

Analysis of the Relationship Between the Psychosocial Learning Environment and Learning Styles to The Achievement of Form Four Additional Mathematics

Analisis Hubungan Persekitaran Pembelajaran Psikososial dan Gaya Pembelajaran dengan Pencapaian Matematik Tambahan Tingkatan Empat

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Abstract

This study was aimed to determine the relationship of psychosocial learning environment, learning styles with the Additional Mathematics achievement besides to identify psychosocial differences in the learning environments and learning styles by gender and school type in achievement. Quantitative approaches with a survey design used for this study. About 205 form four Additional Mathematics students from 13 secondary schools in Setiu district were chosen using strata sampling methods. Research instrument are 'What is Happening in This Classroom' (WIHIC) and Dunn and Dunn learning styles. Data analysed using descriptive to describe the level of perception about psychosocial learning environment and the most dominant learning style while inferential analysis involved the MANOVA and Spearman's Rho correlation test. The findings showed that the students' familiarity had the highest level of perception while the emotional category learning styles was the dominant of the students. The conclusion that students from Boarding Schools are concerned with the aspects of relationship with each other compared the students in other schools. The learning style in three types of schools showed no significant differences in gender and school type. Spearman's Rho correlation analysis showed that was significant relationship between psychosocial learning environments with achievement while no significant relationship between learning styles with achievement. The conclusion, psychosocial learning environment and learning style are elements that need to be attention to enhance the achievement. The implicates of the study are the psychosocial need to be focus to improve the achievement of this subjects.

Keywords: psychosocial learning environment, learning styles, achievement

Abstrak

*Kajian ini bertujuan mengkaji hubungan persekitaran pembelajaran psikososial dan gaya pembelajaran dengan pencapaian Matematik Tambahan selain mengenal pasti perbezaan persekitaran pembelajaran psikososial dan gaya pembelajaran mengikut jantina dan jenis sekolah dalam pencapaian Matematik Tambahan. Reka bentuk tinjauan telah digunakan dalam kajian ini dengan persampelan berstrata yang melibatkan 205 orang murid Tingkatan Empat aliran sains di 13 buah sekolah menengah di daerah Setiu. Instrumen kajian ialah soal selidik *What is Happening in This Classroom (WIHIC)* dan soal selidik gaya pembelajaran *Model Dunn dan Dunn*. Analisis deskriptif untuk menjelaskan tahap persepsi murid tentang psikososial persekitaran pembelajaran dan gaya pembelajaran yang paling dominan diamalkan murid, manakala analisis inferensi melibatkan ujian *MANOVA* dan ujian *Spearman Rho*. Kajian menunjukkan bahawa aspek keakraban murid mempunyai tahap persepsi yang paling tinggi berbanding aspek lain dalam persekitaran pembelajaran psikososial, manakala kajian juga mendapati kategori emosional merupakan kategori gaya model pembelajaran *Dunn dan Dunn* yang paling dominan. Keseluruhan kajian menunjukkan bahawa murid-murid di Sekolah Berasrama Penuh mementingkan keakraban antara satu sama lain berbanding murid-murid di sekolah lain. Manakala gaya pembelajaran di ketiga-tiga jenis sekolah menunjukkan tiada perbezaan yang signifikan mengikut jantina dan jenis sekolah. Analisis *Spearman Rho* menunjukkan wujud hubungan yang signifikan antara persekitaran pembelajaran psikososial dengan pencapaian Matematik Tambahan, manakala tiada hubungan yang signifikan antara gaya pembelajaran dengan pencapaian Matematik Tambahan. Kesimpulannya, kajian menunjukkan persekitaran pembelajaran psikososial dan gaya pembelajaran dapat meningkatkan pencapaian murid dalam mata pelajaran Matematik Tambahan. Implikasi kajian ialah persekitaran pembelajaran psikososial dan gaya pembelajaran merupakan elemen yang penting dalam usaha meningkatkan pencapaian mata pelajaran Matematik Tambahan.*

Kata kunci: *persekitaran pembelajaran psikososial, gaya pembelajaran, pencapaian*

INTRODUCTION

This study involved three variables of the psychosocial learning environment, learning styles and Additional Mathematical achievements. The purposes of this study are to determine the relationship psychosocial learning environment and learning styles with the Additional Mathematics. This study also to identify psychosocial differences in the learning environments and learning styles by gender and school type in achievement. Quantitative approaches with a survey design used for this study. About 205 form four Additional Mathematics students from 13 secondary schools in Setiu district were chosen using strata sampling methods. Most students will be easier to respond indirectly to the learning environment around them. A comfortable environment can help and stimulate the learning behaviour of a student so that more positive or negative. The learning environment that takes into account the physical aspects and psychosocial aspects are able to form a good school culture [1]. The resulting culture is capable of stimulating interest and spirit of students to continue to learn the concepts found in Additional Mathematics [2]. Teachers are individuals who are responsible for creating a conducive and effective classroom environment in dealing with diverse student behaviours. The tasks should be more creative to create the effective environment by teachers. The teaching also be blend with another strategies.

According to [3] the physical environment is more relevant to the development of facilities such as building and furniture equipment. A comfortable and secure classroom must be equipped with basic facilities of blackboard, notice boards and room space. While the psychosocial environment refers to the needs of an individual's emotions with his social environment. Among the features such as comfortable and friendly atmosphere, safe from bullying and threats, atmosphere that stimulates learning and providing the same opportunity for all students is a healthy psychosocial environment in the classroom.

The entire student who took Additional Mathematics subjects was excellent students in Mathematics subjects in Form Three. They should have a solid and steady Mathematical basis. Therefore, the learning style of a student is very important in learning this subject. Teachers need to emphasize students on the appropriate and effective learning styles to help them improve their achievements to the excellent level [4]. Many studies say learning that takes into account student learning styles will have a huge impact on increased achievement, attitude and behaviour [5].

RESEARCH OBJECTIVES

The objectives of this study:

1. Identify student perceptions of psychosocial learning environments in Additional Mathematic teaching and learning.
2. Identify the most dominant learning style practiced by students in teaching and learning Additional Mathematics
3. Identify whether there is a difference in student perception of the psychosocial learning environment in teaching and learning of Additional Mathematics based on gender and type of school.
4. Identify whether there is a difference in student learning styles in teaching and learning Additional Mathematics based on gender and type of school.
5. Identify whether there is a relationship between aspects of the psychosocial learning environment and the achievement of Additional Mathematics among students.

METHODOLOGY

This study is a quantitative study using a descriptive research design on a survey. This design is suitable because researchers want to measure, identify, compare and find relationships between psychosocial learning environments, learning styles and Additional Mathematical achievements. The dependent variables comprise psychosocial learning environments, learning styles, and Additional Mathematical achievements among Form Four students in Setiu districts of rural categories. The independent variable is gender, and the type of school. This study involved Form Four students throughout Setiu district of 13 secondary schools comprising Ordinary Daily Schools (SMKH), Religious Secondary School (SMA), as well as Science Secondary School (SBP). The population for this study is that students are four students who only studied the subject of Additional Mathematics. The data obtained from a set of questionnaires were then analysed using software, 'SPSS Version 11.0 for Window's (Statistical Packages for Social Sciences).

This study involved the use of an instrument used to obtain information about their psychosocial learning environment and their learning style. The questionnaire was divided into three categories starting with Part A, B and C. Part A contains the demographic of the respondents of the study (5 items), Part B contained a Dunn and Dunn model learning questionnaire (45 items), Part C contains questionnaire on the psychosocial learning environment questionnaire of 'What is Happening in This Classroom (WIHIC) (40 items).

RESULTS AND DISCUSSION

Student's perception level of the psychosocial learning environment during the study of Additional Mathematics

Table 1 shows students' perceptions of the psychosocial learning environment during the study of Additional Mathematics. There are five aspects that are being studied which consist of the friendship between the students, the collaboration between students, teacher's equality, teacher's support and engagement of the students. The level of WIHIC scores is based on four levels, high, medium high, medium low and low (Table 4.4). All students were given positive perception for all aspects of WIHIC with the overall mean value at the high level (min = 3.79, SP = 0.64). The findings showed that the student's attitudes aspect (mean=4.11, SP= 0.57) had the highest positive perception and followed by the second aspect is the aspect of cooperation between students (mean=3.97, SP= 0.60). Also, aspect of equality (mean=3.83, SP= 0.66) and followed by teacher support aspect (mean=3.55, SP= 0.67) and the aspect of involvement was the lowest mean score and standard deviation (mean= 3.50, SP=0.69).

Table 1. Value of mean and standard deviation for psychosocial aspects of the learning environment

Aspects	Mean	SP
Student Friendship	4.11	0.58
Collaboration	3.97	0.60
Equality	3.83	0.66
Teacher Support	3.55	0.67
Engagement	3.50	0.69
Total Mean	3.79	0.64

The results of the analysis showed that psychosocial aspects of teaching and learning of Additional Mathematics subjects have positive perceptions on the aspects of student friendship, cooperation between students, teacher equality, teacher support and student involvement. From five aspects, the aspect of friendship between students shows the highest value. The score is expected to be high because when teachers prefer to carry out teaching and learning groups as a result of the relationship between students is increasing close. This finding is similar to the study of Zulkarnain (2012) which says that peers also affect the way of assessing, learning, use, and dietary habits of a student. In addition, peers also influence in the formation of morals among primary and secondary students [6]. Peer influences also stimulate their achievement.

Furthermore, lower mean score on student engagement show that students do not like to engage in learning activities among them. They do not know to solve the questions so they do not like to engage in class while the teaching happened. Lower students' involvement may have been the result of more clever student-centred learning activities. Teachers in the school still use the traditional method of chalk and talk to teach this subject. This strategic is no longer suitable to be practiced in view of the growing tide of progress ahead. Teachers need to attract students by changing the way teaching is conducted abroad. It shows teachers as the main source. Arnyana (2006) explained that to train students in solving problems, teachers can use cooperative strategies, problem solving and inquiry methods. This enables students to actively engage in learning activities. The student's inability to master knowledge continuously and to understand the concepts that are difficult to master is due to the learning process which only involves teachers as facilitators by not actively engaging students [7].

The high concern for these subjects led to the freedom of generating low ideas (Robiah, 2004). The poor responses to Additional Mathematics resulted in them not being able to master it well. From the beginning the students considered this subject difficult, the attitude towards Mathematics is quite narrow while attitude is an important aspect in mastering this subject [2]. If students often have a negative attitude and take it easy on these subjects indirectly affect the pupil's achievement. As for students who are interested in these subjects, they will always strive to improve their skills by providing good and accurate ideas. Disciplined, deep-seated students will work even better when they have less time for other subjects.

The findings also found that the teacher's support aspect was high in the medium level. Most of the students in these three types of schools depend almost entirely on teachers. Therefore, the teacher's questions or notes are very helpful to the students in mastering this subject. According to Siti Marlina (2005), Additional Mathematics is a subject that is difficult to master especially Malay students. So, the support of teachers will stimulate the student's motivation to engage in this subject. Besides a close relationship between teacher and student is a teacher effort in determining student's interest in this subject. Usually, the learning environment revolves around the relationship between teachers, parents, peers in and outside the classroom. The learning environment should be designed to take into account the surrounding influences in order to encourage interaction and cooperation among students. One of the factors is a lack of understanding of the low mathematics concepts and teaching strategies of teachers who are very boring and less creative.

The Most Dominant Learning Styles Practiced by Students in The Teaching and Learning of Additional Mathematics

Table 2 shows the most dominant learning styles practiced by students during the study of Additional Mathematics. There are five categorise styles that are being studied which consist of emotional, psychological, sociological, environment, and physical. The overall mean showed that they were given positive to choose any learning styles with lower level (mean= 2.87, SP=0.30). The finding showed that the emotional category learning style as the most dominant learning style (mean= 3.24, SP= 0.35). Psychological category came in second category (mean=3.03, SP=0.22) followed by Sociological category with high score (mean=3.02 and SP=0.40). Environment category with (mean= 2.59, SP=0.25) and the lowest analysis being Physical category with (mean= 2.45, SP=0.29).

Table 2. Value of mean and standard deviation for learning style

Category	Mean	SP
Emotional	3.24	0.35
Psychological	3.03	0.22
Sociological	3.02	0.40
Environment	2.59	0.25
Physical	2.45	0.29
Total Mean	2.87	0.30

The results of the analysis show that student learning style practices in Setiu district secondary schools are highly influenced by the emotional category and psychological the emotional category is the most preferred learning style compared to five other categories of other learning styles found in Model Dunn learning styles. This category has several elements such as motivation, consistency, responsibility and structure. Students are very happy if motivated as a driving force. While the level of affinity is different for each student to cause them to require different time and rest periods. [8] found that each student is different than their learning style is different.

Besides students in this area wanting tasks or work given to them clearly and deep instructions. Structured and clear instructions and aims to enhance students' understanding and encourage them to perform quality and quality tasks. This subject is an abstract subject that requires a detailed explanation before doing an assignment. Therefore, the whole student needs a clear direction. Teachers who are concerned about students will always try to provide a detailed explanation. Student cognitive levels will be easy if there are clear and easy-to-understand instructions as well as structured work for an assigned task. Students are more eager to work hard to get good scores. This means that students really need the attention of the teacher so that the instructions are clear to help them do an assignment. Although students need to have a high sense of responsibility in accordance with the full commitment so that every ambition to be achieved.

The students in this study are found to be practicing psychological learning styles. This category is the second choice by the students. This category consists of several elements such as analytical or global, dominant left or right brain dominant. The type of analytical student is a student who does a detailed assignment and will be more thorough with every instruction given. These features are different from students who are global because these students will see something that is broad and open [9]. Usually, this student will be more likely to work together in group form than alone. They need more information or instructions to perform an assignment. As long as instructions are not given detailed their assignments will not be produced perfectly.

This study found that students were more comfortable learning with the presence of their best friends to interact with each other. Therefore, for the effectiveness of learning is proposed that Additional Mathematical subject teachers should focus on psychological and emotional categories. According [10] outstanding achievements in Additional Mathematics subject was due to the student itself. When having their own students are more than working and more responsible. While analytical types of students like to learn in light and learning illustrated atmosphere occurs formally. Students in this study prefer to study in a bright atmosphere accompanied by teachers as a facilitator and while global pupils prefer to learn in a gloomy state and sit free as on the couch and floor.

The difference in the perception of the psychosocial environment in teaching and learning of Additional Mathematics based on sex and type of school

This study used the multivariate testing (MANOVA) to determine whether gender (male, female) and type of school (secondary school, religious school and boarding school) for Additional Mathematics subjects affect the aspects of student friendship, cooperation between teacher, teacher support and student engagement in Additional Mathematics learning.

Table 3 Box’s tests for psychosocial aspects of learning environment based on gender and school type

<i>Box’s M</i>	F Value	DK 1	DK 2	Sig.
159.136	1.951	75	20398.568	0.000

Refer the Box’s M test there was a significant variant-covariance difference among dependent variables for all independent variable levels ($F= 1.951$ $p= 0.00$) ($p<0.05$). This means the variants of covariant dependent variables are not homogeneous across all independent variables. According to the variant-covariant homogeneity matrix is significant MANOVA test can still be carried out as long as the sample size is large and almost the same because Type 1 Error is small. Hence, hypothesis testing can be done using MANOVA. Table 1.3 results of the Pillai’s Trace test showed that there was no significant effect of the independent variable of the sex with Pillai’s Trace = 0.008F (5, 195) = 0.316, $p=0.903$ ($p>0.05$) to the dependent variable in the study, zero failed to reject. That’s mean there is no difference in perceptions of students on the aspects of student interaction, student cooperation, teacher equality, and teacher support and student involvement for male and female student.

Table 4. MANOVA’s analysis of the differences in psychosocial aspects of the learning environment based on gender and school type.

Effect	<i>Pillai’s Trace</i>	F	D.K Between Groups	D.K Inside Group	Sig.
Sex	0.008	0.316	5	195	0.903
School Type	0.179	3.848	10	392	0.000
Sex *School Type	0.095	1.956	10	392	0.037

The results of the test also showed that there was a major effect of the independent variable variables with the value of Pillai's Trace = 0.179, $F(10, 392) = 3.848$, $p < 0.00$ ($p < 0.05$) against the dependent variables in the study. Then zero hypothesis is rejected. This means there are significant differences in terms of student intimacy, student cooperation, teacher equality, teacher support and student involvement for all three types of schools. Subsequently, there was an impact of student sex interaction and the type of school by referring to the value of Pillai's Trace = 0.095, $f(10, 392) = 1.956$, $p = 0.04$ ($p < 0.05$) against the variables studied. With these zero hypotheses is rejected.

This finding means students' perceptions on aspects of the interaction of the students, the collaboration between students, teacher equality, teacher support and student involvement are significantly different in the learning environment for the three types of schools and the sex of students. This study is in with the study of [11] on form four students at high-performance schools that found no difference in the aspects of students' friendship and teacher support. Male student may differ from girls while they interact with the environment.

The difference in student learning styles in teaching and learning additional mathematics based on gender and type of school

This study uses multivariate test (MANOVA) to determine whether gender (male and female) and type of school (national secondary school, religious secondary school and full boarding school) for Additional Mathematics subjects affecting the learning style of five categories, namely the environment, emotional, sociological, physical, and psychological, in Additional Mathematical learning. Before MANOVA's analysis was carried out the determination of Varian-Covarian Variance Matrix (Homogeneity of Variance-Covariance Matrices) using the Box's M test

Table 5 Box's tests for category of learning style based on gender and school type

Box's M	F Value	DK 1	DK 2	Sig.
89.411	1.096	75	20398.568	0.267

Referring to Table 5, there was a significant variant-covariance difference among dependent variables for all independent variables level ($F= 1.096$ $p = 0.267$) ($p > 0.05$). This means the variants of the homogeneous dependent variable across all independent variables. According to Stevens (1986), although the variant-covariance homogeneity matrix is significant of the MANOVA test still can be carried out if the sample size is large and almost the same (the largest sample / the smallest sample < 1.5) due to the type 1 error (Type 1 error) is small.

The results of the test also showed that there was a major effect of the independent variables of sex with Pillai's Trace = 0.108, $F(10, 392) = 2.227$, $p = 0.016$ ($p < 0.05$) to the dependent variables in the study. Then zero hypothesis is rejected. This means there is a significant difference in the mean environment, emotional, sociological, physical and psychological categories of national secondary schools, religious secondary schools and boarding schools. While based on Table 6 is also found to be the effect of student sex interaction and the type of school by reference to the value of Pillai's Trace = 0.040, $F(10, 392) = 0.796$, $p = 0.633$ ($p > 0.05$) against the variables studied. With these zero hypotheses is accepted. These results show that there is no significant interaction effect between the sex of students and the type of school on environment, emotional, sociological, physical, and psychological categories.

Table 6 The difference in the categories of learning styles based on gender and type of school

Effect	Pillai's Trace	F	D.K Between Groups	DK Inside Groups	Sig.
Sex	0.060	2.505	5	195	0.032
School Type	0.108	2.227	10	392	0.016
Sex *School Type	0.040	0.796	10	392	0.633

The interaction between the learning environment and the achievement of Additional Mathematics

In this study, Spearman's Rho correlation is used to study the relationship between the learning environment and the achievement of Additional Mathematics. The finding ($R = -0.16$, $p = 0.02$), involvement ($r = -0.18$, $p = 0.00$), teacher support ($r = -0.17$, $p = 0.01$) and equality ($r = -0.18$, $p = 0.01$). All aspects show a very weak relationship. The aspect of cooperation ($r = -0.04$, $p = 0.61$) was a very weak significant relationship with the achievement of Additional Mathematics.

Teaching teachers towards the 21st century learning is a diversity that should be implemented. Today's information technology meets the needs of pupils (Oblinger & Oblinger, 2005). The entire student at school is directly involved with this technology. According to Ainley et al (2008) this progress affects students in terms of behaviour, emotion and cognitive. This is because conducive learning environment can enhance student self-esteem and attitude to a more positive level and are able to help improve student's achievement in this subject.

Table 5. Spearman’s Rho correlation analysis results between psychosocial aspects of the learning environment

Learning Environment	Student Achievement			
	N	Rs	Relationship Power	P Value
Students Friendship	205	-0.162	Can be ignored	0.020
Teacher Support	205	-0.174	Can be ignored	0.013
Student Engagement	205	-0.227	Can be ignored	0.001
Cooperation	205	-0.035	Can be ignored	0.617
Equality	205	-0.180	Can be ignored	0.010

CONCLUSION

Overall, this study found that the learning environment of psychosocial aspects and categories of learning styles became the main element in outstanding achievement for Additional Mathematics subjects. Implications to lesson in class showed that student’s involvement did not active while activity happened. They were not happy and situations were passive. There the role of teacher was important to create an enjoyed teaching. The findings show that there are differences between psychosocial learning environments and school types. Students at SBP are more enthusiastic about learning Additional Mathematics. In addition, the learning style also finds that emotional elements are closely related to feelings. High-motivation pupils are more likely to seek their own initiative. This shows that the perspective of teachers and students, there are good practices related to aspects of cooperation between students, teacher support, equality and student involvement. Teachers and students want a better learning environment in all aspects studied. Additional Mathematics is a complex subject. Proper and effective learning style practices can help students achieve excellent achievements in Additional Mathematics. From this study, learning styles also different between the SBP with another school. Many of them only focus for examination with the traditional style. Therefore, so important to create many styles while they were studied in school according themselves.

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