

EFFECTS OF INDEX LEARNING STYLES (ILS) ON LEARNERS PREFERENCES STYLES TOWARDS LEARNING AUTISM BEHAVIORAL SYMPTOMS

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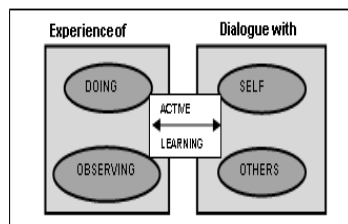
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Graphical abstract



Abstract

In Malaysia, the issue of Autism is silently increasing and it needs to be considered seriously by a society. Azizan (2008) stated that based on a research conducted in Perak; one in every 625 children was autistic. Even though the finding does not represent the actual number of children being affected in Malaysia, the actual number might be higher than that in the real situation. The lack of research particularly on how society should be taught on this disability makes the situation become worse. Nobody knows what causes autism; no proper guide has been distributed and no information on autism was shared at school level. Autism needs special attention from society since the cause of this disability was unknown. More support in terms of research and guidance is needed. Most of the past research and study only focused on autistic children and their parents. Those findings mostly too scientific to be understood by the societies and the results does not often to be published. So in order to increase the knowledge and awareness of learners', the learners preferences style need to be identify in the first place so that when designing the learning material, it can suits and match with their learning styles. In this case, the instrument of Index Learning Styles (ILS) which developed by Felder and Soloman (1994) has been utilized. This instrument consists of forty four (44) items that fall under four categories; Sensing-intuitive, Visual-verbal, Active-reflective and sequential-global. The finding shows that visual learners are dominant compared to text learners. The findings from this study help researcher to develop a suitable an Interactive Multimedia Learning Environment (IMLE) which based on visuals characters which can helps society in learning Autistic behavioral symptoms.

Keywords: Multimedia, learning, environment, index, styles, autism, behavioral, symptoms

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1.0 INTRODUCTION

This study reported the findings from a survey that was conducted on 201 of special education pre service teacher from two public's universities in Malaysia. The main objective of this study was to find out their learning styles towards learning autism behavioral symptoms through the learning material called an Interactive Multimedia Learning Environment (IMLE). The target population of the study was a special education pre-service teacher from local public universities in Peninsular Malaysia. The reason for choosing these respondents was to

support an early feedback from the preliminary investigation (PI) [1], suggesting that these special education pre service teacher are the one will face with autistic children and with this ability they can identify the slow learner students. Based on the table proposed by Krejcie and Morgan (1970) [2], the population size was 550 and the sample size was set at 225. But during the treatment, the final sample was 201 due to attrition. The findings from this study helped researcher to formulate and developed a suitable multimedia learning environment which in line with learners' styles and preferences with the

hope to be utilized by the societies in learning autism behavioral symptoms.

2.0 THE STUDY

This study utilized one instrument called Index of Learning Styles (ILS) developed by Felder and Soloman [3] with purposed to identify learning styles of respondents towards the IMLE. This instruments first developed by Felder-Silverman [4] model and it contained a 44 question instruments designed to access preferences on the four dimensions. This instrument used to assess preferences on four dimensions (active/reflective, sensing/intuitive, visual/verbal, and sequential/global). A student's learning styles profile provides an indication of probable strengths and possible tendencies or habits that might lead to difficulty in academic settings. The questionnaire results simply indicate preferences and the suggestions that follow the results. In this study, the visual/verbal dimension has been chosen to identify learning style amongst the respondents.

3.0 LITERATURE REVIEWS

The development of learning material (IMLE) requires an active learners' to create their own understanding towards learning. Active learning is a teaching strategy proposed by Fink (1999) [5] which encourages learners to write/type, click, discuss, act and create in order to engage in the learning process. Learners who are engaged in learning are more likely to remember what they have learned over time. As shown in Figure 1, learners will be discovered, observing, processing and applying the information that is given to them.

Research has demonstrated that learners probably learn more if they are actively engaged with the material that they are studying in accordance with the active learning approach. The effectiveness of this method relies on the application of suitable multimedia principle that has been applied in IMLE since active learning plays an important role in multimedia learning.

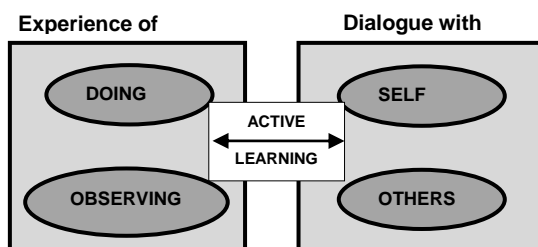


Figure 1 A model of active learning (Fink, 1999)

The general definition of learning styles refers to the various approaches or ways of learning. In other words, learning style is a student's consistent way of

responding to and using stimuli in the context of learning.

According to Keefe (1979) [6], learning styles are the "composite of characteristic cognitive, affective, and physiological factors that serve as relatively stable indicators of how a learner perceives, interacts with, and responds to the learning environment".

Kolb's and Fry (1975) [7] created the famous model out of four elements: concrete experience, observation and reflection, the formation of abstract concepts and testing in new situations. As shown in Table 1, he represented those in the famous experiential learning circle that involves:

Table 1 Kolb's and Fry on Learning Styles (Tennant 1996)

1	Concrete experience followed
2	Observation and experience
3	Forming abstract concepts
4	Testing in new situations

He argued that the learning cycle can begin at any one of the four points, and that it should really be approached as a continuous spiral. However, it is suggested that the learning process often begins with a person carrying out a particular action and, then, seeing the effect of the action in this situation as described in Table 2.

Table 2 Characteristics of Learning Styles by Kolb's and Fry (1975)

Learning Styles	Characteristics
Converger	Abstract conceptualization + active experimentation
Diverger	Concrete experience + reflective observation
Assimilator	Abstract conceptualization + reflective observation
Accommodator	Concrete experience + active experimentation

4.0 PROBLEM STATEMENT

A series of Preliminary Investigations (PI) have been conducted in two states of Peninsular Malaysia at the early stage of this study with the purpose of seeking opinions and basic knowledge of the respondents towards autism in general. This PI was conducted through a series of interviews with; three autism experts, mother with autistic children, two fathers and a mother without autistic children, as well two young women. The overall results showed that most of them had very little knowledge regarding autism and did not know how to identify the symptoms of autism. Among the reasons cited were: no early exposure at school, no knowledge and awareness among authorities, low level of education, less experts and poor facilities provided for this causes.

According to the chairman of the National Autism Society of Malaysia (NASOM) (2010), the level of knowledge and awareness of autism has increased over the years but it is not enough considering many have not gotten the message of what autism is. More research should be conducted in this matter even though many parents have done their share in reporting the cases and seeking help for their autistic children. These people need to understand the basic concept of autism before they can actually understand the findings from the researches. That is why it was really important for these people to be educated in the issues of autism. How are they supposed to help their children when they, themselves do not understand what actually is happening to their children? In order to educate these parents, it is crucial to consider a good learning environment as well as learning material; this is what should be explored as the first step in dealing with autism.

A senior lecturer of an Early Intervention, Autism and Assessment from Universiti Kebangsaan Malaysia (UKM) also holds the same views that many parents in Malaysia do not have the basic knowledge and awareness in terms of the amount of money required in meeting the needs of an autistic child. Working parents also often find themselves torn between career and family commitments and many professional women have had to quit their jobs to look after their children. She also added that many parents do not use proper methods and knowledge in handling their autistic children and these scenarios usually lead to arguments and separation of the family. Surprisingly, there are also cases where parents who just give up on their children despite the fact that they have a higher level of education such as a doctorate degree. Sadly, they did not bother with early intervention as they think that there is nothing much that can be done for their autistic child.

It is important that the lack of knowledge, awareness in recognizing autism behavioral symptoms is addressed. As mentioned by the President of Melaka Tengah Autism Association (MTAA) in 2010, autism is treatable and early intervention is crucial. She added that parents and society should be aware of warning signs and symptoms of autism so that they can take their children for diagnosis. Once diagnosed with autism, parents should not take follow-up treatments for granted as this may cause problems in the future.

They must not wait and expect the child to catch up later or outgrow the problem. The more they know about autism spectrum disorder, the better equipped they will be to make informed decisions for their children.

Barger and Campbell [8] supported above statement where they explore the knowledge of autism among middle schools students. According to this study, 41.6% of students had heard of autism where he concluded that the students with awareness of autism had a slightly better knowledge

of autism than their peers who had never heard of autism. Overall, the students were varied in the level of knowledge that they had regarding the characteristics of autism. The study concludes that in order for autistic peers to participate successfully in an education system among their peers, there must be an increase in the level of knowledge of autism among students.

A study of the knowledge of autism among general practitioners in Pakistan found that only 44.6% of the general practitioners surveyed had heard of autism (Assassi and Ibrahim, *et al.* (2011) [9]. This study measured the awareness of autism in relation to the knowledge of autism among its participants. This study concludes that there are "knowledge deficits concerning autism etiology and diagnosis" and in order for autism disorders to be properly diagnosed and treated, both private and public schools in Pakistan should develop a more robust curriculum on the subject of autism.

There is a lot of information's regarding autism available these days which can be accessed through online resources, books and magazines, as well as organized events. However, the methods used in presenting the information's to society can be too technical and confusing to ordinary people. Those without basic knowledge of what autism will have a hard time in understanding this issue.

While there are many different theories about the best course of treatment for autism, most professionals agree that the earlier the treatment begins, the better the chances are that the child can be helped. The current method in diagnosing autism is still unclear and complicated. Different children would normally have different symptoms. Furthermore, most of the diagnosed results are kept secret by the doctor. Thus, the implementation of learning materials in this research will help society and parents to self-learn the autistic behavioral symptoms so that they can save their time and money from seeking consultation from the experts.

5.0 METHODOLOGY

As proposed by Gribbons (1997) [10], this study employed a quasi-experimental 2 x 2 factorial design to investigate the effects of two presentation modes on the students' achievement of their knowledge, awareness and perceived motivation with purpose to identify autism behavioral symptoms. The main tool to measure the effects of this learning presentation was the development of an Interactive Multimedia Learning Environment (IMLE) with two presentation modes available for learners to use which based on the Presentation Mode 1 (Modality Principle) and Presentation Mode 2 (Redundancy Principle).

A baseline test was carried out to identify homogeneity among the groups. The Presentation Mode 1 (Modality Principle) was administered in Group one (University A) and Presentation Mode 2

(Redundancy Principle) on Group two (University B). There are four stages involved in this treatment.

In stage 1 in week 1, samples were randomly selected and they were remained as samples until the final stages. The purpose of Stage 1 was to determine samples learning styles using Index of Learning Styles (ILS) instrument.

On stage 2 in week 2, the Knowledge Awareness Scale (KAS 1) instrument developed for this research was administered. The purpose of this instrument was to relate samples understanding towards knowledge and awareness of autism. This instrument contained two domains; Knowledge and Awareness. The knowledge domain contained 12 items while the Awareness domain has 18 items.

In stage 3 of week 3, samples have been given the opportunity to self learning the learning material through online access. The duration to access this learning material was one week. The instruction and how to access the location of learning material has been informed during stage one.

In stage 4 of week 4, the treatment of learning material (IMLE) has been administered to samples. Samples were randomly assigned into two treatment groups namely Presentation Mode 1 (Modality Principle) and Presentation Mode 2 (Redundancy Principle).

During the stage one, the sample was randomly divided into two groups and each group was assigned into the Index of Learning Styles (ILS) instruments. The use of ILS was to identify the learning style preferences of the respondents. For the purpose of this study, eleven (11) items were applied and respondents chose the best answer that applies more frequently to them. This instrument had been developed by Felder and Soloman (1994) and the current version of this instrument consists of forty four (44) items that fall under four categories; Sensing-intuitive, Visual-verbal, Active-reflective and sequential-global. This pretest instrument adapted the Visual-verbal category to identify the learners' learning style preferences. The results of this study lead to the development of an Interactive of Multimedia Learning Environment (IMLE).

6.0 RESULTS

In order to make an assumption toward normal distribution of how the sample perceives the learning presentation, the test of normality Index of Learning Styles (ILS) was used and the scores tested. The statistical values as shown in Table 3 indicate the Mean = 13.36, Std. Deviation = 2.418, Skewness = 1.089, Std. Error of Skewness = .166, Kurtosis = .737 and Std. Error of Kurtosis = .330.

Table 3 Statistical data from Index of Learning Styles (ILS)

Statistics		
Scores		
N	Valid	215
	Missing	0
Mean		13.36
Std. Deviation		2.418
Skewness		1.089
Std. Error of Skewness		.166
Kurtosis		.737
Std. Error of Kurtosis		.330

Table 4 and Figure 2 provide relevant data on both modes in terms of learning preferences where the score based on the Kolmogorov-Smirnov statistic was .187, df = 215, Sig. = .000 and on the Shapiro-Wilk the Statistic was .865, df = 215, Sig. = .000. An overall result of the test of normality shows that the scores have some significant impact on how the samples perceived the learning presentation.

Table 4 Test of normality from Index of Learning Styles (ILS)

	Tests of Normality					
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Scores	.187	215	.000	.865	215	.000

a. Lilliefors Significance Correction

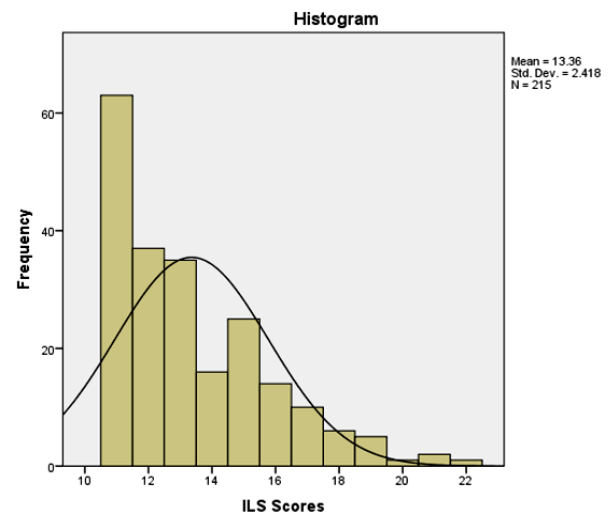


Figure 2 Histogram of ILS score

The effects of these findings were tested on presentation modes which purposely created in this study. Analysis of Covariance (ANCOVA) was conducted to see if there is a significant difference in the effects of an Interactive Multimedia Learning Environment (IMLE) on students' achievement score as measured by Knowledge Awareness Scale (KAS) in terms of Learning Styles. The analysis was based on

the scores after treatment as the dependent variable and Learning Styles as a fixed factor while scores before treatment as covariate. The results as shown in Table 5 and Table 6 for the whole effect on the corrected model show that the effect of an Interactive Multimedia Learning Environment (IMLE) was significant at the $F=3.212$, $p=0.042$ level, and the effect size is $\text{partial } \eta^2 = R^2 = 0.031$ meaning that the model explains 3.1% of the variance in the overall scores.

Table 5 Between-subjects factors

	Value	Label	N
Learning Styles	1	Visual	144
	2	Text	57

Table 6 Tests of between-subjects effects

Dependent Variable: Score after treatment

Source	Type III Sum of Squares	df	Mean Squares	F	Sig.	Partial Eta Squared
Corrected Model	1850.900 ^a	2	925.450	3.212	.042	.031
Intercept	55436.873	1	55436.873	192.379	.000	.493
Pre_Scores	1739.941	1	1739.941	6.038	.015	.030
Error	57056.593	198	288.165			
Total	2751050.000	201				
Corrected Total	58907.493	200				

a. R Squared = .031 (Adjusted R Squared = .022)

However, to use Learning Styles alone as the predictor to the effectiveness of an Interactive Multimedia Learning Environment (IMLE) on students' achievement score before and after the treatment as shown in Table 7 was not significant as a single predictor at the $F=0.098$, $p=0.754$ which is above the significance level.

Even though the mean difference between Visual and Text-based Learning Styles are too small to be considered as significant, the mean for text-based Learning Styles was higher at 116.91 compared to visual based Learning Styles at 115.26.

Table 7 Descriptive statistics

Dependent Variable: Score after treatment

Learning Styles	Mean	Std. Deviation	N
Visual	115.26	18.344	144
Text	116.91	13.806	57
Total	115.73	17.162	201

In conclusion, the overall effects of an interactive multimedia learning environment on students'

achievement score as measured by Knowledge Awareness Scale (KAS) between Learning Styles used in this research was significant. However to use learning styles alone as a predictor to the effectiveness of an interactive multimedia learning environment on students' achievement score before and after the treatment is not significant.

This is due to the fact that the moderator variable (Learning Styles) has been implemented before the treatment and the outcome of this treatment does not influence the learners in making the selection during treatment. Even though the mean difference between picture and text based is too small to be considered as significant, the mean for text based learning styles was higher and the mean for picture-based learning styles is lower.

In general the result from this instrument helps the researcher to identify the learning styles of learners thus managed to develop the suitable an interactive multimedia learning environment which based on the visual representation.

7.0 FUTURE WORKS

Based on the findings, it can be concluded that majority of respondents are preferred visuals presentation as their learning styles. Therefore, these findings strengthen the assumptions that the learning material that needs to be built must have features of visual-based learning in future. The development of Interactive Multimedia Learning Environment (IMLE) has been developed successfully and it was tested to target respondents during the actual treatment.

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