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Influence of Parental Involvement and Peer Support on Mathematics Engagement Among Malaysian Secondary School Students

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ABSTRACT

The aim of this study is to explore these two factors that contribute to shifts in student mathematics engagement among secondary boarding school students. The investigation involved a correlational study of 313 respondents were chosen using proportionate stratified sampling from 13 different secondary boarding schools in Malaysia. The findings of this study revealed students were engaged in mathematics with an overall mean of 3.76 (SD = .36) on a likert scale of 1 - 5. They were more engaged in behavior (M = 3.88, SD = .480) than affective (M = 3.80; SD= .460) or cognitive (M = 3.61, SD = .430) domains. It was also found students received good support from peers (M=4.05, SD= 0.530) and parents (M=3.47, SD= .680). Correlational analysis also showed positive relationships between parents' involvement ($r = .480$; $p < .001$), peer support ($r = .490$; $p < .001$) and students' mathematics engagement. Further analysis indicated these two factors influenced students' mathematic engagement in the classroom. This study provide evidence on the importance of peer support and parental involvement to increase students' mathematics engagement in the classroom.

Keywords: Cognitive engagement, affective engagement, behavioral engagement, parental involvement and peer support.

1. Introduction

Students' engagement is among the variable that is increasingly been studied in various researches. It is important to identify students' engagement in the academic environment because literatures have shown engagement is a predictor in students' academic performance (Akey (2006)). Student engagement is also seen as an indicator of successful classroom instructions (Kenny et al. (1995)). In other words, students who are not active participating in classroom activities will face the possibilities of failing. In general, engagement is defined as the level of involvement and intrinsic interests shown by the students in schools. Behaviorally, engagement in schoolwork means students are persistent, show effort and have the ability to observe while attitude means students are motivated, have positive values of learning, enthusiastic, passionate and take pride of their success. Akey (2006) also mentioned students with high engagement in class will involve themselves within and outside classroom activities that would help them to succeed in learning. Others like Fredericks et al. (2004) defined engagement as a construct with three dimensions (cognitive, affective and behavior). Cognitive engagement combines thoughtful mood and willingness to deploy the necessary efforts to understand complex ideas and mastering difficult skills. Affective engagement comprises positive and negative reactions towards teachers, peers, administrators and schools which determine the relationship patterns with institutions. These would influence the students when doing any tasks given. Lastly, behavior engagement consists of involvement in the academic and social activities or co-curriculum which are considered crucial in the achievement of positive academic outcomes and the hindrance of student dropouts.

Students' engagement is a significant issue in mathematics classroom. Students' engagement has been defined as how mathematics ideas are explored, explained and elaborated (Stephens (2011)). Willis (2010) stated the best way to learn mathematics is via physical, emotional and psychological engagements in the process of teaching and learning. Family involvement, especially parents, in their children's education is crucial since that they are the closest family members who can monitor their children's activities outside the classroom. As stated by Morse, Christenson and Lehr (2004) parents influence their children's commitment towards school by giving academic support and motivating them to learn. Parental involvement consists of partnerships between families, schools and communities. This involvement will raise parental awareness of the benefits of engaging themselves in their children's education and providing them skills in learning (Emerson et al. (2012)). In a study by Vukovic et al. (2013), it was shown parents influenced their children's mathematics achievement, particularly in reducing anxiety towards mathematics (Mo and Singh

(2009)) confirmed the importance of parental involvement in their children's mathematics engagement and performance in secondary schools. In their study, the involvement of parents had implications on their children's practices like providing empirical support in creating school environments that can provide the momentum for the children to get engaged in class.

Peer support is also considered as a factor that influence students' engagement in class and academic performance. A study by Steinberg et al. (1996) showed peer support encouraged students to be more involved in their academic learning in order to succeed. However, there are previous studies that concluded peer support did not influence students' engagement (Furrer and Skinner (2003)). On the other hand, studies by Vigdor and Nechyba (2004), Kindermann (2007) and Betts and Zau (2004) found the peer factor influenced academic performance. Likewise, studies by You (2011) (2011), Veiga et al. (2012), Galvao, Almeida, Carvalho, Janeiro, Nogueira, and Caldeira (2012) and Juvonen et al. (2012), Espinoza and Knifsend (2012) found there was a relationship between peer support and students' engagement in the classroom.

Hence, when studying students' mathematics achievement, it is pertinent to look into factors related to engagement. There are many influential factors but the closest factors to students are family and peers. According to previous researches, these two factors, family involvement and peer support influenced students' engagement in the classroom. Hence it is hoped that the findings of this study will add further knowledge on the influence of these two factors on students' engagement in mathematics learning taking into account the population, learning environment and culture are different from the studies done before.

2. Objectives of the Study

The objectives of the study are

1. To assess parental involvement among students secondary boarding schools
2. To assess peers support among students secondary boarding schools
3. To assess mathematics engagement among students secondary boarding schools
4. To determine the relationship between parental involvement and peers support with mathematics engagement among students secondary boarding schools

5. To determine factors influencing mathematics engagement among students secondary boarding schools

3. Methodology

This research employed a correlational design. Data were collected randomly from students in selected secondary boarding schools in all the Malaysian states. A stratified random sampling technique was used to select 313 secondary students from 13 schools. The details of the respondents are shown in Table 1.

Table 1: Distribution of respondents.

State	Frequency (f)	Percentage (%)
Melaka	9	2.9
Terengganu	26	8.3
Perak	34	10.9
Perlis	4	1.3
Johor	42	13.4
Kelantan	17	5.4
Kedah	26	8.3
Pulau Pinang	9	2.9
Federal Territory	27	8.6
Negeri Sembilan	34	10.9
Pahang	29	9.3
Selangor	47	15.0
Sarawak	9	2.9
Total	313	100

For the purpose of this study, the researchers developed an instrument consisting of three sections. These sections solicited information on the participants' demographic background, mathematics engagement, parents' involvement and peer support. Mathematics engagement was measured on three dimensions, viz. (a) affective; (b) cognitive; and (c) behaviour. A total of 56 items adapted from an instrument by Kong et al. (2003) entitled "Student engagement in the mathematics classroom" was utilised. In the first section, the questionnaire consisted of items on students' demographic background. The second section was on students engagement. The first component, i.e. affective, comprised of 22 items measuring the individual's beliefs about their reactions in the classroom during the process of teaching and learning, attitudes towards the mathematics teachers and peers and students emotion towards mathematics. The cognitive dimension consisted of 20 items referring

to students' perceptions on their mental ability, intelligence and persistence in completing the tasks given, and their experience during mathematics learning in the classroom. The behaviour dimension covered 14 items measuring the positive behaviour including the students' efforts, focus, achievement, class discussion and completing the tasks during mathematics class.

The third section was designed to collect information on parents' involvement and peer support. It consisted of five items adapted from Brown (2009) and Mombourquette (2007). This section measured students' views on their parents' involvement in schools such as the encouragement given to them and involvement in school activities such as meeting with mathematics teachers and school counselors. This third section also looked into the support received from peers during the teaching and learning processes in mathematics class. It contained six items adapted from Akey (2006) and Brown (2009) measuring on the effects or influences of peers towards learning and cooperation in completing mathematics tasks. The participants answered the questionnaire by using a five-point Likert scale indicating whether they strongly disagreed (1), disagreed (2), were undecided (3), agreed (4), or strongly agreed (5) with the statements. All the dependent and independent variables were found to be reliable instruments to measure students' mathematics engagement. The reliability was affirmed from the result of a pilot study conducted on 40 secondary boarding school students who were not involved in the actual study. The Cronbach Alpha reliability coefficient for each subscale ranged from 0.8 to 0.98 (Table 2). A total of 550 questionnaires has been distributed to 13 boarding school and 515 questionnaires were returned back. Based on the ratio and data screening process, only 313 data were used for the analysis.

Table 2: Cronbach alpha reliability index.

		Cronbach Alpha
Mathematics engagement	Cognitive	0.849
	Affective	0.833
	Behaviour	0.832
	Overall	0.843
Parents' involvement		0.705
Peer support		0.723

4. Findings

Mathematics engagement was measured on the basis of three components, viz. cognitive, affective and behavior. Table 3 presents the participants' mean scores with the standard deviations of the three sub-scales. The overall mean for mathematics engagement was 3.76 (SD = .36). The participants scored the highest on the behavior dimension (M = 3.88; SD = .480) followed by the affective dimension (M = 3.80; SD=.460) and cognitive dimension (M = 3.61, SD = .430). The results suggested the participants were more engaged in the behavior dimension as compared to the other the other two dimensions. This showed they were active during the mathematics classroom learning. The two highest means were the items related to the students' efforts to get the correct answers. They tried harder and corrected their mistakes in solving the mathematics questions. The overall students' mathematics engagement for these three dimensions indicated they were at a moderate level.

Table 3: Mean and Stadard Deviation for Dependent and Independent Variables.

		Mean	SD
Mathematics engagement	Cognitive	3.61	.43
	Affective	3.80	.46
	behaviour	3.88	.48
	Overall	3.76	.36
Parents' involvement		3.47	.68
Peers support		4.05	.53

The first independent variable, viz. parents' involvement (M=3.47, SD=.680), showed the importance of the role and involvement of parents in encouraging their children to be engaged in mathematics classroom learning. Most of the high means referred to the involvement of parents in their childrens' mathematics homework compared to activities related to meetings with mathematics teachers or school authorities. Support from peers is also an important factor since the respondents were all in the boarding schools. The overall mean showed the respondents did receive support from their peers (M=4.05, SD=0.530), and this support should hopefully be continued further in the future. The respondents mentioned they would solve the mathematics tasks with their peers, helping each other in learning mathematics and checking each others' work.

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Table 4 shows the Pearson correlation coefficients between the independent variables (parents' involvement and peer support) and the dependent variable (mathematics engagement). There were positive correlations between parents' involvement ($r = .480$; $p < .001$) and peer support ($r = .490$; $p < .001$) with students' mathematics engagement.

Table 4: Correlation Coefficients Between Parental Involvement, Peer Support and Mathematics Engagement.

		Parents' involvement	Peers support
Mathematics engagement	R Sig (2 tailed)	.48** $p < .001$.49** $p < .000$

A stepwise multiple regressions was conducted to determine whether peer support and family involvement predict students' mathematics engagement. Table 5 indicates the statistics test of significance was at the 0.05 ($F(2,310) = 54.748$, $p=0.000$). Table 6 shows the multiple correlation coefficient was .511, indicating approximately 26.1% of the variance of the mathematics engagement was accounted for by parents involvement and peer support. Based on the result presented in Table 7, the most significant contributor to students' mathematics engagement was peer support. This factor contributed 24.2% of the variance in Mathematics engagement. Family involvement was also identified as one of the significant contributors and explained 11.4% variance in students' mathematics engagement. Hence in this study, peer support was a greater determiner of mathematics engagement than parental involvement.

Table 5: ANOVA.

	Sum of Squares	df	Mean Square	F	Sig.
Regression	10.308	2	5.154	54.748	.000
Residual	29.184	310	0.094		
Total	39.492	312			

Table 6: Model Summary.

R	R Square	Adjusted R Square	F Change	df1	df2	Sig. F Change
.511	0.261	0.256	14.042	1	310	.000

Table 7: Coefficient.

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
Constant	2.375	0.136		17.50	.000
Peer_support	0.242	0.039	0.361	6.23	.000
Family	0.114	0.03	0.217	3.75	.000

5. Discussion and Conclusion

Student engagement is an important variable not only to teachers but also to the students. Students' school life is more enjoyable when they are engaged in learning in their classes. Student engagement in classroom activities also fosters greater gains in students' academic, emotional, social and behavioral achievement (Klem and Connell (2004)). Students who are engaged in classroom learning provide an energetic resource in coping with the challenges of schoolwork and also promote motivational resilience (Martin and Marsh (2009)). The findings of this study indicated students were engaged in mathematics classroom learning. Students were more engaged in behavior compared to the affective and cognitive domains. Mathematics is a subject that needs students to practice by solving mathematics questions. This will help them enhance their skills in solving mathematics problems. Besides, students need to be encouraged when solving mathematics tasks in the classroom. The correct and effective teaching strategies together with motivation will help them to be engaged in mathematics classroom learning.

Analysis showed there was a positive relationship between peer support and students mathematics engagement. Previous studies by You (2011), Veiga et al. (2012) and Juvonen et al. (2012) also shown the same results. This means that peers in school are important in helping students to be engaged in the mathematics classroom learning. This type of support will also help them to achieve better academic performance as suggested by Vigdor and Nechyba (2004) , Kindermann (2007) and Betts and Zau (2004) who found the peer factor influenced the students' academic performance. Parents' involvement also has a positive and significant relationship with mathematics engagement. Previous studies such as those by Vukovic et al. (2013) and Mo and Singh (2009) also found out positive significant relationship between parents' involvement and mathematics engagement especially during the middle and high school years. They indicated parental involvement is essential in students' engagement and performance. Besides, intervention evaluations increasingly demonstrate

students' engagement in classroom learning can be strengthened with parental involvement. This also leads to positive results in their performance.

Respondents in this study were secondary students in boarding schools, which means that they were not staying with their families. The overall mean indicated peer support had a higher mean compared to family involvement. Multiple regression analysis also indicated that both factors (peer support and family involvement) influenced their engagement in mathematics class. However the stepwise regression analysis showed that peer support had more influence compared to family involvement. This is understandable because most of the time peers helping them during school hours and also in the hostels surrounded the students. However, the findings also indicated the role of family was still important even though the students were not staying with them most of the time except during school holidays.

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