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Modeling the Relation Between Self-Esteem, Loneliness and Engagement as Factors of Children Achievement In Science

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Abstract

Students' mental health plays an important role in child's daily life. Many studies declared that self-esteem, loneliness and engagement could be a crucial factors that affect students' learning and performance in school. This study is examining the relationship of these three factors with child's achievement in science. The study involved 260 (grade 4 to grade 6) Arab children studying at Arab schools in Kuala Lumpur-Malaysia. Data were collected via three questionnaires (for self-esteem, loneliness and the third one for student engagement), and student science achievement determined by students' GPA scores from their schools. All the questionnaires are valid and reliable according to the Cronbach's Alpha value. The correlational data analysis yielded a negative correlation between self-esteem and loneliness while there is a positive correlation between self-esteem and engagement and between self-esteem and achievement in science. Furthermore, the results showed that both students' self-esteem and engagement is significantly predicted students' achievement in science. Furthermore, results reveal that all the goodness-of-fit indexes fulfilled the requirement of the acceptable model fit with significant paths and correlation. The Model has provided a

reasonable explanation of the structural model of students' self-esteem, loneliness, engagement and achievement in science.

Keywords: Self-esteem, loneliness, engagement, childhood, academic performance, achievement in science.

Introduction

Many non-cognitive factors (such as, mental health, cultural background, previous academic performances, study skills, and many more) may have an influence on a student's achievement and performance in school and life as well. Many researchers asserted the importance of examining the non-cognitive factors related to academic performance (Coetzee, 2011). Not only that, previous research has tied the quality of children's social relationships to their academic achievement (Tassin, 1999), the quality of peer relations has been associated both with students' academic orientations and with their school performance (Flook, Repetti, & Ullman, 2005). Lu & Zhou (2013) find poorer achievement and greater loneliness among migrant children who are isolated in migrant schools.

Theoretical Background

Researchers have suggested that achievement in science in secondary school is a function of many interrelated variables. However, there are school-related variables such as students' academic engagement that can be influenced and are amenable to change by educational interventions. Thus, understanding the role of such factors as motivation, interest, attitudes, and academic engagement on achievement has attracted serious attention in recent years (Singh, Granville, & Dika, 2002). Similarly, results of many researches support the necessity for studying, learning environments and their relation to socioemotional factors such as self-esteem (Booth & Gerard, 2011).

Good theoretical reasons exist for positing a causal link between self-esteem and school success. Healthy self-esteem has been associated with internal locus of control, perceptions of competence, persistence in the face of challenges, coping skills, social support, and a variety of other qualities that are likely to better equip students to succeed in school (Whitesell, Mitchell, Spicer, & Team, 2009).

Early theorists defined and used self-concept in general terms as global perceptions of self-worth, or self-esteem (Pajares & Schunk, 2002). Although the terms self-concept and self-esteem are often used interchangeably, they represent different but related constructs. This self-concept is seen in more general terms (Campbell, 1967), it refers to a student's perceptions of competence or adequacy in academic and nonacademic (e.g., Social, behavioral, and athletic) domains and is best represented by a profile of self-perceptions across domains. Self-esteem is a student's overall

evaluation of him- or herself, including feelings of general happiness and satisfaction (Manning, 2007)

Theories of self-esteem have been based on one of two fundamentally different assumptions about the essential nature of self-esteem. Traditionally, intrapersonal theorists have conceptualized self-esteem as a person's private self-evaluation. Humanistic approaches that dominated thinking about self-esteem in the middle of the 20th century likewise viewed self-esteem as a personal evaluation of one's goodness or worth (MacDonald, Saltzman, & Leary, 2003).

Issues of self-esteem are likely to arise in middle and late childhood, children become more aware about managing and controlling their emotions to meet social standards. A greater sense of social awareness arises because of the wide increase of significant others, as well as some internalisation of the perceived values and norms of society could lead to those issues. At his stage, statements of self-image will include emotionality, interpersonal references, as well as trait labels (Alpay, 2000) and is so necessary as to be the prime motivator of all behavior (Campbell, 1967).

Promoting high self-esteem is important because it relates to academic and life success (Al Khatib, 2012; Manning, 2007). Research indicates that persons who maintain positive self-concepts with higher self-esteem tend to report more positive affective states, greater wellness, more life satisfaction and fewer depressive symptoms which in turn affect their performance in school (Yaacob, Juhari, Talib, & Uba, 2009) (Campbell, 1967). More recent longitudinal investigations of the link between self-esteem and academic achievement have found as much indication that achievement enhances self-esteem as they have that self-esteem enhances achievement (Whitesell et al., 2009).

According to Booth & Gerard (2011) much research has validated the assumption that high self-esteem is associated with educational achievement. Self-concept is frequently positively correlated with academic performance, but it appears to be a consequence rather than a cause of high achievement. This suggests that increasing students' academic skills is a more effective means to boost their self-concept than vice versa (Manning, 2007).

Moreover, Various research indicated that self-esteem was negatively correlated with some other mental problems such as loneliness (Al Khatib, 2012). In Malaysia, Yaacob, Juhari, Talib, & Uba (2009) examined the degree of relationships between loneliness, stress and self-esteem with depression among adolescents. The findings of the study showed that loneliness, stress and self-esteem have moderate significant relationships with depression and stress emerged as the strongest predictor of adolescent depression.

Loneliness is a distressing, painful experience that humans want to avoid. Most people are probably going to have a significant experience of loneliness some time in their lives (Al Khatib, 2012). Loneliness is a complex emotion resulting from deficiencies in

fulfilling intimate or social needs (Tassin, 1999). It is an important aspect of psychological distress in childhood and adolescence (Lu & Zhou, 2013). Asher, Hymel, & Renshaw (1984) found that more than 10% of children from third through sixth grade reported feelings of loneliness and social dissatisfaction. Perlman & Peplau (1984) defined loneliness as an unpleasant experience that occurs when a person's network of social relationships is significantly deficient in either quality or quantity. This definition shares three points of agreement with the way most other scholars view loneliness (Alhoot & Abdallah, 2015).

1. loneliness results from a deficiency in a person's social relationships.
2. loneliness is a subjective experience; it is not synonymous with objective social isolation. People can be alone without being lonely, or lonely in a crowd.
3. the experience of loneliness is aversive, unpleasant and distressing.

Several studies have explored the causes of loneliness, one set of the causes lies in cultural and situational environments such as changes in social networks, and changes in personal relationships especially loss of significant relationships (Al Khatib, 2012).

From middle to late childhood, loneliness appears to be an indicator of internalizing emotional problems and negative self-perceptions such as anxiety, shyness, depression, or low self-esteem (Bonetti, 2009). The available evidence suggests that loneliness is associated with poor mental health, loneliness was associated with indices of poor personality integration (Perlman & Peplau, 1984). Barrett & Mosca (2013) found that social isolation is a significant feature of the lives of return migrants. In a study conducted by Shouqair on a sample of 290 pupils from second grade of middle school in Egypt and Saudi Arabia, the results showed a positive relationship between self-esteem and mutual social relations and a negative relationship between the scores of members of the two samples in appreciation of self-esteem and loneliness (Shouqair, 1993).

Salomon and Strobl examined loneliness, social support, and help-seeking behavior in children, ages 9 to 13. Participating were 330 fourth to sixth graders from middle and low income families from the Montreal, Canada region, who completed two questionnaires measuring feelings of loneliness and social dissatisfaction and help-seeking. Independent variables were sex, school performance, and socioeconomic status (SES). The results indicated that children with lower school performance were significantly more lonely than children with higher school performance, and more particularly expressed feelings of rejection and isolation. Sex and SES had no effect on the loneliness score (Salomon, A.; Strobel, 1996). Similarly, Noramn (2003) examined the identification and perception of 170 middle school children in the seventh grade in a public school in Tennessee to determine the extent and direction of the relationships among children's loneliness scores, The results indicated that there is

no statistically significant relationship between students' loneliness scores and school performance (Norman, 2003).

From the educational literature, it is clear the relationship between student achievement, loneliness and self-esteem. There is general agreement amongst researchers that students who are underachieving at school are also likely to have low self-esteem, and that improvements in self-esteem will lead to improvements in achievement (Alpay, 2000). A low self-esteem may be exhibited through several operations by the child such as avoidance, compensation, low motivation, and resistance (Alpay, 2000), this could also leads to loneliness as low self-esteem is a one of the most powerful predictors of loneliness (Mahon, Yarcheski, Yarcheski, Cannella, & Hanks, 2006; Harward, 1989).

Recently, the concept of school engagement has been receiving increased attention from researchers, policy makers and educators because they consider it an important precursor of positive school outcomes. literature review revealed that academic engagement has been shown to be amenable to influence through school or classroom practices (Nako, 2015).

According to Fredericks, Blumenfeld, and Paris (2004) there has been a substantial variation regarding the terminology of engagement in research. Engagement often appears with other words as shown in the terms: "school engagement", "academic engagement", and "student engagement" ("student engagement in academic work" and "student engagement in/with school") (Fredericks et al., 2004) .

With regard to the use of the terms of "student engagement" and "school engagement", Appleton, Christenson and Furlong (2008) argued that "school engagement" accentuates only the role of school context, not the influences of other contexts such as family and community. Alternatively, "student engagement" is applied in terms of both school settings and academic work in classroom contexts. They observed that student engagement includes academic engagement (e.g., time on academic task), cognitive (e.g., the use of self-regulation and meta-cognition strategies), behavioral (e.g., attendance and participation in both curricular and extra-curricular activities) and psychological engagement (e.g. identification). Thus, "student engagement" can be used to represent both "school engagement" and "academic engagement" (Appleton, Christenson, & Furlong, 2008).

Student engagement is often conceptualized as a multidimensional construct (Appleton et al., 2008; Fredricks et al., 2004) (Hoff & Lopus, 2014) (Veiga, 2012). Several types of engagement were noted - academic, cognitive, intellectual, institutional, emotional, behavioral, social, and psychological to name a few (Taylor & Parsons, 2011).

However, there are some disagreements across the different conceptualizations in relation to the number of dimensions of engagement. In the literature, three dimensions of student engagement are typically described: cognitive engagement,

behavioral engagement and emotional. Fredericks et al. (2004) distinguishes between cognitive, behavioural and emotional engagement.

1. Cognitive engagement, which refer to students' personal commitment with their learning. It can be understood as students' psychological investment in their own learning. When cognitively engaged, students concentrate, focus on achieving goals, are flexible in their work and cope with failure. This is different from high performance: a student who is performing well may still be disengaged if they are coasting and not motivated to exert themselves more than is necessary to get by.
2. Behavioural engagement, which represents students' participation in classroom, school and after-school activities. This includes adhering to behaviour rules, attending lessons as required and arriving at classes on time. Importantly, behavioural engagement refers to the learning behaviours that are important for high student performance, which may include collaboration and communication with peers.
3. Emotional engagement (also as affective engagement), which reflects students' affective reactions to school, teachers and peers. This has also been called 'identification' with school and learning practices. Students are engaged when they feel included in the school and feel an emotional bond with the school, its teachers and their peers.

Overall, there is an agreement that student engagement is a multidimensional construct. All three dimensions of student engagement (behavioral, cognitive, and emotional engagement) are considered as imperative components in student learning.

Among students who stay in school, there is accumulated evidence that greater student engagement is associated with better academic outcomes (Appleton et al., 2008). Student engagement has primarily and historically focused upon increasing achievement, positive behaviors, and a sense of belonging in students so they might remain in school (Taylor & Parsons, 2011). The positive consequences of the engagement can be felt on psychological development and on the general well-being of the student (Fredericks et al., 2004). There are a number of benefits of students' engagement with school. For example, (Fullarton, 2002):

- Young people who have positive feelings towards school and who are active participants in a variety of school activities are more likely to stay in school and are more likely to become independent learners.
- Other studies have found positive relationships between a student's engagement and academic achievement and with other educational outcomes, including better attendance and aspirations to higher levels of education. While dissatisfaction with aspects of school life has been demonstrated to be a key issue for non-completion of secondary school.

Psychological disengagement refers to “a defensive detachment of self-esteem from one’s outcomes in a domain such that self-esteem is not contingent upon one’s successes or failures in that domain” (Nako, 2015). Clearly, student engagement is a rich research area. Educators must continue to seek to understand and apply specific, well-considered, if not agreed upon, strategies that support student engagement in learning both in and beyond the classroom (Taylor & Parsons, 2011).

Statement of the problem

A lot of attention has been given to the children mental health as one of the most influential factors on their academic achievement (Alhoot & Abdallah, 2015). The deformation of the self-concept can lead to loneliness (Hamza, 2003). Low self-esteem was associated with high levels of loneliness, it emerged as the most significant predictor of loneliness (Al Khatib, 2012; Vanhalst, Luyckx, Scholte, Engels, & Goossens, 2013). A path analysis supported the model; a lack of peer acceptance in the classroom in 4th grade predicted lower academic self-concept and more internalizing symptoms the following year, which in turn, predicted lower academic performance in 6th grade (Flook et al., 2005). Vanhalst et al., 2013 investigated the direction of effects between loneliness and self-esteem in two independent longitudinal studies, and the underlying role of social acceptance was investigated. Results indicated that self-esteem and loneliness influenced one another in a reciprocal manner. Furthermore, the dominant path from self-esteem to loneliness was partially mediated by perceived--but not actual--social acceptance (Vanhalst et al., 2013).

On the other hand, the consequences of not engaging students in learning are reportedly dire; some educationists consider engaging disengaged pupils to be one of the biggest challenges facing educators, as between 25% and over 66% of students are considered to be disengaged (Taylor & Parsons, 2011).

However, while the relationship between mental health and achievement is well established, the nature of the link remains a matter of considerable debate. Therefore, the major purpose of this study is to test the relationship between Arab children's self-esteem, loneliness and their achievement Arabic schools in Malaysia. It also investigate if self-esteem and loneliness are predicting factors of arab children achievement.

For more specification, the study aims at answer the following questions:

1. What is the level of loneliness, self-esteem and engagement among Arab children's in Malaysia?
2. Is there any significant correlation between loneliness, self-esteem, engagement and achievement in science of Arab children's in Malaysia?

3. Do the hypothesized measurement model for the loneliness, self-esteem, engagement and achievement in science fit the collected data from Arab children's in Malaysia?

Based on the literature review of motivation and engagement; the research hypotheses are presented as follows.

H1: Students' Loneliness has a negative relationship with students' self-esteem.

H2: Students' Loneliness will predict students' engagement.

H3: Students' Loneliness will predict student achievement in science.

H4: Students' self-esteem will predict students' engagement.

H5: Students' self-esteem will predict their achievement in science.

H6: Students' engagement will predict their achievement in science.

H7: Students' engagement mediate the relationship between their self-esteem and their achievement in science.

Research Method

Research design

This research is a descriptive in nature; its key purpose is a description of the state of affairs, as it exists at present. Surveys are concerned with describing, recording, analyzing and interpreting conditions that either exist or existed (Kothari, 2004). According to this research methodology, the researcher achieved the objectives of the study by using suitable methods for data collection such as, a questionnaire to identify the level of self-esteem and loneliness among Arab children's in Arabic schools in Malaysia.

The Sample

The sample in this study was randomly selected from four Arab schools in Kuala Lumpur city: which resulted in 260 students (age average 10.8 years) in the middle stage. Table (1) illustrates the research sample in terms of gender and class. The male students formed 43.1% of the sample while the female students formed about 56.9%. Concerning the students' class, (28.8%) from the fourth class, 39.6% fifth class and 31.5% are from sixth class.

Materials

In order to model the relationship between children level of loneliness, self-esteem and engagement, the researchers adapted three instruments; revised version of the self-report UCLA (University of California, Los Angeles) Loneliness Scale developed by Russell, Peplau, & Cutrona (1980), and Index of Self-esteem (ISE) A 25-item questionnaire developed by Hudson (1982), and Fredricks and his collages scale to measure school engagement in elementary school students.

The adapted UCLA-R Loneliness Scale comprises 20 items that presented statements about children's feeling of Loneliness. The items are 3 Likert scale (usually, sometimes, never). The scale divided into three sub-scale: social relationship (6 items), rejection (9 items) and loss of mutual intimacy (5 items). Cronbach's alpha, the measure of reliability, was calculated for the scales and subscales; " social relationship " had an alpha of 0.71, "rejection" had an alpha of 0.76, and " loss of mutual intimacy " had alphas of 0.706. The overall scale had an alpha of 0.75. All scales and subscales were greater than 0.7, which is considered "acceptable" for exploratory research.

This study utilized the Index of Self-Esteem (ISE) (Hudson, 1982). This 25-item index is intended to measure the amount, intensity, and/or significance of a problem an individual has with self-esteem. The items are rated on a Likert scale from 1-3 (usually, sometimes, never). 3 items has been deleted according to the results of validity and reliability test. The researchers test the reliability using Cronbach's alpha internal consistency coefficient. The results of Cronbach's Alpha for the 22 items scale indicate that the overall scale had an alpha of 0.85. This means that the instrument has a good reliability and can be used to measure children self-esteem.

Fredricks and his collages developed this scale to measure behavioral, emotional, and cognitive aspects of school engagement in elementary school students. The scale includes 15 items (4 items for behavioral, 6 items for emotional and 5 items to test the cognitive domain) which were drawn from variety of measures and several additional items. The reliability of the scales was also examined across demographic characteristics. In general, the results were similar for boys and girls. The reliability for the behavioral engagement scale ($\alpha = .67$) was slightly lower for third grade than for fourth ($\alpha = .74$) and fifth grade ($\alpha = .73$). The reliability for emotional engagement was similar across the grades at both waves. (Fredricks et al., 2004).

Data Analysis

Structural Equation Modeling using AMOS 22 was used to test the hypothesized model. To evaluate the fit of overall model fitness, the following tests were employed: Chi Square Statistic (χ^2), Root Mean Square Error of Approximation (RMSEA), Normed Fit Index (NFI), Standardized Root Mean Square Residual (SRMR) and Goodness of Fit Index (GFI). All these indices are among the most frequently used.

Chi Square Statistic (χ^2) tests the independence of the hypothesized model and the analyzed covariance. If the χ^2 is not significant, usually if $p > 0.05$, then the null model is accepted. Root Mean Square Error of Approximation (RMSEA) is based on the assumption that a perfect model fit is unrealistic and that reality can only be approximated. If the value of RMSEA is less than 0.05, it indicates a reasonable approximation to the data. Some authors have also suggested that a value 0.08 can also be regarded as a reasonable fit indicator. Normed Fit Index (NFI) compares the proposed model to a model in which no relationship is assumed. NFI values of 0.90

and above are generally assumed to be good indicators of model fit. Standardized Root Mean Square Residual (SRMR) is the "standardized summary of the average covariance residuals". When the value is fairly close to zero the model is said to be of reasonable fit. Lastly, the Goodness of Fit Index (GFI) measures the proportion of variance and covariance that the proposed model is able to explain. The GFI indices range from zero to one, where one indicates a perfect fit. Models with GFI values of 0.90 or above can be considered to be reasonable approximation of the data. Along with all these indices, the path coefficients have been scrutinized carefully.

Results

The main aim of this study is to model the relationship between children level of loneliness, self-esteem, engagement and their effect on science achievement of grade 4-6 children in Arab schools in Malaysia. It also investigate if loneliness, self-esteem and engagement are predicting factors of arab children achievement in science. Therefore, Structural Equation Modeling (SEM) was used to test the hypothesized model.

Results of descriptive statistics

The questionnaires were used to asked children to report their feeling of loneliness and self-esteem and engagement. table (2) includes the means and standard deviations about Arab children's feeling of loneliness, self-esteem and their engagement in science classroom.

The results in table 2 show that Arab children have a moderate level of loneliness with 53.3% (M = 1.606, SD = 0.413). On the other hand, Arab children have high level of self-esteem with 79.7% (M = 2.391, SD = 0.417). Regarding the engagement scale, the results in table 2 show the highest percent 81.6% (M = 2.447, SD = 0.314). Such results reveal that the Arab children have a moderate level of loneliness, high level of self-esteem and high level of engagement in science classroom.

Table 3 displays the correlations between the variables, each variable has a significant correlation with each other variable. Engagement was positively correlated with self-esteem, and negatively correlated with loneliness. on the other hand, self-esteem is negatively correlated with loneliness .

Results of SEM

The model testing process of this study followed the two-step procedure proposed by Kline (Kline, 2011). The first step is a confirmatory factor analysis of the measurement model. This is conducted by freeing the parameters among the constructs to allow them to correlate. This two-step modelling approach provides an accurate representation of indicator reliability through the measurement model then focuses on the interaction of the structural model or latent variables (Hair, Anderson, Tatham, & Black, 2009).

Confirmatory factor analysis of overall measurement models for each of the construct was conducted by constraining all of the items on the three scales. The CFA results for overall measurement model indices indicated poor fit for the model, to modify the measurement model the researchers excluded the many items that have high error and the low factor loading using modification indices (MI).

A test of structural relationships using AMOS version 22 was conducted to assess the model data fit and the hypothesized relationships between theoretical constructs that include loneliness, self-esteem, engagement and achievement in science of grade 4-6 children in Arab school in Kuala Lumpur. The structural model did not achieve an overall good fit. The relative chi-square of this model is more than 5 (chi-square/degrees of freedom ratio /df= 7.272), Kline (2011) recommended normed chi-square value ranging from less than 2 to less than 5. (Table 4 and Figure 2 show the result of structural model). In addition, all goodness-of-fit indices were lower than the desirable ranges.

To improve the model fit, the researchers deleted some paths especially the direct path between loneliness and achievement, the direct path between loneliness and engagement, and the direct path between self-esteem and achievement. The structural model achieved an overall good fit. The relative chi-square of this model is less than 3 (chi-square/degrees of freedom ratio /df= 1.638), indicating an accepted fit, and all goodness-of-fit indices were in the desirable ranges. Table 5 and Figure 3 show the result of structural model.

Since all model fit indices shows a better fit to the data, the path coefficient that estimates the hypothesized relationships of the model are then evaluated. The path coefficients in Figure 3 and Table 6 shows the result of testing the hypotheses, and Table 7 shows the indirect effects between the variable stated in hypothesis 7.

All of the hypotheses were examined through the path coefficient and the statistical significance to direct effect. Based on the result in Table 6 we can bring forward the result of hypotheses testing.

Hypotheses H1: Students' Loneliness has a negative relationship with students' self-esteem.

Based on Table 6, the result of path analysis indicated a significant positive relationship exist between the students' loneliness and students' self-esteem ($\beta = -2.033$; $CR = -7.168$; $P = .000 < .05$), hence Hypotheses **H1** is supported by the data; the hypothesis is accepted, meaning that students' loneliness has a negative relationship with their self-esteem. Therefore, we can predict of both of them from the other one.

Hypotheses H2: Students' Loneliness will predict students' engagement.

Results from Figure 3 and table 6 show that no direct effect between the two factors, therefore we reject the hypotheses that we can predict students' engagement by their loneliness level.

Hypotheses H3: Students' Loneliness will predict student achievement in science.

Results from table 6 and Figure 3 show that no direct effect between the two factors, therefore we reject the hypotheses that we can predict students' achievement in science by their loneliness level.

Hypotheses H4: Students' self-esteem will predict students' engagement.

Based on Table 6 and Figure 3, the result of path analysis indicated a significant positive relationship exist between the students' self-esteem and students' engagement ($\beta=.042$; $CR= 4.811$; $P = .000 <.05$), hence Hypotheses **H3** is supported by the data, the hypothesis is accepted, meaning that students' self-esteem is a strong predictor of engagement.

Hypotheses H5: Students' self-esteem will predict their achievement in science.

Results from table 6 and Figure 3 show that no direct effect between the two factors, therefore we reject the hypotheses that we can predict students' achievement in science by their self-esteem.

Hypotheses H6: Students' engagement will predict their achievement in science.

Based on Table 6 and Figure 3, the result of path analysis indicated a significant positive relationship exist between the students' engagement and their achievement in science ($\beta=11.491$; $CR= 4.196$; $P = .000 <.05$), hence Hypotheses **H6** is supported by the data, the hypothesis is accepted, meaning that students' engagement is a strong predictor of their achievement in science.

Hypotheses H7: Students' engagement mediate the relationship between their self-esteem and their achievement in science.

To test the hypothesis that students' engagement mediate the effect of students' self-esteem on student achievement. Based on the result in Table 6, the interaction between self-esteem and engagement is significance at .05% level. Furthermore the interaction between self-esteem and achievement significance in which is $\beta= 0.242$ and $p = .000 <.05$. Evidence consistent with mediation has been found. Thus, it appears that mediation through students' engagement, while statistically significant, explains substantial part of the total effect of students' academic achievement in this study. Thus, students' engagement Mediation effect on the relationship between self-esteem and achievement (H3 accepted).

In summary, results reveals that all the goodness-of-fit indexes fulfilled the requirement of the acceptable model fit with significant paths and correlation. The Model has provided a reasonable explanation of the structural model of motivation, students' engagement and academic achievement employed in this study.

Discussion

Children's mental health could be one of the crucial factors for their achievement. As a result, it is important to test the relationship between children achievement and some of the non academic factors related to children's mental health. The present study employed a SEM to model the relationship between children's level of loneliness, self-esteem, engagement and their achievement in science.

The findings indicate that students' engagement was positively correlated with self-esteem, and negatively correlated with loneliness. On the other hand, self-esteem is negatively correlated with loneliness. This means that children who feel lonely have a low self-esteem level, therefore they will not engage well in the learning process.

Regarding modeling the relation between the factors, a test of structural relationships using AMOS version 22 was conducted to assess the model data fit and the hypothesized relationships between theoretical constructs that include loneliness, self-esteem, engagement and achievement in science of grade 4-6 children in Arab school in Kuala Lumpur. The structural model did not achieve an overall good fit. To improve the model fit, the researchers deleted some paths especially the direct path between loneliness and achievement, the direct path between loneliness and engagement, and the direct path between self-esteem and achievement. The structural model achieved an overall good fit.

The result of path analysis indicated a significant positive relationship exist between the students' self-esteem and students' engagement; this meaning that students' self-esteem is a strong predictor of engagement. To test the hypothesis that students' engagement mediate the effect of students' self-esteem on student achievement. Based on the result, it appears that mediation through students' engagement is statistically significant; this explains substantial part of the total effect of students' academic achievement in this study. Thus, students' engagement Mediation effect on the relationship between self-esteem and achievement in science among grade 4-6 Arab children studying in Malaysia.

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Table 1. The Sample

Age	Gender				Row Totals	
	male		female			
4	27	24.1%	48	32.4%	75	28.8%
5	47	42.0%	56	37.8%	103	39.6%
6	38	33.9%	44	29.7%	82	31.5%
All	112	43.1	148	56.9	260	

Table 2. Basic Descriptive Statistics

	Mean	% of Mean	Std. Deviation	level
Loneliness	1.606	53.5%	.41301	Moderate
Self-esteem	2.391	79.7%	.41739	high
Engagement	2.447	81.6%	.31394	high

Table 3. Correlations Between Predictor Variables

	loneliness	self-esteem	engagement
loneliness		-.705**	-.290**
self-esteem	-.705**		.280**
engagement	-.290**	.280**	

** Correlation is significant at the 0.01 level (2-tailed).

Table 4. Model Summary

Table 1: Summary of Goodness of Fit Analysis Structural Model

Variables	p=\p	CFI	CMIN/df	RMSEA
Structural Model	.000	.895	7.272	.112

Table 5. Summary of Goodness of Fit Analysis Structural Model

Variables	p=\p	CFI	CMIN/df	RMSEA
Structural Model	.033	.990	1.638	.036

Table 6: Direct Impact of Structural Model: β for Structural Model and Hypotheses

	(β)	S.E.	C.R.	Estimate	P	Hypotheses
lonley <--> self_esteem	-2.033	.284	-7.168	0.818	** *	H1:Significance
engagement <--- lonley						H2:Not Significance
achievement <--- lonley						H3: Not Significance
engagement <--- self_esteem	.042	.009	4.811	0.275	** *	H4:Significance
achievement <--- self_esteem						H5: Not Significance
achievement <--- Engagement	11.493	2.739	4.196	0.242	** *	H6:Significance

β : Standardized Regression Weights; S.E: Standardized Error; C.R.: Critical Ratio *: p \leq 0.05, ***: p \leq 0.001

Table 7: Summary of Direct and Indirect Effect of Variables of SMQ

Predictor Variables	Student engagement			student achievement in science		
	Direct Effect	Indirect Effect	Total Effect	Direct Effect	Indirect Effect	Total Effect
Self-esteem	.275	-	.275	-	0.067	0.067

Note: Standardized path estimates is reported

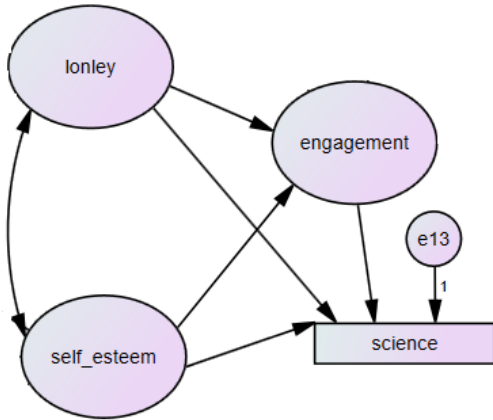


Figure 1 The proposed model

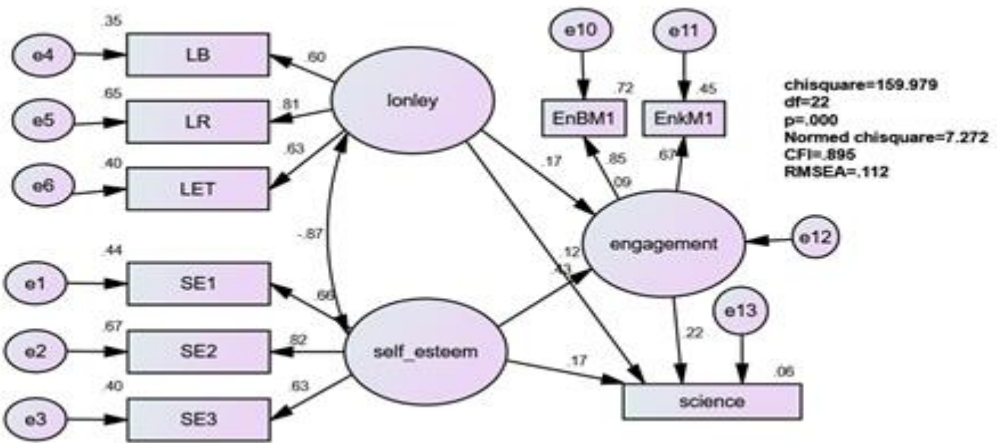


Figure 2. The Fit of the proposed model

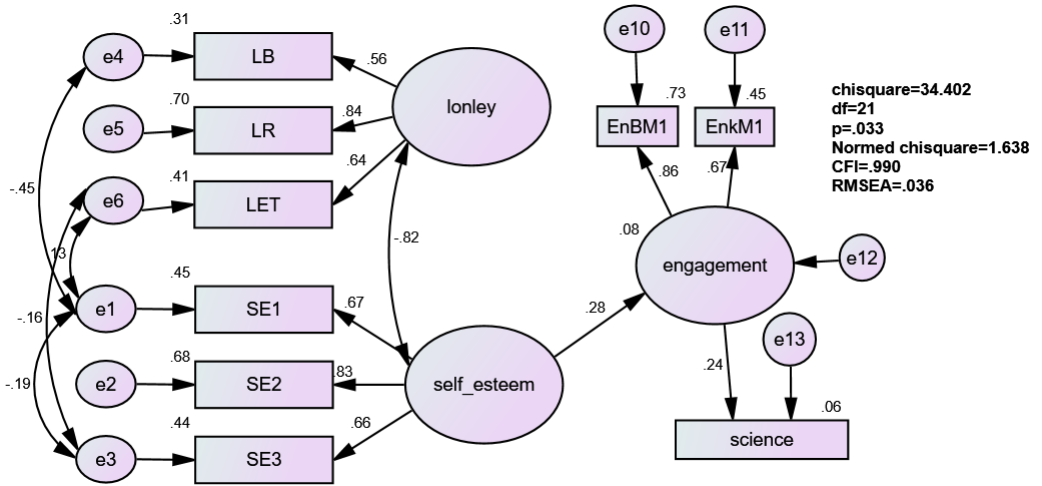


Figure 3. The Fit of the final model