

Learning support and academic achievement among Malaysian adolescents: the mediating role of student engagement

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Abstract The aim of this study was to examine the associations between learning support, student engagement and academic achievement among adolescents. We also examined the extent to which affective, behavioural and cognitive engagement play a mediating role in students' perceived learning support from parents, teachers and peers, and contribute to their academic achievement. Malaysian adolescents (aged 12–17 years, $N = 2359$) completed a self-administered questionnaire based on an adapted version of the Student Engagement And Learning Support Scale. Item and factor analyses were performed to ensure appropriate psychometric properties of the scales. Pearson correlation analysis identified the relationship between variables and structural equation modelling was conducted to identify the role of student engagement as a mediator between learning support and academic achievement. The study provides empirical support for the hypothesis that perceptions of learning support influence adolescents' affective, behavioural and cognitive engagement in school in different ways, which in turn influences their academic achievement. Cognitive engagement seemed to be the best predictor of academic achievement and the strongest mediator for all three types of learning support. Behavioural engagement was negatively associated with academic achievement, and affective

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engagement did not have a direct relationship with academic achievement, although it contributed indirectly through cognitive and behavioural engagement. The results of this study provide a basis for policy makers to initiate prevention and intervention programs for increasing the quality of parent–child, teacher–student and peer–peer relationships which ultimately could lead to improved academic competence and outcomes.

Keywords Affective engagement · Behavioural engagement · Cognitive engagement · Parental support · Peer support · Teacher support

Introduction

The development of favourable students' attitudes towards school, in general, and learning, in particular, has been the thrust of much educational research around the world. Malaysia is no exception in this respect. In its newly launched National Education Blueprint 2013–2025 (Ministry of Education 2013), 11 strategic and operational shifts were outlined to raise educational standards and outcomes, particularly student achievement. Academic achievement is an indicator of students' adjustment to school and their future success. Guided by a range of theoretical frameworks and empirical models, researchers have identified a collection of factors contributing to achievement, which can be grouped into two dimensions: internal and external. Intrapyschological processes are internally regulated and malleable. These include students' engagement in school and academic self-efficacy (Fredericks et al. 2004; Schunk and Mullen 2012; Skinner et al. 2009), as well as their conviction about ability and effort (Swinton 2010; Yeung 2011). External factors refer to sociocultural and ecological contexts, such as family, school and culture, which are not internally regulated (Eccles et al. 2006; Karbach et al. 2013; Wentzel et al. 2012). This theoretical orientation is grounded in Bronfenbrenner's (1977) ecological-systems theory in which the child is situated at the centre of an intricate web of mutually influencing contexts, from family in the home, to school, to community and to social institutions. Empirical findings have increasingly supported the theory that human development occurs in relation to social contexts and that children's developmental outcomes are influenced by their interactions with significant people in these environments which become the foundation of their learning environment (Allen and Fraser 2007; Smith 2013).

It has been established that both students' engagement and the significant people (e.g., parents, teachers and peers) in their social contexts can influence their academic achievement (Lam et al. 2012; Li and Lerner 2013; Wentzel 2012). In the current study, we examined students' perceptions of learning support from parents, teachers and peers, and the impact of students' engagement in school as possible factors affecting academic achievement. Consistent with the literature, student engagement in this study was defined as a multidimensional construct encompassing three related components: affective, behavioural and cognitive (Appleton et al. 2008; Fredericks et al. 2004; Jimmerson et al. 2003). Though there are many studies that have examined the role of socialising agents as sources of significant influence on achievement (Danielsen et al. 2010; Shen et al. 2014; Wentzel et al. 2010), as well as the role of student engagement as a mediating factor (Chen 2005; Chen et al. 2010; Li et al. 2010; Perry et al. 2010), few studies have investigated the extent to which those three support systems simultaneously influence the three components of engagement and its impact on students' academic achievement in a single study. For

example, studies by Wentzel et al. (2010) focused on the learning support of teachers and peers with a sample size of 358 adolescents, while Chen (2005) examined the role of engagement as a composite factor among 270 adolescents. The present article explores the direct and indirect associations between students' perceived learning support (from parents, teachers and peers) and student engagement (affective, behavioural and cognitive) simultaneously, as well as the impact on achievement for a large sample size ($N = 2359$) of Malaysian adolescents.

In Malaysia, the aspiration to be a developed country is marked by rapid economic globalisation and a highly-competitive labour market that demands more knowledge and technology-intensive skills than ever before. As a developing economy, Malaysia is focused on improving achievement test scores and other academic outcomes of its school-going population (Ministry of Education 2013). The disparity of outcomes between boys and girls and between urban and rural schools is a challenge that needs to be addressed. High-quality education is key to securing upward social and economic mobility for its citizens, and also for the country's nation-building agenda. It is important to understand factors affecting student achievement among Malaysian adolescents so that implications for policy and practice are appropriate for the current context. Much of the research on the relationship between parental, teacher and peer support with student engagement and achievement has been conducted in Western contexts and in developed countries. Drawing on the potential value of this concept in understanding school success and failure in Malaysia, it is our contention that the development of a psychometrically-sound working model suited to the local population is a necessary first step. The purpose of this study was to examine whether school engagement mediates associations between students' perceptions of learning support and their academic achievement. Specifically, the objectives were twofold: to explore the relative importance of the three sources of learning support (parents, teachers and peers) to student engagement and academic achievement; and to examine the extent to which the dimensions of student engagement (affective, behavioural and cognitive) mediate the relationship of parent, teacher and peer support to academic achievement.

Student engagement

Empirical studies have shown that student engagement at school is important in predicting academic achievement and to overcome school dropouts (Appleton et al. 2008; Finn and Zimmer 2012). However, definitions of student engagement differ. Finn (1989) suggests that student engagement at school consists of two dimensions—participation and identification—while Appleton et al. (2006) suggest that engagement comprises four components, namely, academic, behavioural, cognitive and affective engagements. In general, there is agreement that student engagement is multidimensional, and most researchers agree with the construct of engagement proposed by Fredericks et al. (2004), who suggest that student engagement consists of three dimensions—behavioural, affective and cognitive. Fredericks et al. (2004) define behavioural engagement as students' participation in learning activities that reflect hard work and diligence as well as engagement in school co-curriculum activities. Students with high behavioural engagement are active in classroom activities and show interest in success. Affective engagement refers to emotional reactions such as showing interest, pride, boredom and worry in classrooms or at school. Students with interest and high motivation towards school and learning have high affective engagement. Cognitive engagement refers to students' learning strategies which involve self-regulation and meta-cognitive skills in planning, monitoring and evaluating the

content of learning. Students with high cognitive engagement display readiness to accept challenges are flexible in problem solving and evaluate the relevance of learning in school as preparation for the future.

Other researchers (Chen 2005; Li et al. 2010) have shown that student engagement at school plays the role of a mediating construct that relates learning support to academic achievement and shows variation according to support sources. For example, Chen (2005) found that parental, teacher and peer academic support among teenagers in Hong Kong directly and indirectly influences their achievement at school. Teacher support makes the greatest contribution towards direct and indirect achievement through students' engagement at school. Chen analysed the role of the engagement mediator as an overall construct, while in research by Li et al. (2010), the role of student engagement as a mediator is analysed according to two engagement dimensions: behavioural and emotional engagement. In the current research, we examined the extent to which each engagement dimension is responsive to context variation or variables under study.

Learning support

Student engagement does not reflect students' individual characters; it refers to a condition that is influenced by family, school and peers in achieving consistent learning expectations and support (Reschly and Christenson 2006; Roeser et al. 2000). Research has revealed that interpersonal relationships, family and peer group dynamics, as well as interactions in the teaching and learning process, have a direct influence on how and why students work to achieve academic performance. A socio-ecological approach to explain the relationship between family, peer and school support with students' engagement and their achievements is based on the work of theorists such as Bronfenbrenner (1989) and Eccles (2007). According to Bronfenbrenner, human evolution occurs in an arrangement of systems. The micro-system is a physical and social environment in daily life at home, school and the neighbourhood. The direct relationships in the micro-system have a significant effect on children and teenagers' development. A socio-ecological approach theorises that, in order to achieve, students' needs and expected learning must be aligned, and the expectations of both students and school must be clearly stated. This research examined students' perceptions relating to parental, school and peer support towards learning, with the assumption that students' perceptions of parental, school and peer supports influence their engagement and achievement at school.

Empirical studies of parental involvement and parenting styles have proven the role of parents as contributors to school engagement and children's performance at school (Bempechat and Shernoff 2012; Waanders et al. 2007). Parents or family members who provide academic support to students (e.g., assisting with homework) and give motivational support (e.g., discussing school and monitoring the children's activities) contribute towards students' performance at school. Studies by Eccles et al. (1993), Furrer and Skinner (2003), and Roorda et al. (2011) have shown that positive teacher–student interaction contributes towards school performance and motivation. Student participation in the classroom and school can be enhanced if teachers pay attention to, and are concerned about, their students' emotions (Croninger and Lee 2001; Pianta et al. 2012). The teacher's role in identifying the objectives of the co-curriculum and providing opportunities for students to personally relate learning at school to their daily life and interests are important in the teaching and learning process (Assor 2012; Hipkins 2012).

Positive peer relationships are also an important component of the socialisation and education process, apart from a students' relationships with their parents and teachers.

Studies by Wentzel (1999, 2005, 2009) show that maintaining positive relationships with peers has a favourable impact on student motivation and engagement at school. The extent to which students feel accepted by their peers, and whether these relationships are based on friendship or emotion, can also influence and motivate students to become more actively engaged in academic and school activities (Juvonen et al. 2012).

In this study, student engagement at school was defined as a three-dimensional construct consisting of various behavioural, affective and cognitive engagement processes. We analysed student engagement as a mediator using two models. First, we analysed learning support and student engagement as a composite model. Then, a second model was employed in which associations of the sub-constructs of learning support and student engagement were analysed using SEM to reveal the direct and indirect relationships between parent, teacher and peer support and the three dimensions of student engagement with students' achievement simultaneously. We present the hypothesized path model in Fig. 1.

By fitting the hypothesised structural models to the data and estimating their parameters, we addressed the following specific research questions:

1. As a composite, does school engagement mediate the association between perceived learning support and academic achievement?
2. Do students' affective, behavioural and cognitive engagements mediate the association between their perceived parental, peer and teacher support and academic achievement?

Specifically, this study hypothesised that (a) student engagement mediates the relationship between learning support and academic achievement, (b) the higher the level of learning

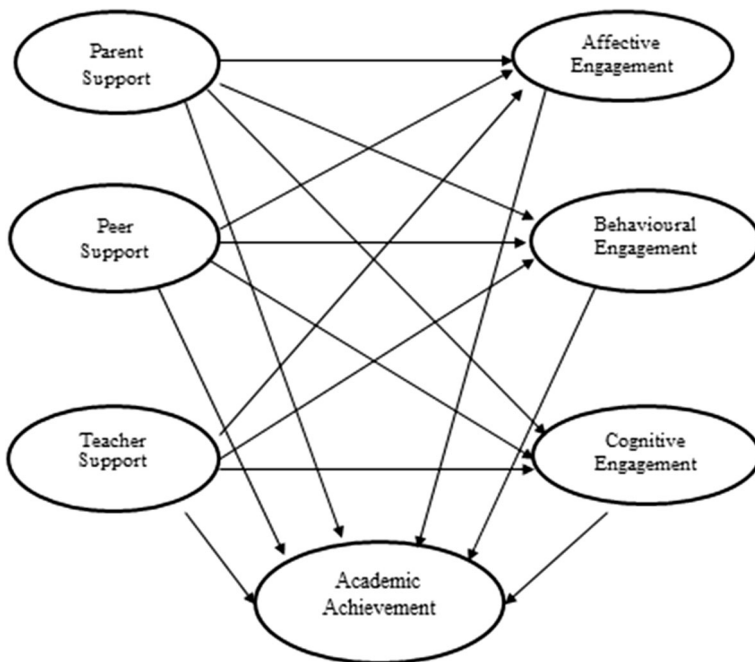


Fig. 1 Hypothesised path model with student engagement mediating perceptions of learning support and academic achievement

support perceived by students, the higher is the level of student engagement, and (c) higher levels of student engagement lead to higher academic achievement.

Method

Research design

We employed a cross-sectional survey design using a self-administered questionnaire to determine the relationship between perceived learning support, school engagement and academic achievement among male and female adolescents from urban and rural schools in Malaysia.

Sampling and participants

A stratified random sampling procedure was employed to identify participants for the study. Schools were identified by location, based on Education Statistics from the Ministry of Education. Only co-educational and non-residential schools were selected. Students in special-education classes were not included in the study.

Data were collected from a sample of 2359 adolescents between 12 and 17 years of age. The group included students from 31 schools in both urban and rural areas in Peninsular and East Malaysia. Of the total sample, 1170 (49.6 %) were boys and 1189 (50.4 %) were girls. Students from all ethnic backgrounds were included, with a majority of Malays ($n = 1740$), as well as Chinese ($n = 266$), Indian ($n = 237$) and other ethnic minorities ($n = 116$). There were 1114 (47.2 %) students from urban schools and 1245 (52.8 %) from schools in rural areas.

Procedure

We conformed with regulations for carrying out research set by the Ministry of Education, Malaysia. Consent to undertake data collection in the schools, and the identification of students meeting the study criteria, were accomplished through a proposal presented to the relevant department of the Ministry of Education. Further discussions took place with the State Education Department and the various school heads following the random stratified sampling procedure to identify schools and students. The data-collection process took place in designated classrooms by appointed research assistants, with the class teacher in attendance. The self-administered questionnaire took approximately 30 min to complete. The students were given a pen and a pin as a token of appreciation for their efforts.

Measures

Academic achievement

Details of students' academic achievement in Year 6 (aged 12–13 years), Form 2 (aged 14–15 years) and Form 4 (aged 16–17 years) were collected from each school. Academic grade point averages (GPAs) were calculated based on the subjects taken and obtained from school records. Students' GPAs were converted to a three point scale: low = 1, medium = 2 and high = 3.

Student Engagement and Learning Support Scale

We adapted a questionnaire developed by Lam et al. (2009) that measures two main constructs, school engagement and learning support. The questionnaire comprised 33 items that measure students' engagement and 14 items that measure learning support using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The medium of instruction in schools is the Malay language. Thus, the questionnaire was translated through these processes: (1) translation from English to Malay language, and back translation into English (Brislin 1970); and (2) confirmation by a three-person panel of experts of the suitability of the translation and interpretation of items (Sperber 2004).

To test the reliability of the translated version, a test and re-test was carried out with 20 students who were fluent in Malay and English. Students were divided into two groups: Group 1 (10 students) responded to the questionnaire in the Malay language; and group 2 (10 other students) responded to the English version. After a week, the two groups of students were tested again. Group 1 used the English version and group 2 used the Malay version. Reliability for the translation of the questionnaire was high: the split-half correlation between Malay and English versions was 0.73, while the Cronbach alpha coefficient for the constructs of school engagement and learning support in the Malay version was 0.85 and 0.74, respectively.

Our school engagement index measures affective, behavioural and cognitive dimensions. These scales have been found to be both reliable and valid (Lam et al. 2012). Out of a total of 33 items in the original questionnaire, 12 items were removed owing to low factor loadings of less than 0.40, which means that these items were not measuring the construct of student engagement (Bankstahl and Görtelmeyer 2013). Table 1 gives an overview of all the items used in this study. Item and factor analyses were performed using structural equation model (SEM) analysis to ensure appropriate psychometric properties of the scales and items. The distribution of items for each dimension of student engagement was as follows:

1. The *affective engagement subscale* describes students' sense of pride and enthusiasm about school and interest in class. A sample item is "I think learning is boring". Items like this were reverse coded so that higher scores indicate positive engagement. There are six items that measure affective engagement.
2. The *behavioural engagement subscale* describes students' efforts and persistence in class and school activities. Sample items include "When I am in class, I participate in class activities" and "I am an active participant of school activities such as sports day and parent day". Eight items measure behavioural engagement in this subscale.
3. The *cognitive engagement subscale* contains seven items that measure use of cognitive strategies to make learning meaningful. Sample items include "When I study, I try to understand the material better by relating it to things I already know" and "I try to understand how the things I learn in school fit together with each other".

Confirmatory factor analysis (CFA) was conducted to assess the degree to which the three-dimensional structure of student engagement fits the data. We examined the goodness-of-fit of the three-dimensional structure of student engagement, with the 21 items loaded on three latent student engagement constructs: affective, behavioural and cognitive engagement. Computation of the three-dimensional structure indicated best fit to the data overall ($\chi^2 = 1329.967$ with $df = 186$ ($p < 0.001$); GFI = 0.94; CFI = 0.93; RMSEA = 0.05). The three-dimensional structure representing affective, behavioural and cognitive engagement explains the covariance among the 21 items. Factor loadings were assessed for statistical

Table 1 Factor loading for all latent variables

Latent construct	Factor loading	
	Unstandardized	Standardized
<i>Student engagement</i>		
Affective engagement		
1. I think what we are learning in school is interesting	0.46	0.64
2. I enjoy learning new things in class	0.52	0.57
3. I think learning is boring	0.93	0.50
4. I am proud to be at this school	0.60	0.62
5. Most mornings, I look forward to going to school	0.56	0.64
6. In class, I work as hard as I can	0.40	0.69
Cognitive engagement		
1. When I study, I try to understand the material better by relating it to things I already know	0.45	0.66
2. When I study, I figure out how the information might be useful in the real world	0.50	0.62
3. When I study, I try to connect what I am learning with my own experiences	0.63	0.54
4. When learning things for school, I try to see how they fit together with other things I already know	0.69	0.53
5. I try to see the similarities and differences between things I am learning for school and thing I know already	0.54	0.60
6. I try to understand how the things I learn in school fit together with each other	0.50	0.62
7. I try to match what I already know with things I am trying to learn for school	0.56	0.62
Behavioural engagement		
1. I try hard to do well in school	0.42	0.65
2. When I'm in class, I practice in class activities	0.63	0.58
3. I pay attention in class	0.49	0.64
4. If I have trouble understanding a problem, I go over it again until I understand it	0.61	0.63
5. When I run into a difficult homework problem, I keep working at it until I think I've solved it	0.65	0.66
6. I volunteer to help with school activities such as sport day and parent day	0.93	0.51
7. I make up my own examples to help me understand the important concepts I learn from school	0.68	0.56
8. When studying, I try to combine different pieces of information from course material in new ways	0.74	0.57
<i>Learning support</i>		
Parent support		
1. My parents ask me about school	0.54	0.63
2. My parents discuss school work with me at home	0.56	0.71
3. My parents monitor (check) my academic progress	0.53	0.67
4. My parents praise me for my progress and improvement in school	0.60	0.61
5. My parents help me when I have trouble with homework	0.58	0.70

Table 1 continued

Latent construct	Factor loading	
	Unstandardized	Standardized
6. My parents try their best to provide me with the resources for studying and learning (e.g., books, quiet study place, computer)	0.70	0.52
Peer support		
1. At my school, I have a friend who really cares about me	0.47	0.73
2. At my school, I have a friend who talks with me about my problems	0.58	0.67
3. At my school, I have a friend who helps me when I'm having a hard time	0.44	0.73
Teacher support		
1. At my school, there is a teacher who cares about me	0.61	0.69
2. At my school, there is a teacher who listens to me when I have something to say	0.65	0.66

significance at the $p < 0.05$ level. The standardised factor loadings for the 21 items were significant and their standardised coefficients ranged from 0.50 to 0.69.

There were three subscales that comprise learning support: parent, peer and teacher support. Parent support was measured by six items that describe parent involvement in their child's learning, such as discussing school work with them at home or helping them in their school homework. Students indicated the frequency of their parent support as stated in these items on a five-point Likert scale with 1 as *never* and 5 as *always*. Peer support was measured by three items, namely, "At my school, I have a friend who really cares about me", "At my school, I have a friend who talks with me about my problems" and "At my school, I have a friend who helps me when I'm having a hard time." Students were asked to respond to these statements using a five-point Likert scale with 1 as *strongly disagree* and 5 as *strongly agree*. Teacher support was measured by two items, namely, "At my school, there is a teacher who cares about me" and "At my school, there is a teacher who listens to me when I have something to say." Students were asked to indicate whether they agree or disagree with these statements on a five-point Likert scale with 1 as *strongly disagree* and 5 as *strongly agree*.

We examined the goodness-of-fit of the three-factor structure of the proposed model of learning support comprising parent, teacher and peer support using CFA. The indices indicated that the three-factor model had the best fit with the overall data ($\chi^2 = 299.029$, $df = 41$, $p < 0.001$; CFI = 0.96; TLI = 0.94; RMSEA = 0.05). The three-factor model representing teacher support, peer support and parent support explained the covariance among the 11 items. The standardised factor loadings for the 11 items were significant and their standardised coefficients ranged from 0.52 to 0.73.

Controlled variables

We controlled for students' gender, school year and location of schools because previous studies have suggested that demographic characteristics can influence their perception of learning support, school engagement and achievement (Lewis et al. 2011; Wang and Holcombe 2010).

Gender	We indicated whether the student was male (1) or female (2)
Location	We represented schools as located in urban (1) or rural (2) settings
School year	We represented the sample in this study as students aged 12–13 years in Year 6 (1), aged 14–15 years in Form Two (2) and aged 16–17 years in Form Four (3)

Data analyses

We used AMOS 18.0 (Byrne 2010) for all analyses. Structural equation modelling (SEM) was used to fit the hypothesised path models to data and to answer the research questions. To test the hypothesis that school engagement mediates the relationships between learning support and academic achievement, we followed Baron and Kenny's (1986) requirement for mediation effects. The first requirement is that there is a significant relation between the predictor and the outcome. The second is that a significant relation exists between the predictor and the hypothesised mediators. The third condition requires that the mediator variables must be significantly associated with the outcome. The fourth requirement is that the impact of the predictors on the outcome variables is less after controlling the effect of the mediators. To understand how learning support (as the predictor variable) influences student engagement (as mediators) in schools and how student engagement affects achievement, we need to understand how students view the support that they receive from pertinent people in their environment. This study was conducted to examine the relationship and contribution of each construct as well as the relationship of each sub-construct with student achievement.

To address the research questions, we began by testing hypotheses about the direct effects of learning support, school engagement (both constructs as a composite) and academic achievement. Then we tested the direct effects among the three sub-constructs of learning support, three sub-constructs of student engagement, and academic achievement. We tested a set of paths for possible mediation— affective, behavioural and cognitive engagement as mediators of the associations between students' perceptions of learning support from parents, teachers and peers and their academic achievement. Beyond the guidelines of Baron and Kenny, other researchers (Dearing and Hamilton 2006; MacKinnon et al. 2002) estimated indirect effects using delta method standard errors based on Sobel's (1982) asymptotic z test, which is appropriate for the large sample size.

In this study, we dealt with missing data through full-information maximum likelihood estimation, allowing us to include all available data. Decisions concerning model fit of these data were based on four fit indices: the Chi square fit index, Bentler comparative fit index (CFI), Tucker-Lewis fit index (TLI) and root mean square error estimate (RMSEA). Following Kline (2005), model fit is excellent when the coefficient for CFI and TLI is greater than 0.95; and model fit for both is deemed adequate if the coefficient is >0.90 (Byrne 2010). For the RMSEA, a coefficient <0.05 indicates an excellent fit, and a coefficient under 0.08 indicates an acceptable fit.

Results

Teacher, peer and parent support were positively associated with all three dimensions of school engagement and achievement. All variables appeared to have a low to moderate correlation (0.09–0.69), allowing us to eliminate the problems of multicollinearity (Kline

2005). We found an expected pattern of bivariate correlations. Reliability of student engagement, learning support and achievement variables was measured by internal consistency. The coefficient of internal consistency for all variables (0.68–1.00) was considered acceptable to excellent (George and Mallery 2003). Table 2 presents means and standard deviations between latent constructs in the model.

Mediation effect of student engagement as a composite

All the requirements for mediation analysis as proposed by Baron and Kenny (1986) were met. First, the predictor variable (learning support) significantly predicts the outcome variable (academic achievement). Second, the predictor variable (learning support) significantly predicts the mediator variable (student engagement). Third, the mediator variable significantly predicts the outcome variable (academic achievement) when analyses are adjusted for the predictor variable. The total effect of learning support on academic achievement was significant ($\beta = 0.09, p < 0.01$). As shown in Fig. 2, learning support significantly predicted student engagement ($\beta = 0.65, p < 0.001$). Student engagement significantly predicted academic achievement after controlling for learning support ($\beta = 0.10, p < 0.01$). The overall model fit was good ($\chi^2 = 446.409$ with $df = 33, p < 0.001$); CFI = 1.00; TLI = 1.00; RMSEA = 0.04). To examine the mediation effect, a Sobel test (Preacher and Hayes 2004) was conducted and revealed that the mediation effect was significant, $z = 7.26 (p < 0.001)$. Taken as a whole, the results revealed that student engagement, as a composite, mediated the association between learning support and academic performance. However, the mediation effect of student engagement was not complete because the direct effect of learning support on achievement was significant ($E_d = 0.09, p < 0.001$). The indirect effect of learning support on achievement through student engagement was small but statistically significant ($E_i = 0.07, p < 0.001$).

Relations between perceived learning support, student engagement, and academic achievement

Figure 3 presents the standardised path coefficient for the final model. The overall model fit was acceptable ($\chi^2 = 404.540$ with $df = 21 (p < 0.001)$); CFI = 0.94; TLI = 0.92;

Table 2 Means, standard deviations, internal consistency and intercorrelations among all latent variables

Variable	Mean	Standard deviation	Internal consistency	Correlations							
				1	2	3	4	5	6	7	
1 Affective	3.95	0.66	0.78	1							
2 Behaviour	3.69	0.63	0.80	0.53	1						
3 Cognitive	3.70	0.66	0.82	0.69	0.66	1					
4 Teacher support	3.97	0.71	0.81	0.50	0.45	0.52	1				
5 Peer support	4.07	0.82	0.75	0.24	0.28	0.28	0.33	1			
6 Parent support	3.61	0.92	0.68	0.51	0.40	0.49	0.44	0.35	1		
7 Achievement	2.24	0.75	1.00	0.11	0.22	0.09	0.12	0.12	0.09	1	

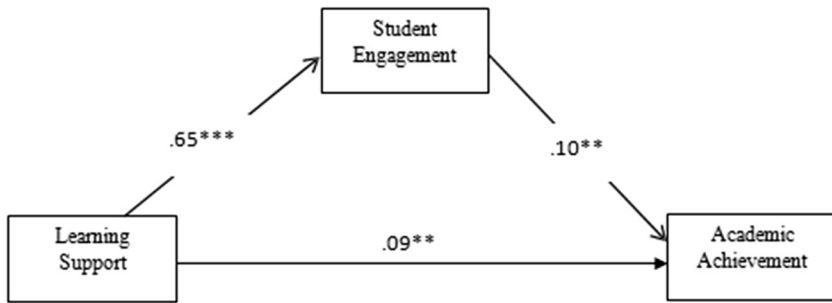


Fig. 2 Student engagement as mediator between learning support and academic achievement (** $p < 0.01$, *** $p < 0.001$)

RMSEA = 0.04). The model accounted for a large portion of the variance in the outcomes ($R^2 = 0.35, 0.35$ and 0.26) for affective, behavioural, and cognitive engagement, respectively. However, the variance for achievement was small ($R^2 = 0.07$). For the sake of clarity, we first describe the direct paths within the model. In this analysis, we examined whether each learning support predicted each component of student engagement, and whether the three components of student engagement, in turn, predicted student achievement. After describing direct relationships, we then present results of the mediation analysis.

Testing the direct paths between perceptions of learning support and academic achievement

Among the three types of support, only perceived peer support was positively associated with academic achievement ($\beta = 0.06, p < 0.01$). Contrary to our hypotheses, perceived parent and teacher support were not associated with academic achievement.

Testing direct paths between perceptions of learning support and student engagement

As seen in Fig. 3, students' perceptions of their parents' support were positively associated with affective engagement ($\beta = 0.34, p < 0.001$), cognitive engagement ($\beta = 0.32, p < 0.001$) and behavioural engagement ($\beta = 0.37, p < 0.001$). Additionally, students with higher perceptions of teacher support tended to have higher school engagement affectively, cognitively and behaviourally ($\beta = 0.36, 0.23$ and 0.30). Finally, perceived peer support was positively associated with cognitive engagement ($\beta = 0.10, p < 0.001$) and, contrary to our hypothesis, perceived peer support was not associated with affective and behavioural engagement.

Testing direct paths between learning support and student engagement with academic achievement

Perceived peer support and cognitive engagement were positively associated with academic achievement ($\beta = 0.06$ and 0.25 , respectively). Parent and teacher support were positively associated with behavioural engagement, while behavioural engagement was

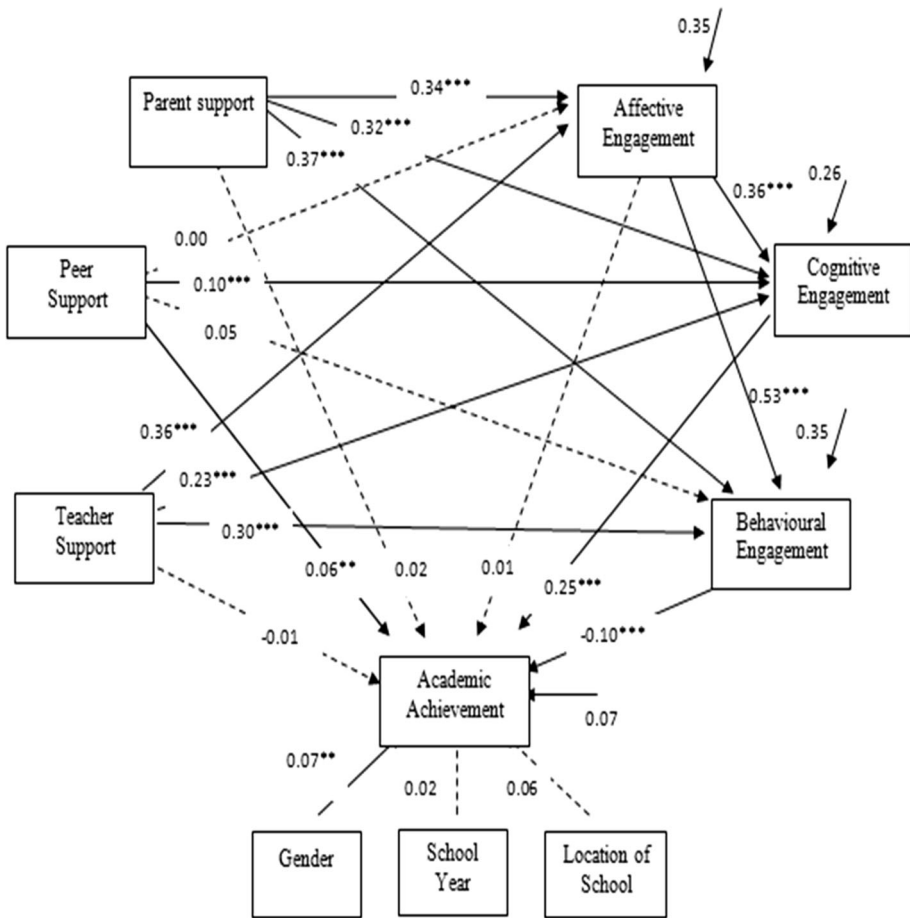


Fig. 3 Standardised coefficients for model of school engagement mediating the relations between perceptions of learning support and academic performance ($N = 2359$). (Note: Solid lines indicate significant paths and dashed lines indicate non-significant paths ** $p < 0.01$, *** $p < 0.001$)

negatively associated with academic achievement ($\beta = -0.10, p < 0.001$). Parent and teacher support were positively associated with affective engagement, but the association between affective engagement and academic achievement was not significant. Given that the path from affective engagement to academic achievement was not significant, we adjusted the model with theoretically-based modifications. As reported by Finn and Zimmer (2012) and supported by Voekl (2012), research on affective engagement has typically revealed weak or indirect relationships with academic achievement. As such, we hypothesise that affective engagement does not have a direct effect on academic achievement, but only an indirect effect, via cognitive and behavioural engagement. We tested this hypothesis by creating a path from affective engagement to cognitive and behavioural engagement. Affective engagement was found to contribute indirectly to academic achievement through cognitive engagement ($\beta = 0.36, p < 0.001$) and behavioural engagement ($\beta = 0.53, p < 0.001$).

Testing mediated relations

Table 3 presents the results of mediation tests based on the Sobel test, indicating that behavioural and cognitive engagement mediated the associations of perceived parent, teacher and peer support with academic achievement. The effect of learning support from these pertinent persons on academic achievement was explained by the degree to which students were supported to try their best in school and to be actively involved in school activities.

Students who perceived high levels of support from their parents, teachers and friends reported being self-regulating and strategic about learning and tended to have higher academic achievement.

Discussion

The questions addressed in the present study contribute to research efforts aimed at furthering the understanding of student engagement in school and its mediating role in the association of perceived parent, teacher and peer support with adolescent academic achievement. Generally, the findings support the theoretical conceptualisation of three different but related dimensions of student engagement: affective, behavioural and cognitive. Results indicate that students' perceptions of learning support from their parents, teachers and peers contribute differentially to the three dimensions of student engagement. Each dimension of student engagement also affects academic achievement differently. Finally, we found that student perceptions of learning support directly and indirectly influence academic achievement through their impact on the three dimensions of student engagement. As such, the findings in this study contribute to the literature in four main ways.

First, having confirmed the mediating role of student engagement as a single measure, we further analysed the mediation effects of the three dimensions of student engagement. This allowed us to extricate the unique contribution of each dimension of engagement. By including the three dimensions of engagement, we were provided with an opportunity to assess the 'sensitivity' of different dimensions of engagement to individual variation in learning support that exists in the lives of adolescents. For example, although a positive association has been well documented between behavioural and cognitive engagement with academic achievement (Wolters and Taylor 2012), the specific contribution of affective engagement is not well known and has not been demonstrated empirically (Janosz 2012). While the findings of the present study supported the mediating role of behavioural

Table 3 Sobel test of mediation

	Mediated pathway			<i>z</i>	<i>p</i>	
Peer support	→	Cognitive	→	Achievement	8.61	0.00
Peer support	→	Behavioural	→	Achievement	4.68	0.00
Parent support	→	Cognitive	→	Achievement	2.38	0.02
Parent support	→	Behavioural	→	Achievement	4.89	0.00
Teacher support	→	Cognitive	→	Achievement	9.63	0.00
Teacher support	→	Behavioural	→	Achievement	2.36	0.02

Significant $p < 0.05$

and cognitive engagement, the mediating role of affective engagement is inconclusive and therefore requires further investigation.

Second, although the results indicated that cognitive engagement positively predicted academic achievement, and behavioural engagement negatively predicted academic achievement, the direct path from affective engagement to academic achievement was not significant. Consistent with prior studies (Chen 2005; Lam et al. 2012), cognitive engagement seemed to be the best predictor of academic achievement and the strongest mediator for all three types of learning support. However, among the three types of support, perceived parent support seemed the strongest contributor to cognitive engagement but did not directly contribute to academic achievement. The nonsignificant effects of parent involvement in academic achievement are consistent with previous studies (Mattingly et al. 2002; McNeal 1999). In comparison, the pattern of parental support found in this study makes sense with respect to Malaysian culture in which parents are viewed as responsible for their children's education. Parents are likely to intervene by offering help and to manage after-school tuition classes to make sure that their children perform in school. Teacher support seemed to play a crucial role, too, and this is not surprising considering that teachers are the ones who set and evaluate learning objectives, as well as determine what and how they teach the curriculum material.

The prominent role of cognitive engagement as the only direct and positive contributor to academic achievement in this study is expected and could be found to be unique to the Malaysian context. The system of education in Malaysia is examination oriented and academic competitiveness is prevalent. Students must sit for three major national examinations throughout their school life: at the completion of Primary 6 (equivalent to Grade 6 in the United States), at the completion of Form 5 (equivalent to Grade 9) and in Form Five (Grade 12). Students compete to be placed in 'elite' schools or in residential schools, or streamed into good classes with better learning facilities and more effective teachers. Streaming or placement by achievement is common practice and, therefore, to be engaged cognitively is highly valued. Since 2010, student assessment has been redesigned to reduce the effectiveness of drilling and teaching towards the test, but the practice is embedded in the school culture and is still prevalent. In comparison, similar studies by Wang and Holcombe (2010) and Li et al. (2010) with American adolescents revealed that affective and behavioural engagement are not only equal but strong and positive contributors and mediators of achievement. The nature of the education system, as well as the school culture, differs markedly in Malaysia and the United States, and therefore each system or school culture impact students differently. Cross-cultural studies or studies involving samples from different educational systems and school cultures might shed light on the question of whether and how aspects of the school culture impact on which dimensions of student engagement. These comparisons could contribute towards a better understanding of how the wider support systems impact on school engagement and student achievement across cultures.

Third, parent and teacher support were strong contributors to behavioural engagement, but behavioural engagement negatively predicted academic achievement. The negative relationship between behavioural engagement and academic achievement suggests that the higher the behavioural engagement the more poorly students achieve. One possible explanation is based on what McNeal (1999, 2012) termed the *reactive hypothesis*. In this study, it is possible that adolescents perceived parents and teachers as exerting strict control in monitoring their studies. McNeal (1999) contends that social control and monitoring are considered a reactive strategy. The theory could explain the nonsignificant direct relationship between perceived parent and teacher support and academic

achievement. Additionally, perceived higher levels of parental and teacher support (although well intended) might not be welcomed because they conflict with the developmental needs of adolescents to seek autonomy and detachment from adults. The perceived higher levels of parent and teacher support mediated by behavioural engagement can be seen as interfering with their needs to be independent, to the extent of even evoking adverse reactions (Cripps and Zyromski 2009; McNeal 2012). Thus, Malaysian parents need to have adequate knowledge of the developmental needs of their adolescents in order to better gauge when to step back and when to provide the kinds of support that are beneficial to improving adolescents' level of engagement and achievement (Mahatmya et al. 2012). The episodes in the students' daily lives at home and school are shaped by their engagement and disaffection. The development of motivational dynamics that shaped these daily experiences hold promise for helping to explain the stability of students' motivation across the school year and for identifying underlying processes that contribute to trajectories of motivation across several years (Skinner and Pitzer 2012). Further investigation of how, and if, parent and teacher support predicts subsequent behavioural engagement could help to explain the relationships of these constructs. Adolescents in other cultures also might experience similar developmental and educational challenges inferred from the findings of this study.

Fourth, it is not surprising that peers play a critical role in influencing students' levels of cognitive engagement and achievement outcomes, considering their frequent interactions during the course of each school day. Such factors perhaps have contributed to adolescents' perceiving peer support as the strongest predictor to cognitive engagement and academic achievement. This finding is consistent with previous studies (Wentzel 2005; Wentzel et al. 2012). The perception that there are friends to whom they can turn and with whom they can share their experiences is essential for developing positive peer relationships, which are associated positively and consistently with a range of academically-related outcomes. This finding provides further evidence that adolescents develop both confidence and competence when they receive peer acknowledgement for their academic accomplishments (Guthrie and Wigfield 2000). It is noteworthy, however, that the impact of parent and teacher support on affective and cognitive engagement was much greater than peer support. This finding concurs with the findings of Wang and Eccles (2012) who suggest that the shift in adolescent social priorities towards peer relationships might not always be the case. Perceived support from both teachers and parents seems to be an important buffer for promoting a positive sense of self and emotional well-being.

Policy makers in Malaysia have an imperative to improve the quality of education for students. In this study, the support of parents, teachers and peers was perceived as equally important and predictive of students' own perceived levels of engagement and achievement outcomes. Policy makers need to understand that student engagement in school must include attention to the multiple learning supports with which adolescents interact, and that no single variable fully or adequately explains the engagement outcomes. By extension, no single intervention is able to promote adolescents' school engagement. Thus, interventions designed to target specific engagement outcomes need to account for different aspects of adolescents' sources of learning support. Considering this finding, policy makers should continue capitalising resources to help stakeholders to better support their students' education, (e.g., helping teachers and parents to establish positive relationships with the adolescents in their care to create a climate favourable to both teaching and learning). The adolescents' self-perceptions are also a valuable perspective to consider when designing prevention and intervention programs. The programs, if implemented appropriately, might help in increasing the quality of teacher–student relationships and parental involvement,

which in turn could benefit student achievement. There are sufficient numbers of participants in this study to further analyse the differences or similarities of perceived support and achievement outcomes based on gender, school year and school location to provide information for planning targeted prevention or intervention programs.

The present study has several limitations. The students' self-perceptions of the support from their parents, teachers and friends were studied at a specific point in time in a cross-sectional fashion, and as such, the findings are limited to the demographic profile of the this study's students who predominantly are Malays from urban and rural areas in Malaysia. We would predict that the relations between provisions of learning support and student outcomes would be fairly universal (Wentzel et al. 2010), but future studies in Malaysia should include more ethnically-diverse students as reflected in the Malaysian population structure which is multi-ethnic and multi-lingual. Future studies should also include students from a range of different socio-economic backgrounds. Second, given that adolescents' self-perceptions of the quality of learning support from parents, teachers and peers can change over time, future use of different research designs (longitudinal, experimental and case studies) could provide a more robust, valid method of identifying differential effects of learning support on student engagement and academic achievement. The non-experimental nature of this study limits our ability to make causal inferences and to address reciprocal effects of learning support and adolescent school engagement. Finally, future use of multiple sources of information (teachers, parents, peers and informants) and use of multiple methodologies (interviews, observations, surveys) is likely to add credibility and enrich interpretations of current findings. These additional data could explicate the processes by which self-perceived support from the three sources is related to the dimensions of engagement and academic achievement.

In conclusion, the purpose of the present study was to address a gap in the literature by identifying the mediating role of Malaysian adolescents' engagement in relation to learning support and academic achievement. We simultaneously examined the associations of all perceived learning supports (from parents, teacher and peers) in relation to each of the three dimensions of engagement and their academic achievement. Based on the large sample of Malaysian adolescents in this study, our findings support a conclusion that a multidimensional model of learning support provided by relevant individuals in the lives of these adolescents, and its associations with the three dimensions of student engagement, provide a more comprehensive picture of the complex relationship between different sources of support and different dimensions of engagement than a one-dimensional model. The study provides empirical support for the hypothesis that perceptions of learning support influence adolescents' affective, behavioural and cognitive engagement in school, which, in turn, influences their academic achievement.

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