 4
Understanding the Role of Digital Technology in Multiple Intelligence Education:
A Meta-Analysis

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ABSTRACT

The theory of multiple intelligences has been embraced by the education and research communities worldwide. Substantial research has been conducted to understand multiple intelligences and learning. However, studies that examine how various types of technology affect across the board the different types of intelligences in learning is lacking. This chapter reviews the multiple intelligence (MI) theory and how emergent technologies can be used to support MI learning in education using a meta-analysis method. The results reveal that bodily-kinesthetic is most responsive to technology-based intervention compared to other types of intelligences and that immersive and visual images are effective in improving verbal linguistic and bodily-kinesthetic intelligences. Discussion of the findings are made along with their implications in educational practices. Suggestions for future research and practice are made in regard to multiple intelligence and emergent digital technology.

INTRODUCTION

Humans' abilities to obtain and apply knowledge and skills can be largely influenced by factors like intelligence that involve logic thinking, reasoning, elaboration, planning, problem solving, and so forth. Traditionally, intelligence is defined as a general capacity for knowledge conceptualization and application that can be measured by IQ (Intelligence Quotients) (Bas, 2016; Visser, Ashton, & Vernon, 2006). This traditional definition of intelligence is challenged with the publication of Howard Gardner's seminal book *Frames of mind: The theory of multiple intelligences* in 1983. Instead of defining intelligence in terms of mental tests or IQs (Binet & Simon, 1916; Boring, 1950), Gardner argues that intelligence should be examined in a larger social and cultural context. According to Gardner (1983), there are at least seven types of intelligences: verbal-linguistic, logical-mathematical, musical-rhythmic, bodily-kinesthetic, visual-spatial, interpersonal, and intrapersonal. Later, he suggested naturalistic and existential intelligences are worthy of being included (Gardner, 1999).

Gardner's pluralistic view changes the traditional perception on intelligence. It embraces the notion that intelligence should be treated as a full range, rather than a single, construct and that learners should be assessed based on their own strengths. In other words, the pluralistic view of intelligence capitalizes on individual differences and strengths when assessing learners' performance in academic learning (Bars, 2016; Wilson, 2018). For example, a learner who is talented in art may not necessarily hold up to the same standard as those defined in IQ test. That is, he or she may not perform as desirably as others in mathematics and reasoning problems which are the major foci in IQ test. However, he or she has the talent or intelligence that could make them stand out and potentially becomes a successful artist. It is evident that the learner's artistic talent or intelligence can never be fully recognized by the standards identified in traditional IQ tests. Researchers point out that negligence of learners' intelligences in areas other than verbal linguistics and logical mathematics could in fact lead to disservices to our students (Armstrong, 1994; Denig, 2004; Kezar, 2001).

Research on multiple intelligences has gone in multiple directions and can be roughly defined in the areas of learning styles, self-efficacy, instruction and pedagogy, motivation, achievements, and technology. While previous research has revealed significant findings with regard to their relations with multiple intelligences, the focus of the current chapter, due to space constraints, will center on the technological aspects by investigating how different types of digital technology (e.g., gaming, multimedia, graphics, animation, etc.) may influence the learners' development of multiple intelligences in learning. The goal of the current chapter is to reveal the roles of digital technology in multiple intelligence education. To achieve this goal, we employ a meta-analysis approach to analyze the relationship and interactions between digital technologies and multiple intelligences. The chapter is divided into two sections: literature review and meta-analysis. The literature review has two purposes: (1) providing an overview on research pertaining to multiple intelligence education in the context of educational technology, and (2) developing a theoretical framework for meta-analysis based on the view of current research in multiple intelligences and digital technology. The meta-analysis section also includes two sub-sections: (1) methodological approaches (e.g., data sources, search criteria, data coding scheme, etc.) and (2) presentation of the results. The chapter ends with a discussion on the findings and recommendations for future research and practices. By reading the chapter, the readers will learn:

1. The relations between multiple intelligences and digital technologies,
2. The status of digital technologies in support of variety of intelligences,

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