

A Primer on Multiple Intelligence

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Abstract: The characteristic of "intelligence" is usually attributed to humans. It is often regarded as the ability to solve problems. It was generally believed that intelligence was a single entity that was inherited. Today, an increasing number of researchers, including Howard Gardner, believe that there exists a multiple of intelligences, quite independent of each other. People have a unique blend of intelligences. This paper presents Gardner's multiple intelligences as well as other intelligences such as social, emotional, spiritual, military, and artificial intelligences.

Keywords: Multiple Intelligences

I. INTRODUCTION

Traditionally, intelligence is often regarded as a person's intellectual capacity that he is born with and that cannot be changed. It is fixed and can be measured. Historically, intelligence has been measured using the IQ test which is a general measure of one's cognitive function. Other views of intelligence have emerged in recent years. One such view is the theory of multiple intelligences proposed by Howard Gardner.

Professor Gardner at Harvard's Graduate School of Education argued that there are better or alternative ways to measure intelligence than standard IQ tests. He believed human intelligence was multidimensional. In 1983, Howard Gardner published seven types of intelligence in his famous book [1]. He shook the educational world by what he called multiple intelligences. These are: verbal/linguistic, mathematical/logical, spatial, musical, kinesthetic, interpersonal, and intrapersonal. In 2006 (twenty-three years later), Gardner added an eighth branch to his model in his another book [2]. This eighth branch is known as naturalistic intelligence. Gardner has suggested the possible addition of a ninth known as "existential intelligence."¹ This spectrum of intelligence indicates that people can be smart in a number of different ways. This implies that we are all intelligent in different ways, but there is always a primary, or more dominant, intelligence in each person.

II. GARDNER'S INTELLIGENCE

Multiple intelligence theory pluralizes the traditional concept of intelligence. As mentioned earlier, Howard Gardner developed the Theory of Multiple Intelligences. He listed the following forms of intelligence [2-4]:

1. *Musical intelligence:* The capacity to think and feel in terms of sound and rhythm. Individuals with this intelligence, such as Michael Jackson and Ed Sheeran, can recognize and create musical pitch, rhythm, timbre, and tone.
2. *Spatial Intelligence:* The ability to see and represent the world using concepts such as shape, color, and form. Individuals with this intelligence, such as Frank Lloyd Wright and Amelia Earhart, can recognize and manipulate fine-grained spatial images.
3. *Mathematical/Logical reasoning:* The ability for working with numbers, logical concepts, and abstract

analysis. People with this intelligence, such as Albert Einstein and Bill Gates, can readily develop equations, perform calculations, and solve abstract problems.

4. *Interpersonal Intelligence:* The ability to understand and interact with other people effectively. Individuals with intelligence, such as Mahatma Gandhi and Mother Teresa, can recognize and understand other people's moods, desires, motivations, and intentions.
5. *Intrapersonal Intelligence:* A person's innate ability to understand his or her inner world, a world from which many people are entirely disconnected. People with this intelligence, such as Aristotle and Maya Angelou, can recognize and understand their own moods, desires, motivations, and intentions.
6. *Bodily-Kinesthetic Intelligence:* The ability for motor skills, such as dancers, athletes, sculptors, or even surgeons. People with this intelligence, such as Michael Jordan and Simone Biles, can use one's own body to create products, perform skills, or solve problems through mind-body union.
7. *Linguistic Intelligence:* The ability to express oneself with such clarity that others can comprehend and relate to them. People with this intelligence, such as William Shakespeare and Oprah Winfrey, can analyze information and easily create products such as speeches, books, and memos.
8. *Naturalistic Intelligence:* The ability to perceive and classify the intricate patterns in the world around them. Individuals with this type of intelligence, such as Charles Darwin and Jane Goodall, can identify and distinguish among different types of plants, animals, and weather formations that are found in the natural world.
9. *Existential Intelligence:* The sensitivity and capacity to tackle deep questions about human existence, such as the meaning of life, why we die and how we got here.

Multiple intelligences theory states that everyone has all eight intelligences at varying degrees of proficiency. All nine intelligences are needed to live a balanced life. Figure 1 illustrates the nine multiple intelligences [5].

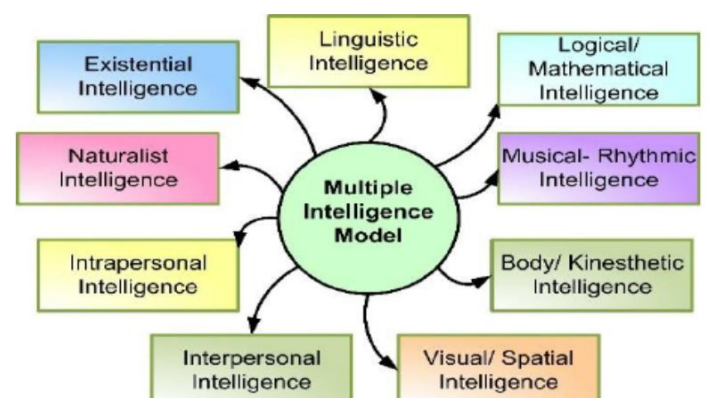


Figure 1: Illustration of Gardner's theory of nine multiple intelligences [5].

III. OTHER TYPES OF INTELLIGENCES

Evidently, Gardner's list is still not exhaustive. There are other types of intelligence such as Social Intelligence, Spiritual Intelligence, Business Intelligence, Emotional Intelligence, Augmented Intelligence, Computational Intelligence, Machine Intelligence, Artificial Intelligence, Abstract Intelligence, Swarm Intelligence, Ambient Intelligence, Digital Intelligence, Military Intelligence, and the list continues. These intelligences are relatively independent. Every intelligence is unique and important in its right. In this section, we will focus on some of these additional intelligences.

- *Emotional intelligence:* This refers to the ability to identify and manage one's own emotions, as well as the emotions of others. It is a set of abilities related to the understanding, use, and management of emotion as it relates to one's self and others. People have different personalities, traits, and values, and different ways of expressing their emotions. We unconsciously use emotional intelligence in our daily lives [6].
- *Spiritual intelligence:* This is concerned with integrating the inner life of mind and spirit with the outer life of work in the world. It is essential for both personal and professional development. The term implies awareness of our relationship to the divine. It is a unique ability to feel, understand, and act beyond selfish motives. It can be expressed as love, compassion, modesty, wisdom, and service [7].
- *Social intelligence:* This refers to the ability to successfully build relationships and navigate social environments. It is about figuring out the best way to get along with others. It is the ability to adequately understand and evaluate one's own behavior and the behavior of others. It is the ability to get along well with others and win their cooperation. It is the key to life and career success [8].
- *Artificial intelligence (AI):* This is the cognitive science that deals with intelligent machines which are able to perform tasks heretofore only performed by human beings. It is mainly concerned with applying computers to tasks that require knowledge, perception, reasoning, understanding, and cognitive abilities. AI is potentially the algorithmic study of processes in every field of study. The main objective of AI is to teach the machines to think intelligently like humans do. AI is a science with research activities in the areas of image processing, natural language processing, robotics, machine learning, etc. [9].
- *Swarm intelligence:* This is the emergent collective intelligence of groups of simple agents. The concept of swarm intelligence is an emerging domain which belongs to the field of artificial intelligence (AI), as many of its pursuits can be linked to machine learning. It belongs to the emerging field of bio-inspired soft computing, which is closely related to AI. It is inspired from the biological entities such as birds, fish, ants, wasps, termites, and bees [10].
- *Computational intelligence.* This refers to recreating human-like intelligence in a computing machine. It consists of a set of computing systems with the ability to learn and deal with new situations such that the systems are perceived to have some attributes of

intelligence. It is efficient in solving real-world problems which require reasoning and decision-making. It produces more robust, simpler, and tractable solutions than the traditional techniques. The goal of computational intelligence is to recreate human-like intelligence in a human-made machine [11].

- *Digital intelligence:* This refers to an all-encompassing set of technical, cognitive, social, and emotional competencies that enable individuals to face the challenges of digital life. It belongs to "meta-intelligence" – one that is composed of many constituent intelligences. Digital intelligence addresses the what, why, where, when, who, how, and how much of digital technology to improve our operational efficiency and performance. It is about putting the data to use immediately. It is the intersection of big data with big science.
- *Military intelligence:* This is a military branch that uses information collection and analysis approaches to provide guidance and direction to assist commanders in their decisions. As an academic field, military intelligence is multidisciplinary area that combines language, political theory, economics, sociology, and psychology. Military intelligence includes information on other nations' military forces, plans, and operations which is collected through a variety of means. The term intelligence is often used for an agency that gathers such information.

Other forms of intelligence include mobile intelligence, industrial intelligence, abstract intelligence, concrete intelligence, cultural intelligence, machine intelligence, human intelligence, business intelligence, augmented intelligence, Internet intelligence, public intelligence, competitive intelligence, and the list continues.

IV. BENEFITS AND CHALLENGES

The traditional mode of teaching has not been successful for all students as is evidenced by the dropout rate of 50% in high schools in the United States. In the 21st century, a combination of new technology, new knowledge, and rapid access to that knowledge is the key to individualizing instruction, but this will require new teaching methods to make the best use of available resources [12]. Educators have positively responded and embraced Gardner's theory. Many schools in North America have sought to structure curricula according to the intelligences. As shown in Figure 2, understanding multiple intelligences helps teachers to understand children better [13].



Figure 2: Understanding multiple intelligences in children [13].

Gardner's theory of multiple intelligences enjoys considerable popularity among educators who have incorporated multiple intelligences in their teaching. It has been suggested as alternative to more traditional psychometric tests. Multiple intelligences confirm what educators already experience: students think and learn in many different ways. Nine kinds of intelligence would allow nine ways to teach, instead of one. Figure 3 shows how multiple intelligences provide nine different potential pathways to learning [14].

MULTIPLE INTELLIGENCE ACTIVITIES



Figure 3: Multiple intelligences provide nine different potential pathways to learning [14].

Gardner's theory has come under criticism from both psychologists and educators. Most of the criticism and resistance come from cognitive psychologists and psychometricians and from those removed from the classroom, such as journalists and researchers.

Critics argue that Gardner's different "intelligences" simply represent talents, personality traits, and abilities. They are synonymous with learning styles. Gardner's theory also suffers from a lack of supporting empirical research. If someone claims that they teach to the multiple intelligences, one should ask how is it done, what instructional methods are followed, what assessment techniques are used [15]. The multiple intelligences seem to be limited to educational use and have not been applied elsewhere.

CONCLUSION

Multiple Intelligences refers to the concept introduced by Howard Gardner that challenges the traditional view of intelligence and explains the presence of nine different multiple intelligences in people. Howard Gardner is one of those researchers who have recently questioned the idea that intelligence is a single entity. Although some criticize and resist Howard Gardner's notion of multiple intelligences, it still has helped a significant number of educators to question their work and reflect on their practice [16]. For more information about multiple intelligences, please visit Howard Gardner's official website of Multiple Intelligences Theory at www.multipleintelligencesoasis.org

One may also consult the books in [17-30] and the following related journals: *Journal of Intelligence*

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