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Intelligence and Learning Style: Gender-Based Preferences

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Abstract

Learning at all levels have emphasized on the development of logical-mathematical intelligence and verbal-linguistic intelligence mainly through reading and writing activities. However, Howard Gardner's theory of multiple intelligences argues that students will be better served by a broader vision of education, in which teachers use different methodologies, instructional materials and activities to reach all students. This paper attempts to provide a brief overview of the implications of Howard Gardner's theory of multiple intelligences and learning styles based on sensory modalities for teaching and learning. Multiple intelligences theory helps teachers determine their instructional strategies for effective teaching and visual, auditory, reading-writing, and kinaesthetic, or collectively known as VARK learning model helps students identify their most effective learning approach. This article also provides an overview of gender differences in intelligence and learning style to facilitate effective teaching and learning approach. Eight undergraduate students (four females, four males) were

interviewed and their learning strategies were recorded. Findings showed that female students favour learning styles of visual, auditory, and kinaesthetic, which involved verbal-linguistic intelligence, visual-spatial intelligence, and bodily-kinaesthetic intelligence whereas male students prefer learning style of auditory, which involved interpersonal intelligence. The results also indicated that students with different intelligences and genders perceive or learn new information in different ways. These learning styles should be identified and employed by the students so as to maximize their learning.

Keywords: Gender differences, multiple intelligences, learning styles, intelligence.

1. Introduction

Gardner has given a new hope to all students to be recognized as intelligent within a specific domain with his theory of Multiple Intelligences (MI). He has revolutionized the traditionally accepted concept of intelligence which views human intelligence in term of academic achievement only. He notes that intelligence is (1) the ability to solve problems that one encounters in real life; (2) the ability to generate new problems to solve; and (3) the ability to make something or offer a service that is valued within one's culture [4]. Gardner (2004)[10] has proposed eight core intelligences that one possesses to certain degree namely verbal-linguistic (V-L), logical-mathematical (L-M), bodily-kinaesthetic (B-K), visual-spatial (V-S), musical-rhythmic (M-R), interpersonal (INTER), intrapersonal (INTRA), and naturalist (N).
The key ideas of Gardner's Multiple Intelligences theory are (1) one has eight intelligences in varying amount; (2) one can nurture and strengthen the intelligences; (3) no intelligences work independently; and (4) one can perform each intelligence in different ways[2]. Besides, the theory demonstrates that (1) one has at least a strong intelligence; (2) one has some weaker intelligence; (3) one can strengthen weak intelligences; and (4) one's brain is as unique as a fingerprint [5]. Hence, this theory has some implications for teaching and learning in the sense that (1) intelligence can be nurtured and strengthen through teaching; (2) intelligences can be improved; and (3) students of different intelligences have different learning styles and different needs[6].

One of the most significant features of the theory of multiple intelligences is how it presents eight different potential pathways to learning. If a teacher is having difficulty reaching a student in the more traditional linguistic or logical ways of instruction, the theory of multiple intelligences suggests several other ways in which instructional material can be presented to facilitate effective learning [1].

Teaching strategies can be modified and organized in the light of MI Theory to develop not only one but also all intelligences that one possesses. In order to develop verbal-linguistic intelligence for example, students are trained to think in words and to perceive and generate spoken and written language. Teachers may apply teaching strategies that are based on verbal-linguistic intelligence such as story-telling, poetry declamation, impromptu speaking, reading aloud, verbal lecture, classroom discussion, report writing, interview, words in the classroom, classroom reading, reading comprehension, and writing.

Besides, teachers should encourage students to appreciate and utilize numerical, abstract, and logical reasoning to solve problems. In order to emphasize on logical-mathematical intelligence in classroom activities, teachers can have outlining, abstract symbol, graphic organizer, number sequence/pattern, calculation, deductive reasoning, inductive reasoning, problem solving, and logic/pattern game.

Teachers may also employ teaching strategies that can develop students' bodily-kinaesthetic intelligence. Bodily-kinaesthetic intelligence is the ability to make use of all or part of one's body to solve problems or fashion products. Such strategies involve drama, creative movement, dance, role-playing, manipulative, classroom games, physical exercise, exercise break, field trips, body language, inventing, and sport game.

At the meantime, students should be taught to think in three-dimensional ways and to perceive, modify, transform, and create visual or spatial images. The purpose is to improve their visual-spatial intelligence. For such purpose, classroom activities should give due consideration to pictorial representation, flow chart, visual outline, visual chart, concept map, mind-mapping, clustering, mindscaping, visual imagination, visual memorization, highlighting with colour, varying shapes, drawing model , webbing, pretending/fantasy scenario, and montage/collage.

According to Gardner (2004)[10], every student possesses musical-rhythmic intelligence that is the ability to create, communicate, and understand meanings made out of sound, pitch, melody, rhythm, and tone. To further develop this intelligence, teachers can focus on rhythmic pattern, vocal sound/tone, music composition, rapping, environmental sound, instrumental sound, musical spelling, nonsense sounds, choral reading, curriculum songs, singing/humming, and musical performance.

Teachers may also expose students to activities that help them recognize, appreciate and contend with the feelings, beliefs, and intentions of other person. Such activities include giving feedback, cooperative learning, problem solving, group discussion, person-to-person communication, jigsaw, and group project.

Teacher should also help students develop their intrapersonal intelligence. It is the ability to understand oneself with emotions, strengths, desires, and vulnerabilities and to use such information effectively in adaptable one's own life. Teaching strategies that are based on intrapersonal intelligence take account of journal writing, self-reflection, self-directed learning, compliment circle, peer support, setting and achieving goals, thinking skill, and independent study/project.

Last but not least, teachers should come up with activities for students of naturalist intelligence. Naturalistic intelligence is the ability to distinguish among critical features of the natural environment. The teaching strategies include classification matrices, natural media utilization, caring for animal, natural world encounter, growing thing, and nature-watch activity.

2. Learning Style

Individuals vary from each another in their ability to understand complex ideas, to suitefficiently to the surroundings, to be taught from experience, to engage in various forms of reasoning, and to face obstacles. Therefore, Gardner (1985)[9] suggests that each student has a different intelligence profile. Accordingly, different intelligences that eachstudentpossesses result in different learning styles and different needs. Definitely students of different gender have different needs and thus have different preferred ways of learning. There are a number of models available for identifying different learning styles, with each model demonstrating distinctive view of learning styles. Regardless of their different views, each model helps students decide which learning approaches are most helpful for them. The model used in this article defines learning styles based on sensory modalities in which a student customarily prefers to take in and process new information.

Each student is unique and therefore, all in individual ways have different learning styles or preferred ways of taking in and processing new information. Some students may have a preferred style of learning and less use other styles. Others may use different styles in different situations. Teachers need to know student learning styles, guide them how to benefit from their learning styles, and develop their less dominant abilities [2]. Relationships were found between fixed concepts of ability and approaches to teaching [17]. Adapting teaching approaches that meet student different learning styles preferences may improve students' motivation and performance[20]. A good teaching environment should try to encourage students to adopt a deep approach to learning[17]. Furthermore, knowing the student learning style preferences will aid in the development of the most effective teaching approaches[21].

However, there is no agreement on the numbers or varieties of learning styles[14]. One simple way to describe learning style is to consider the sensory channel in which a student desires for taking in new information. This kind of learning style preferences which has some similarities to Gardner's multiple intelligences point of view comprises of visual (V), auditory (A), reading-writing (R) and kinaesthetic (K), or collectively known as VARK[21].

Students of visual-type learn best information mainly when they see and read the information. Therefore, they prefer the information to be in the form of text, symbols, charts, diagrams and pictures. The learning strategies that suit these students include writing own notes, taking notes, making graphs or diagrams or mind maps, having vivid imagination, watching videos or TV programmes, reading illustrated books or magazines, surfing the Internet, using pictures, posters or wall charts, using bright colours to highlight notes, studying in a quiet place, and visualizing information as a picture.

Another type of student is auditory students who learn effectively when they hear information or talk about it. Thus, they prefer verbal presentations, discussion, and cooperative learning. The suggested learning strategies for these students involve participating in class discussion, making presentation, recording lectures, reading text out aloud, talking out aloud repeatedly, making up little story or rhyme, using mnemonic, discussing topics with peers/instructors, teaching peers, and listening to audio recording.

The third learning style is reading-writing. Students of this type of learning style prefer to learn by reading and writing. Hence, they often benefit from interactions with textual materials. The learning strategies that these students are advised to use include making flashcards of words or concept, writing out important information, reading notes silently, organizing diagrams into statement, and rewriting information in other words.

For kinaesthetic students, they learn great through hands-on approach, actively touching or doing to explore the information. This kind of student likes activity-based, practical, and investigative learning. They would achieve better with learning strategies like taking frequent study breaks, moving around when they study, practising problems, making models, practising skills, reading out loud from notes, carrying out experiments or role plays, demonstrating to other people, highlighting reading material, listening to music when they study, and skimming through reading material.

Teachers cannot reach all the students no matter what teaching approach they adopt, unless they can teach multi-modally and cater for all the intelligences in their lesson. For that reason, teachers should present information in different styles and use a variety of teaching strategies. This variety in presentation of content and instructional materials allows students to learn better and more quickly especially if the chosen teaching strategies and instructional materials and technology used better match their preferred learning styles[20].

It is important to consider student learning styles so that (1) teachers can cultivate self-monitoring and self-awareness for learning and motivation among students, and (2) teachers will recognize, acknowledge, and accommodate student differences in multiple intelligences and learning styles[7].

3. Gender Differences in Learning Style Preferences and Intelligences

Experimental evidence suggests a difference in intelligence between males and females. Males show strengths in logical-mathematical, visual-spatial, and bodily-kinaesthetic, while females demonstrate strengths in verbal-linguistic and musical-rhythmic[19]. The results are quite consistent with the outcome of studies by Furnham, Fong, and Martin (1999)[8] and Rammstedt and Rammsayer (2000)[16]. Furnham et al. (1999)[8] indicated that male had significantly strong logical-mathematical intelligence, visual-spatial intelligence, and bodily-kinaesthetic intelligence, but female none. Rammstedt and Ramsayer (2000)[16]reported that male had significantly high level of logical-mathematical intelligence and visual-spatial intelligence, while female were significantly strong in musical-rhythmic intelligence.

Loori(2005)[14] revealed that there were significant differences between males' and females' preferences of intelligences. Males preferred learning activities involving logical-mathematical intelligence, whereas females preferred learning activities involving intrapersonal intelligence. Gardner (1993)[10] stated that multiple intelligences have a cultural component. From this perspective, the difference in intelligence is not biological, but rather social. The origin of these differences is found in single roles and positions in society.Muhammad Sohail Ali et al. (2009)[3]listed that one of the possible factors affect the gender differences in intelligence are social influences. These factors includegender roles, self-conception, outside influence, education, and personality.

4. Methodology

A study was conducted to investigate differences in preferences of learning styles and intelligences between male and female students studying in various degree programmes inUniversiti Putra Malaysia (UPM). The participants were four female students and four male students who were interviewed in UPM campus.

Table 1: Preferences of Learning Strategies between Males and Females

Learning Strategy	Respondent
Making mind map	Female 1, Female 2, Male 1, Male 3
Discussing topics with peers/lecturers	Female 1, Female 3, Female 4, Male 1, Male 2, Male 4
Using bright colour to highlight notes	Female 1, Female 2, Male 1
Making diagrams	Female 1, Male 1
Reading notes silently	Female 1, Female 3, Female 4, Male 2, Male 3, Male 4
Joining study group	Female 1, Female 3, Female 4, Male 3, Male 4
Studying in a quiet place	Female 1, Female 2
Listening to music when study	Female 1, Female 3, Female 4, Male 2
Making up story	Female 2
Believing in oneself capability	Female 2, Male 1
Taking notes	Female 3
Taking in information through outdoor activities	Female 3
	Female 3
Taking in information through nature	Female 4, Male 3
Rewriting information in other words	Female 4, Male 3
Having vivid imagination	Female 4, Male 3
Drawing picture	Male 1
Doing self-reflection	Male 1
Making up rhyme to aide memorization	Male 2
Watching movie	Male 2, Male 4
Teaching peers	Male 3
Writing own notes	Male 4
Writing outline	

Findings revealed that all students regardless of their gender use different learning strategies to improve their learning (refer to Table 1). Most students prefer to either discuss the topic with peers/lecturers or read notes silently or join a study group to understand the new information. It is evident that the students love to interact with other people (affective strategies) and evaluate ones' learning (meta-cognitive strategies).

Table 2: Preferences of Learning Styles between Males and Females

	Female 1	Female 2	Female 3	Female 4	Male 1	Male 2	Male 3	Male 4
Visual	✓✓✓✓	✓✓✓	✓✓	✓✓	✓✓✓	✓	✓✓✓✓	
Auditory	✓✓✓	✓	✓✓✓	✓✓✓	✓✓	✓✓✓✓	✓	✓✓✓
Reading-Writing	✓		✓✓	✓✓			✓	✓✓
Kinaesthetic	✓✓	✓	✓✓	✓	✓	✓		

Table 2 disclosed that there is a difference between males' and females' preferences of learning style. All male students prefer learning style of auditory, while all female students prefer learning styles of visual, auditory, and kinaesthetic.

Table 3: Preferences of Learning Strategies Based on Multiple Intelligences between Males and Females

	Female 1	Female 2	Female 3	Female 4	Male 1	Male 2	Male 3	Male 4
Verbal-Linguistic	✓	✓	✓✓	✓✓			✓	✓
Logical-Mathematical								✓
Visual-Spatial	✓✓✓	✓✓	✓	✓✓	✓✓✓	✓	✓✓✓✓	
Bodily-Kinaesthetic	✓✓	✓✓	✓✓	✓	✓	✓		
Musical-Rhythmic	✓		✓	✓	✓	✓		
Intrapersonal	✓	✓			✓✓			
Interpersonal	✓✓		✓✓	✓✓	✓	✓✓✓	✓	✓✓✓
Naturalist			✓					

Based on the findings, it is evident that males prefer learning activities involving interpersonal intelligence, whereas females preferred learning activities involving verbal-linguistic intelligence, visual-spatial intelligence, and bodily-kinaesthetic intelligence (refer to Table 3).

5. Conclusion

On the whole, students of different genders have different ways in perceiving and understanding new information. In this context, male students prefer learning style of auditory whereas female students favour learning styles of visual, auditory and kinaesthetic. There is also a difference between males and females in term of preferences on learning strategies which are based on multiple intelligences. In order to improve their learning, male students prefer learning activities that emphasize on interpersonal intelligence while female students prefer learning activities that stress on verbal linguistic intelligence, visual-spatial intelligence and bodily kinaesthetic intelligence.

Knowing gender differences in multiple intelligences and learning styles does not mean that teachers are labeling the students to certain learning styles or teaching them based on certain intelligences. In fact, teachers should use gender differences in the same way that they use information regarding multiple intelligences, and learning styles. The information allows teachers to better understand their students. Raising teacher awareness about how their students learn helps them to engage more effectively in their students' learning. Likewise students are also encouraged to recognize their intelligences and learning styles in order to understand how they learn most effectively. Furthermore, it is important to care for students' individual differences and learning styles as they are the foundation upon which teachers should build their instructional methods. Eventually, by knowing gender differences in multiple intelligences and learning styles teachers are helping their students to become successful learners in future.

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