Understanding the Psyche of a Math Learner

Introduction

There is a long history associated with the use of the word 'psyche' in philosophy first and later in psychology, stretching far back to the ancient times. It represents one of the fundamental concepts for understanding our human nature from a scientific perspective. "The English word 'soul' is sometimes used synonymously to mean 'psyche', especially in older texts" (Hillman, 1989, p. 20). When another word 'human' precedes 'psyche' to form the term 'human psyche', it refers to the conscious and unconscious parts of the human mind or spirit (see Amoroso et al., 2018, for detail). Contemporary ideas of the psyche have been very much influenced by the differing theories of two pioneering psychotherapists, Sigmund Freud and Carl Jung.

When we talk or use the phrase 'psyche of a math learner' here, we are asking the question: "What is going on in the mind of a math learner: consciously as well as unconsciously?" Whether it is conscious, subconscious or unconscious, the math learner's mind is so intangible that science is likely to be forever struggling with defining it. However, in this short article, our focus is on our understanding of a math learner's psyche through his/her math learning behavior, which, in turn, is influenced by his/her preferred math learning style and also his/her logical-mathematical intelligence.

Math Learning Behavior

In the math learning process, a student learns by acquiring, ingesting, and storing or accepting math information. The main characteristic of math learning is that it is a process of obtaining essential math knowledge to change the math learner's behavior (also known as math learning behavior) through interaction, practice, and experience in math problem-solving.

The term 'Math Learning Behavior' places its emphasis on the crucial link between the way in which a math learner goes about acquiring his/her math knowledge and behavior related to math learning. In doing this the focus is upon establishing positive relationships across three

elements of (i) self, (ii) other learners, and (iii) the math syllabus/curriculum. A student's experience with learned information composes his/her body of knowledge relevant to math. Math learning as a process is unique to each individual. Some learn quickly, scanning the information and mastering the math concept or skill seemingly effortlessly. Others may stumble or struggle while processing math information, taking longer to grasp the math concept of requiring numerous exposures over a sustained time. As a result, we need to know a math learner's preferred math learning style.

Math Learning Styles

There is actually a diverse range of learning styles appropriate for every math learner. Each of these learning styles can constitute a math learner's psyche. Schools generally use linguistic or logical learning styles, but other styles may be more effective for some math learners.

When a student is not performing as well as s/he is expected to do so in math, it is likely s/he just needs to be taught math in a different way. It is important to remember that learner diversity is not exclusively about qualities, beliefs and faith. It can also determine how the student can best learn new math skills. Some math learners perform better through movements and hands-on activities, while some need visual information to fully understand a math concept. That is why a successful math teacher is one who does not only disseminate math knowledge and encourage positive math learning but can also identify the math learning styles of students and tend to each one of them.

The idea of individualized math learning styles can be traced back to Neil Fleming's VARK model, which was introduced in the 1970s. Since then, the Fleming model has greatly influenced education. Today it is one of the common and widely used learning framework. The Fleming's learning styles are categorized into visual, auditory, reading-writing and kinesthetic. The Fleming model can be expanded into Howard Gardner's theory of multiple intelligences (TMI), which has increased from the original seven to the current nine different intelligences (Brown & Liepolt, 2004): (1) Verbal-linguistic intelligence; (2) Logical-mathematical intelligence; (3) Spatial-visual intelligence; (4) Bodily-kinesthetic intelligence; (5) Musical intelligences; (6) Interpersonal intelligence; (7) Intrapersonal intelligence; (8) Naturalist intelligence; and (9) Existential intelligence.

Critics of TMI have argued that Gardner's definition of intelligence is too broad and that his nine different so-called "intelligences" simply represent talents, personality traits, and abilities. However, despite the criticism, the TMI enjoys considerable popularity with educators and many of them have utilized the theory in their teaching philosophies and work to integrate Gardner's theory into the classroom (Cerruti, 2013).

Logical-Mathematical Intelligence

The 'true' psyche of a math learner displays, among the nine multiple intelligences mentioned above, the logical-mathematical intelligence (assessable by a standardized math assessment such as Comprehensive Mathematical Abilities Test-2nd Edition), which is that ability to think conceptually and abstractly, and capacity to discern logical and numerical patterns. When someone likes using his/her brain for logical- mathematical reasoning, s/he is a logical learner. In fact, math learners are logical learners. S/He can easily recognize patterns and can connect seemingly meaningless concepts easily. Math learners being logical often lean towards classifying and grouping information to help them further understand it. They excel in numbers and are fine with doing complex calculations (e.g., trigonometry off the top of their

head!). For their future career, these math learners could pursue their interest in accountancy, book-keeping, computer programming, and scientific research.

Conclusion

So, what is the psyche of a math learner? We can sum it up with the following statement: "It refers to a logical-mathematical mind that capacitates a student's math learning behavior, which, in turn, is influenced by his/her preferred math learning style, consciously, subconsciously and/or unconsciously".

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