Dimensions of Learning Styles among Students with Attention Deficit-Hyperactivity Disorder (ADHD) in Malaysia

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Abstract

Learning styles play an important role in explaining the way a student masters the lessons they have learned in school. This study aims to review the dimensions of learning styles of students with attention deficit-hyperactivity disorder in Malaysia. The study is believed to provide information about the learning styles of students with attention deficit-hyperactivity disorder in the Integration Programme. This will help the Special Education teachers to prepare and plan effective ways of teaching that can be tailored to students' learning styles. Findings of the survey showed that learning styles of students with attention deficit-hyperactivity disorder are more likely to reflect elements of design, motivation, learning in pairs, kinaesthetic elements and impulsive elements. The findings of this study also indicated that the emotional element in the learning styles of these students is more dominant, followed by perceptual, psychological and environmental elements. Interviews with Special Education teachers showed that students with attention deficit-hyperactivity disorder are more prone to the temperature element, either hot or freezing cold, or the noise element. In addition, the findings also revealed that a number of students with attention deficit-hyperactivity disorder tend to be more aggressive when learning activities involved colourful visuals. It was found that the students prefer to learn in pairs and are able to learn better in the morning and become more distracted when studying in the afternoon. The learning style of students with attention deficit-hyperactivity disorder is multidimensional, interconnected and interdependent with each other.

Keywords: *Attention Deficit-hyperactivity Disorder, Learning Styles, Special Education, Integration Programme*

Introduction

Special Education in Malaysia encompasses educational services designed and implemented for students with special needs. The Ministry of Education outlined the philosophy of education as an ongoing effort to produce individuals who are skilled, able to plan and manage their lives and realize their own potential as individuals and members of society (Ministry of Education Malaysia, 1997). The philosophy also interprets the goal of special education as to provide the optimal development of students with special needs including students with learning disabilities, so they can live as individuals who are skilled, self-reliant, and able to plan, manage daily life and adapt to society.

In order to realise these goals, the Ministry of Education has established a special education programme that consists of a Special School, Integration Programme and Inclusion programme. The Integration Programme is implemented by placing students with learning disabilities in mainstream schools. Students with learning disabilities are students who have special learning disabilities, which refers to one or more disorders, or disorders in basic psychological aspects involving the understanding or use of language, either oral or written

According to Litner (2003), attention deficit-hyperactivity disorder (ADHD) is a complex neurobiological disorder believed to be caused by the malfunctioning of neurotransmitters, which are the brain's chemical messenger. The American Psychiatric Association (APA) explains that individuals who suffer from ADHD are those who show signs of a lack of concentration, are impulsive and are hyperactive continuously over a certain time period (Mash & Wolfe, 2002). In addition, ADHD is associated with a variety of disabilities including cognitive, psychiatric, educational, emotional and social (Grönlund et al., 2006). Meanwhile, Mohd Zuri and Aznan (2011) explained ADHD as one of the learning disabilities. ADHD symptoms have an impact on three to seven per cent of the population (Turkington & Harris, 2003). According to Kauffman and Landrum (2009), three to five percent of the school's student population is comprised of students with ADHD.

The main problems of students with ADHD are difficulties in maintaining attention, hyperactivity and impulsive behaviour. This behaviour affects the student's academic learning and their social relationships (Haliza & Samuel, 2009). Indirectly, this problem is also a distraction to other students and teachers in the classroom. As this poses an obstacle to the achievement of the objectives of teaching and learning, Jamila (2006) pointed out that these students require specialised curriculum and teaching methods appropriate to their disability. This problem would be overcome by recognising and emphasising the learning styles of the students.

Learning style is described as a way of nurturing ideas in everyday life situations, inclinations and priority in learning, as well as reflects the way people think and process information (Rief, 2007). For children with ADHD, the inability to focus in class can lead to poor performance, stress and frustration. One way to help a child succeed in school is to identify his or her learning style, and then implement some strategies of teaching. Identifying the learning style at the same time will help the teacher to understand their students' strengths.

In the opinion of Dunn and Dunn (1993), learning styles are sets of biological and growth characteristics of individuals which enable the identification of effective or ineffective teaching for most students. Subsequently, Henley (1999) pointed out that research on learning styles help us to understand and appreciate the complexity of the learning needs of students thereby making teachers more flexible when deciding or determining how to teach students according to individual needs. In other words, learning style plays a significant role in achieving optimal learning, which is the acquisition of new information, the processing of this information and the ability of this information processing to affect behaviour change. It is clear that the effectiveness of the teaching process for a particular learner depends on the manner or style of learning.

Since teaching and learning is a key determinant of future success of the country, it should be planned and implemented successfully and efficiently (Ministry of Education, 2012). Therefore, attention should be paid to student learning styles as this can influence the effectiveness of learning (Lerner, 2003). There is a famous quote attributed to Einstein that says, "Everybody is a Genius. But if you judge a fish by its ability to climb a tree, it will live its whole life believing that it is stupid." This quote illustrates the idea that learning is as much

circumstantial as it is innate. This is an important idea to think about when it comes to educating children with ADHD.

Literature Review

The learning style of ADHD students is an important and is relevant in generating the development of these students in a comprehensive and balanced manner. Learning style is the way one acquires and maintains information or skills without disputing how the process is described and is very different for each individual (Dunn, 2009). In fact, the way a person learns is highly dependent on the personality of the individual. Every student actually has a different way of processing and storing information (Noraini & Shuki, 2009). Thus, it is important to consider the variations in learning styles when planning, designing and implementing educational activities for students with ADHD. In fact, successful teaching requires a learning environment that is productive and effective (Hvozdíková, 2011). Hence, when teachers know and understand about the different ways a student with ADHD learns or processes information, they will be able to develop teaching strategies that are appropriate to the capacity and needs of students with ADHD.

Most ADHD definitions state that hyperactivity and developmental issues begin before the age of seven or eight years old. These include disabilities in academic and social skills that are often accompanied with other disabilities (Kauffman & Landrum, 2009). According to Brand et al. (2002), students with ADHD have a difficult experience in learning at school as they struggle with concentration and impulse control needed to ensure the success of their learning. These symptoms make it difficult for students with ADHD to pay attention and stay focused on teaching and learning activities in order to complete their work. Hvozdíková (2011) mentioned that there are many factors that influence the work and the process of teaching students with ADHD. To address the features and the inability to meet their individual needs, the Ministry of Education Malaysia. (1997), recommends "teachers may modify methods or techniques of teaching or learning, time for activities and narrative subjects and teaching aids for achieve the goal and subjects of special education" (Ministry of Education, 1997).

Meanwhile, Bowring-Carr and West-Burnham (1999) also pointed out that if the strategies of teaching are not aligned with the students' learning styles, there will be inconsistencies that result in a lack of understanding. As a result, students cannot achieve their potential and the teacher is unable to create a learning environment that is more meaningful to these students. Therefore, understanding a student's learning styles will be advantageous to modify the teacher's method, timing, activities and teaching aids based on the students' learning styles. This information can certainly provide a platform for teachers to deal with students with ADHD who are identified as having characteristics that affect learning in the classroom routine. Thus, although students have different learning styles, teachers should strive to make a difference in their classrooms that will benefit every learning style (Mohd Zuri, Roshiza & Wan Sharipahmira, 2014). Shahabudin and Rohizani (2003), assert that teachers need to provide a learning environment in line with the requirements of a learning style. Being sensitive to students' learning styles will enable teachers to help students overcome their weaknesses and learning difficulties. Therefore, identifying and understanding the dominant learning styles among students with ADHD can contribute to improving the quality of teaching and learning. To achieve this, the focus of the research is to examine aspects of learning styles, which is also one of the key aspects of individual differences in terms of an individual student's capability, interest, and how they receive and respond to a particular stimulus. Gaining an understanding of the learning styles of students with ADHD will enable us to meet the educational needs of these students in a more holistic manner.

Research Objectives

The aim of this study is to identify the learning styles of students with ADHD in Integration Programme. In particular, the objectives of this study are:

i.   identify the learning styles of students with ADHD in the Integration Programme; and

ii.   identify the perceptions of teachers about the dominant learning styles among students with ADHD in the Integration Programme.

Research Questions

Learning style is one of the important indicators that are relevant for understanding how ADHD students master new knowledge and skills. Referring to the importance of learning styles towards cognitive development of students with ADHD in the Learning Disabilities Programme Integration, this study intends to answer the following questions:

i.   What are the learning styles of students with ADHD in the Integration Programme?

ii.   What are the perceptions of teachers about the dominant learning styles among students with ADHD in the Integration Programme?

Research Method

This study utilised mixed method, combining quantitative methods, via a survey and qualitative method via interviews. The survey aimed to identify learning styles among students with ADHD in the Integration Programme. The survey used a questionnaire adapted from Dunn and Dunn (1978).The questionnaire was administered to 230 ADHD students in the Integration Programme in secondary schools. Next, structured interview was conducted to explore the perceptions of teachers based on their experience in teaching and dealing with ADHD students. A structured interview was administered to the three special education teachers who teach students with ADHD and are involved in the Integration Programme in primary school.

Findings and Discussion

Research findings have showed that there are various dimensions of learning styles among students with ADHD. Dunn (1984), explained that more than 200,000 students with ADHD have a multi-dimensional learning style. The learning styles preferences of students with ADHD are not dominated by a single type; the findings prove that interdependence exists between elements of learning styles among students with ADHD.

Learning styles of students with ADHD were analysed using mean scores. The following: environmental, emotional, sociological, physiological, perceptual and psychological elements are found as dominant elements of the multi-dimensional learning style among ADHD students.

Environmental elements

Many elements can affect the environment, and the environment is directly designed to make people feel happy and energetic or vice versa (Wilson, Mitchell, Musser, Schmitt, & Nigg, 2011). In the context of learning styles, this element contains four environmental elements: temperature, light, sound and design. The results showed the highest mean score for the design element, at 3.2141 (sd = .7278) and the lowest mean score was recorded for the sound element, at 2.4713 (sd = .7723). This finding indicates that the design element is more preferred by students with ADHD compared to light, temperature and sound. This result also confirms the findings by Nejati, (2020), who showed that exposure to a temperature which is too cold or too hot will have a bad influence on achievement in a variety of different tasks. In addition, this study also showed that students with ADHD do not like the sound element, which recorded the lowest mean score.

Emotional elements

Emotional element is made up of four elements, namely motivation, consistency, responsibility and structure. The results showed the highest mean score was recorded for the motivational element, at 4.0215 (sd = .7225) and the lowest mean score was indicated for the element of responsibility, at 2.8723 (sd = .6564). This finding indicates that the element of motivation in emotional elements of learning styles is preferred by students with ADHD. This finding also in line with the findings of Baharin et al. (2007). Students with ADHD require stimulation of their motivation to develop and improve their learning performance. This supports the findings by Lukavská (as cited in Hvozdiková, 2011), who found that hyperactive students can follow the rules in the classroom if they are recognized by the teacher.

Sociological elements

There are three sociological elements: alone, in pairs and in groups. The results showed the highest mean scores was recorded for the in pairs element, at 2.9571 (sd = 1.1990), followed by the in groups element, with a mean score of 2.8846 (sd = 1.2324) and the lowest mean score was recorded by the alone element, at 2.8584 (sd = 1.1509). The findings of this study indicate students with ADHD prefer learning in pairs compared to learning alone or in groups. This finding is not consistent with the findings by Baharin Abu et al. (2007), who showed that most students prefer to study alone and sometimes like to study with a friend. This study also did not support the findings by Lukavská (as cited in Hvozdíková, 2011), which noted that students prefer to learn in groups.

Physiological elements

Physiological elements include three elements: food, time and mobility. The results showed the highest mean score was recorded for food, at 2.8355 (sd = 1.0576) and the lowest mean score was recorded for mobility, at 2.6840 (sd = .8198), with the time element in the middle. The data showed that among the physiological elements, food is an important part of the preferred learning styles of students with ADHD in the Integration of Learning Disabilities Programme. This indicates that students with ADHD can learn better when allowed to study while eating or drinking.

Perceptual elements

Perceptual elements are made up of three elements: auditory, visual and kinaesthetic. The highest mean score was recorded for the kinaesthetic element, at 3.3117 (sd = .7682), followed by auditory elements, at 3.2902 (sd = .8454) and the lowest mean score was recorded for visual elements, at 3.1634 (sd = .7771). These findings support the findings by

Hvozdíková (2011), which clearly show that students with ADHD prefer kinaesthetic learning, like moving and touching objects. This finding also corresponds with the findings of Dunn (1984) whereby students with low achievement prefer kinaesthetic style compared to auditory and visual.

Psychological elements

Psychological elements of learning styles consist of the following: analytic, global, reflective and impulsive. The results showed the highest mean scores were recorded for the impulsive element, at 3.3090 (sd = .9632) and the lowest mean score was recorded for the reflective element, at 2.7191 (sd = 1.2220). These findings indicate that impulsive elements play a strong role in the preferred learning styles of students with ADHD. This commensurate with the characteristics of students with ADHD as they are easily being distracted, hard to take turns and having difficulty in controlling their behaviour. As affirmed by Rief (2007), the main characteristics of ADHD children include extreme physical activity, impulsive behaviour and lack of self-control, difficulty adapting to the activities in the classroom, aggressive behaviour, weak social skills, lower levels of self-esteem, and high levels of frustration.

The findings of this study show that the elements of design, motivation, learning in pairs, food, as well as kinaesthetic and impulsive learning are dominating elements in the learning styles of students with ADHD. This indicates that these elements must be considered by special education teachers when planning their teaching strategies for students with ADHD, to optimize the students' learning. Overall, the emotional element is more dominant in the learning style preferences of students with ADHD followed by perceptual elements, psychological elements, environmental elements, sociological elements and physiological elements. This finding corresponds with the findings by Baharin Abu et al. (2007), who found that the emotional learning styles category is the most dominant learning style. However, the physiological element is the least dominant element among the learning styles of students with ADHD. These findings prove that to create a conducive and effective learning climate, it is necessary to emphasise the emotional element of motivation, the element of consistency, the element of responsibility and structural elements. In order to create a conducive learning environment for students with ADHD, these elements need to be set as a priority.

Interview Findings

The following is an analysis of the findings of interviews related to the opinion of Special Education teachers about the dominant learning styles among students with ADHD in the Learning Disabilities Programme Integration. In relation to environmental elements, specifically light, special education teachers argue that bright lighting atmosphere in the classroom can help students with ADHD focus on learning. Meanwhile, a dark atmosphere will cause drowsiness, preventing the students from actively participating in learning activities. The teachers also stated that noise can distracting students with ADHD while learning. Moreover, a hot classroom temperature causes them to become restless and uncomfortable, which can also affect their concentration on teaching and learning activities. In addition, design is an important part of a conducive classroom. The feedback from the Special Education teachers showed that they considered proper design important and would adapt design to suit the individual classes. This is because some students with ADHD prefer a formal class set up while others liked the atmosphere of an informal class arrangement. Subsequently, a Special Education teacher stated that students with ADHD can still learn well and be motivated without rewards. Conversely, students with ADHD will learn better and focus on the task when it is something that they are interested in.

Next, in terms of consistency the special education teachers' feedback showed that students with ADHD have a sustained effort to complete their tasks or activities. The special education teachers felt that students with ADHD require motivational elements to create positive learning behaviours. Findings from the interviews also showed that the element of responsibility dominates students' learning behaviour. Those who are not, are able to be a responsible student when he or she is being asked to lead in a group of students. The findings show that ADHD students who work in groups can be responsible for the tasks and only a number of them were easily bored with routine tasks. The findings from interviews also showed that students with ADHD were more motivated by their own rules and are not be able to comply with the direction of teaching and learning. It was also found that some of the students love colourful visuals, while a number of other students with ADHD will show aggressive behaviour when given colourful visual tasks. In addition, analysis of interviews about the food element indicates that this element can easily distract ADHD students. However, one of the teachers argued that the students sometimes need a boost in terms of food to complete a given learning task. The teachers also stated that time is an element that affects ADHD students' learning, ADHD found to be more focus in teaching and learning at the morning compared to in the afternoon. Analysis showed that the focus of students with ADHD was interrupted when they were studying in the afternoon.

In terms of mobility, the teachers stated that teaching and learning activities involving the movement can increase student involvement and productivity. In relation to sociological elements, the teachers felt that students with ADHD tend to prefer learning in pairs and insists it also depends on cognitive performance. Overall, special education teachers viewed students with ADHD as being better suited to studying in pairs as they are unable to focus when learning in groups. When it comes to psychological elements, such as impulsive, reflective, global and analytic stimulus, the teachers explained that students with ADHD find it difficult to follow directions and like to begin work without waiting for teachers' instructions, while also relying on their emotions. This finding is compatible with the characteristics of students with ADHD as described by Barkley (1998), whereby individuals with ADHD showed significantly more problems with attention and impulsivity and are extraordinarily active. Meanwhile, Special Education teachers also felt that the psychological element depends on the performance and skills of the individual ADHD student.

Conclusion

The analysis of this study shows that the learning behaviours of ADHD students in secondary are multidimensional. This explains that the elements of learning style for an ADHD student are interrelated and interdependent with each other consistently. The findings prove that learning style is able to dominate the learning behaviour of ADHD students. The teachers need to consider their students' learning styles creating a more conducive learning environment. Teachers also need to focus on the abilities and the disabilities of students with ADHD. Knowledge of learning styles will help students manipulate their strength to acquire new knowledge and skills. Therefore, the emphasis on identifying action elements of learning style can improve the concentration of students with ADHD towards learning and actively increasing their cognitive performance to help achieve educational transformation. The identification of individual learning styles and their strength will help teachers to develop a multi-faceted teaching approach. All students must be encouraged to choose an approach that would help them to acquire knowledge and skills effectively.

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