Multiple Intelligences & Its Application in the Classroom

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Part 1: Literature Review

Problem Statement

The method of instruction of most teachers in Singapore follows the Didactic teaching or 'Chalk and Talk' method, which benefits students with aptitude in the academic subjects such as mathematics, science and languages (Tan, 2005). This leads to the development of students who possess the Logical- Mathematical Intelligence (LMI) or the Linguistic Intelligence (LI). The LMI students usually fare better in Science and Mathematics and later go on to form the bulk of the Science stream students while the LI students do better in language and humanities subjects, leading to the formation of the Arts stream students. However, non-academic talents and abilities, such as in the areas of music, art and sports are not given the same importance as what is given to the mainstream academic subjects (Quah, 1990).

With the introduction of the Ability Driven Education (ADE) policy, launched as part of the Thinking Schools, Learning Nation vision in 1997, there is an explicit aim to equip and prepare students to meet the challenges of a knowledge economy by taking into consideration their individual abilities and talents and helping every Singaporean excel according to the combination of talents and abilities he possesses (Teo, 1999a). Students who may possess other intelligences will also be given the chance to prove themselves and shine. This is a shift away from the traditional belief that only students who are equipped with LMI or LI are intelligent. It recognizes that students may possess Multiple Intelligences (MI) and hence this results in teachers needing to vary their teaching methods.

Questions

1. What are the various Multiple Intelligences that have been found to exist currently?
2. How can Singapore teachers employ different teaching strategies to cater to students with Multiple Intelligences?
3. What are the potential benefits of employing these MI strategies to students and teachers?

Literature Review

1. What are the various Multiple Intelligences that have been found to exist currently?

According to Gardner (1983), there is a cultural and biological basis for multiple intelligences. All societies value different types of intelligences. The cultural value placed upon the ability to perform certain tasks provides the motivation to become skilled in those areas. Thus, while particular intelligences may be evolved in many people of one culture, those same intelligences may not be as developed in individuals of another. In the Singapore culture, the paradigm shifts in education moved from the 'survival' to 'efficiency' phases (Tan, 2005). In these two periods, there was a great emphasis on the development and use of verbal and

mathematical intelligences. Now, with the advent of the ADE, other forms of intelligences are being recognized as being on par with the traditional intelligences so as to be able to produce people who will be able to fill into different niches in society, rather than all being adept at only one skill.

Gardner & Hatch's (1989) definition of intelligence succinctly fits in with the move that the Singapore education system is taking with ADE. According to them, intelligence is 'the capacity to do something useful in the society in which we live. Intelligence is the ability to respond successfully in new situations and the capacity to learn from one's past experiences.' In this knowledge economy, the shift towards the ADE is to enable the people to have the ability to adapt and address problems faced by Singapore in the future. Hence we should advocate the use of MI strategies in all our classrooms.

The eight intelligences which Gardner defines are the logical-mathematical intelligence (LMI), linguistic intelligence (LI), spatial intelligence (SI), musical intelligence (mI), bodily-kinesthetic intelligence (BKI), personal intelligence which consists of interpersonal intelligence (RI) and intrapersonal intelligences (II) and finally the naturalistic intelligence (NI).

The LMI consists of the ability to detect and learn through patterns, numbers, reasoning deductively and thinking logically. This intelligence is most often associated with scientific and mathematical thinking. LI involves having a mastery of language. This intelligence includes the ability to effectively manipulate language to express oneself rhetorically or poetically. It allows one to use words and language as a means to remember information. The SI gives one the ability to manipulate and create mental images in order to solve problems. These children learn though pictures and images. This intelligence is not limited to visual domains, Gardner notes that SI is also formed in blind children. mI encompasses the capability to recognize and compose music pitches, tones and rhythm. (Auditory functions are required for a person to develop this intelligence in relation to pitch and tone but not for the knowledge of rhythm). BKI is the ability to use one's mental abilities to coordinate one's own bodily movements. This intelligence challenges popular belief that mental and physical activities are unrelated. RI and II are separate from each other though closely related in most cultures and are sometimes linked together under personal intelligence. RI refers to the ability of one to relate to and work with others. People with RI are often team players and learn through social interaction. II instead refers to the ability to understand one's own feelings and motivations and to learn thorough introspection. Such people are usually self-motivated, individualistic and introverts. Finally, the NI designates the human ability to discriminate among living things as well as possess sensitivity to other features of the natural world. These children learn through nature experiences.

According to Gardner, although the eight intelligences are anatomically separate from each other, they rarely operate independently. Rather, the intelligences are used concurrently and typically complement each other as individuals develop skills or solve problems. For example, a dancer can excel in his art only if he has: 1. strong mI to understand rhythm and variations in music, 2. RI to understand how he can inspire or emotionally move his audience through his movements, and 3. BKI to provide him with the agility and coordination to complete the movements successfully.

Our society as a whole and our schools in particular, reinforce LI and LMI while neglecting other ways of knowing. Teachers love children who are good with words and logic. However, children who show ability in dance, art, music, social relations, intuition, drama, nature and other areas of self-expression are not given much recognition in the academic arena (Brualdi, 1996). Rather, their intelligences are confined to after-school, 'not-as-important' activities. As teachers, we have to start by providing opportunities for students with MI in our very classrooms and provide students with a full-spectrum learning environment rather than just emphasizing one or two teaching methods.

2. How can Singapore teachers employ different teaching strategies to cater to students with Multiple Intelligences?

From the neurobiological viewpoint and the second basis for Gardner's theory (1983), numerous researches have indicated that learning is an outcome of the modifications in the synaptic connections between the neurons. Primary elements of different types of learning are found in particular areas of the brain where corresponding transformations have occurred. Thus, various types of learning result in synaptic connections in different areas of the brain (Brualdi, 1996). Also, known as experience-expectant plasticity of the brain (Greenough et al., 1987), this provides great possibility to teachers to teach students, knowing that this plasticity enables us to learn throughout our lives. Jerome Bruner confirms this by stating that that any subject can be taught effectively in some intellectually honest form to any child at any stage of development (Hirsch, 1996).

Diamond (1984), has shown that enriched environments increase the size of the cortex, the density of the glial cells, and the density and number of synaptic connections. All this invariably shows the large impact environment has on brain development in our young.

Using this, if information is presented in ways that fit each child's learning style, children would be capable of learning more than currently believed (Education Commission of the States, 1996, p. vi). Campbell (1984) states that each person possesses all the eight MI and each can be developed to an adequate extent.

The first thing that teachers and parents need to do is to appreciate individual differences and use approaches tailored to each child's constellation of abilities and needs. The MI theory forces teachers and parents to step back and take a different perspective on intelligence. A truly integrated curriculum has to be developed to address every intelligence in a balanced way (Armstrong, 1996). Armstrong (1998) says that every student is a genius and what teachers have to do is to awaken the genius in our classrooms, by firstly recognizing that there are many ways of learning and knowing and then to provide a truly holistic education by using a myriad of strategies.

Teachers can use MI strategies in two broad ways. In the first, the teacher plans the lesson such that one concept is presented in a style that engages most or all of the intelligences. For example, when teaching about war, a teacher can show students battle maps (SI), play strategy games (LMI), play war songs (mI), organize a role play on the Surrender of the British to the Japanese in 1942 (BKI and RI), organize a field trip to see how people lived and what they ate (NI) and have students read a novel about life during the period (II and LI) (Brualdi, 1996). This

kind of presentation not only excites students about learning, it also allows teachers to reinforce the same materials in a variety of ways. By activating a wide assortment of intelligences, teaching in this manner can facilitate a deeper understanding of the subject material. Each child possesses their own unique set of intellectual strengths and weaknesses which determine how a student learns. This is commonly referred to as the learning style of the child and it depends on the MI of the child. While it may be difficult and impractical for a teacher to accommodate every lesson with all of the learning styles to suit every individual in the classroom, the teacher can show students how to use their more developed intelligences to assist in the understanding of a subject which normally employs their weaker intelligences (Lazear, 1992).

The second method that teachers can use is to design learning centres within their classrooms. A specific area of the classroom could be designated for each of the eight intelligences. For example, each classroom might include a book nook (LI), a mathematics/science corner with puzzles and science kits (LMI), an art area (SI), a carpeted open space (BKI) next to which is a musical centre with a radio and other musical devices (mI), a group discussion area (RI), a quiet loft (II) and an ecology centre (NI). Planning these centres takes time and effort at the beginning but in the long run it allows for all children to learn though their strengths and to share their expertise, to be appreciated for the gifts that they possess and to appreciate others for their gifts. Appendix A provides more educational tools to meet this broad range of learning abilities.

The Ministry of Education is taking a right step in this direction of recognizing MI with the introduction of schools that offer the integrated programme (IP), where students can skip the 'O' level examinations and go directly to the 'A' levels or the International Baccalaureate. Principals are given more autonomy on the direction and emphasis they want their schools to have and the students they choose to accept into their schools based on non-academic prowess. The Singapore Sports School, Arts School and the NUS Maths and Science school are all moves in the right direction (Ministry of Education, 2004a). Now teachers and parents also have to realize this and start to apply the MI theory in the classrooms and homes.

3. What are the potential benefits of employing these MI strategies to students and teachers?

Students

According to Bruce Campbell's research results in a multiple intelligence classroom, (1984), numerous hypotheses were validated. In Singapore schools, we may also be able to reap the same benefits.

Firstly, students in the class displayed increased independence, responsibility and self direction over the course of the year. Cooperative skills improved in all the students. The students valued their own voices and gained confidence when they realized that it is not just about focusing on what they are weak at but rather to focus on their strengths (Costanzo and Paxton). Students previously identified as having behavioral problems made significant improvement in their behavior. Students were able to work multimodally and used a minimum of three to five intelligences in their classroom reports and presentations. KBI students particularly benefited from the active process of moving from learning centre to centre. Leadership skills emerged in most students especially in the non-traditional MI learning centres such as interpersonal and music. Parents reported improved behavior at home. There were more positive attitudes about school and increased attendance. Daily work in the music and kinesthetic

intelligences helped students retain information, as at the end of the year, students were still able to recall songs containing academic information which they had learned at the beginning of the year. Finally, students became more skilled at working effectively in this type of unique classroom. They developed camaraderie and appreciated and respected each other's strengths.

Teachers

The role of the teacher changed as the year progressed to becoming less directive and more facilitative. This is in line with our country's goals of making students independent, self-directed learners. There was less direct instruction. The teacher also became more creative and multimodal as she experimented with new possibilities and approaches. The teacher began to work with the students rather than for them.

By having students work on different activities, they are more engaged. At the various learning centres, their physical, emotional and social needs would be addressed and there would be less opportunity for students to be bored, resulting in less disruptive behavior. When students see the teachers as having a keen interest in making their lessons more interesting for the benefit of the students, there would be more respect and trust, resulting in less management problems for the teacher. By working together in the various ways, the students bonded and shaped a community of learners, resulting in them being empowered as individuals and to take ownership of their learning processes. All this leads to the creation of a positive classroom environment in which a teacher can maximize the benefits she gives to her students.

Implications for child/adolescent development in Singapore

Teachers

Teachers need to understand their students' needs and beliefs as they are, and not as how teachers think they should be (Rogers, 1999). In this way, they would be able to increase student engagement and motivation and this would ultimately lead to increased learning and achievement. One of the most important key to learning style effectiveness is providing choice and a variety of methods for students to learn (Rogers, 1999) and this key can be provided through teachers employing different MI teaching strategies. Learning only occurs when what is being presented is meaningful to the students. Creating a motivating environment requires an abundant supply of brain-compatible, research-based strategies and techniques compatible to each student. Using MI strategies meets the students' emotional needs and they will more likely engage in learning. Hence, teachers have to constantly seek out best practices that enable students to learn and ensure that they attain a certain standard in their learning.

Students

Complex, enriched environment for humans end up having many of the features of the upper-middle class, urban and suburban life (Bruer, 1997). The classroom is one place where we as teachers are able to level this playing field for each of our individual students and hence, we should provide these opportunities for our students in the classroom and not expect them to do it on their own at home as children without the means to have an enriched environment would lose out.

A programme on Singapore's Channel News Asia Television Channel is currently airing a programme called Asia's Wonder Kids which showcases child prodigies. The children portrayed

are not just talented in the academic subjects but also in the other intelligences such as music, dance, sports, film-making and poetry. This gives the right signal to children that it is alright if they are not academically inclined, but they must work and excel in whatever their talents are. Their talents will be recognized and there will be a place for them to apply their individual skills.

Assessment

Schools have depended primarily on the LI and LMI have measured intelligence in terms of achievement in these realms. Having known that using MI instructional strategies reaches out to individual students learning needs, we can, in the same way, re-look at the way assessment is done. Can all the MI be tested in the same way, through the current mode of pen and paper summative assessments employed by most schools? Even though the Principal can change the mode of assessment in the school examinations, these are usually only done for the Continual Assessments and not for the Mid or Final Year Examinations due to parental pressures. Moreover, the major Primary School Leaving Examinations and GCE 'O' Level Examinations have remained of the same structure and it maybe no wonder then that parents demand for quantitative assessment modes.

The MI theory provides teachers with an expanded framework to use when assessing their students. Teachers must seek to assess their students' learning in ways which will give an accurate overview of their strengths and weaknesses. As children do not learn in the same way, they cannot be assessed in the same way. The teacher should begin by creating an 'intelligence profile' for each student and assess the students' progress using their own intelligence. Some assessment methods include student portfolios, independent projects, group projects, open-ended assignments and student journals (Lazear, 1992).

Conclusion

Perhaps, with the realization of the knowledge that 'we are not all the same, we do not all have the same kinds of minds, and education works most effectively for most individuals if…human differences are taken seriously' (Gardner, 1995), the education community would be able to allow for individual differences and provide greater opportunities for learning and success.

> *It is of the utmost importance that we recognize and nurture all of the varied human intelligences, and all of the combinations of intelligences. We are all so different, largely because we all have different combinations of intelligence. If we recognize this, I think we will have at least a better chance of dealing appropriately with the many problems that we face in the world (Gardner, 1987).*

MI theory is a way of thinking; it is an attitude about people which allows for similarities and differences. It allows for inclusion and enrichment, for self-esteem building and the development of respect for each individual and the gifts they bring to the classroom.

Part 2: Research Plan

As mentioned earlier, Singapore teachers mainly employ Didactic Teaching and use pen and paper summative assessment. Campbell's (1984) multiple intelligence class research showed many benefits that using MI strategies can produce.

Research Question(s)

1. Would using MI strategies in Singapore classrooms result in a better learning climate?
2. Would Singapore students be happier and perform better if they are assessed according to their individual MI?

Sample

Two classes of forty students each, both being taught by the same teacher, same subject and same level. The students could be Secondary Two students being taught Science by the same teacher.

Procedure

Students from both classes would complete a learning climate survey assessing their feelings of how they view their learning, their contentment with how they are taught, class atmosphere and liking for the subject. For one semester, the control class would be taught by direct teaching methods and sit for pen and paper tests at the end of every chapter. The other class would be the experimental group and would be taught using the MI strategies covered earlier. The students would also sit for an 'intelligence profile' test and would be assessed based on their individual intelligences. For example, students who have been found to have LI would be assessed through essays and debates while those who are KBI would be assessed though short skits or dances for the same chapters. At the end of the semester, the students again sit for the learning climate survey and the results between the two groups are assessed.

Predicted results/ implications

It is predicted that using MI strategies in the Singapore classroom would result in an enhanced learning climate as students would feel that they are learning better, learning more and like the subject better. They would feel more content with the way their teacher teaches as it addresses their individual needs and gives them a variety of ways to learn, engaging them and making them feel less bored. The class atmosphere would also be livelier with sharing and non-competitiveness as students are assessed according to their own abilities and intelligences. As students are tested according to the way they learn best, they would not feel pressured to achieve using ways that they may not be adept at. Hence, they would approach assessment in a more positive view too.

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Appendix A

Multiple intelligences and their educational tools

Linguistic intelligence (LI): Books, tape recorders, word processing software, label makers, printing sets, storytelling, talking books, writing materials, discussions, debates, and public speaking.

Logical-mathematical intelligence (LMI): Strategy games (chess, checkers) logic puzzles (Rubik's cube), science kits, computer programming software, nature equipment, brain teasers, Cuisenaire rods, and detective games.

Spatial intelligence (SI): Films, slides, videos, diagrams, charts, maps, art supplies, cameras, telescopes, graphic design software, three-dimensional building supplies (Lego's), optical illusions, visualization activities, and drafting materials.

Bodily-kinesthetic intelligence (BKI): Playgrounds, obstacle course, hiking trails. Swimming pools, gymnasiums, model-building kits, wood carving sets, modeling clay, sports equipment, space to move, carpentry materials, machinery, costume and drama.

Musical intelligence (MI): Percussion instruments, metronomes, computerized sound systems, CDs and tapes, musical instruments, the human voice, sounds of nature, things to strum, pluck, tap and blow into.

Interpersonal intelligence (RI): Clubs, committees, after-school programmes, social events, cooperative learning, interactive software, Internet, group games and projects, discussions, simulations, competitive and noncompetitive sports, and peer teaching.

Intrapersonal intelligence (II): Self-paced instruction, individualized projects, solo games, sports, forts, tree houses, lofts and other retreat spaces, diaries and journals, meditation and self-esteem activities.

Naturalistic intelligences (NI): Aquariums, trips to the zoo, nature walks, pets and small animals, farms, gardening, and ecology projects.

Adapted from Utopian Schools, by Thomas Armstrong, 1996