THE INFLUENCES OF SELF-CONCEPT AND LEARNING ENVIRONMENT TOWARDS THE ALGEBRA ACHIEVEMENT OF MATRICULATION STUDENT

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Abstract: **Self-concept, learning environment, and achievement are interrelated with in describing student abilities in algebraic mathematics. By observing these three aspects, the purpose of this study is to determine the influence of self-concept and learning environment towards the achievement of algebra in the matriculation college. The findings from this study show that there is a moderate positive relationship between the self-concept and the achievement of student algebra (r = 0.393, p <0.05), while there is no significant relationship between learning environment and algebraic achievement(r = 0.142, p>0.05). It is show that male students have better level of self-concept, more influence by learning environment and have a better level of achievement than women. This can be seen from the result of the study which male student has a higher score on all variables studied. Even though, the min score of male student are higher, there is no significant difference between the student's learning environment and gender. Regression test shows that self-concept is the best predictor of algebraic achievement. However, with only 14.5% of self - concept influencing the achievement of algebra, it can be concluded that self - concept alone is not the only factor affecting achievement. It is hoped that, this study will help teachers to get the idea in teaching and learning to enhance students' self-concept as well as positive learning environments and to improve student achievement in algebra.**

Keywords: **algebra, algebraic achievement, learning environment, mathematics self-concept.**

1. INTRODUCTION

There are already few studies has been carried out on achievement of student at both level which are the school level and the higher education level. However, even though 21st century lesson is focuses more on the achievement of students in Science, Technology, Engineering, & Mathematic (STEM), the student achievement in the other subject is still being a topic of discussion among educators. This is because; the educators are still looking for a suitable method in addressing the problem of student achievement.

The quality of an educator is a fundamental thing to ensuring the effectiveness of teaching and learning (Rahayu et al., 2018). Therefore it is important for educators to identify factors that can influence the achievement of students, particularly mathematics which are the core subjects in STEM education.

Based on the results produced by Trends in Mathematics and Science Study (TIMSS) in 2015, the factors that improving student achievement was self-confidence and the learning environment (Ministry of Education, 2015). While the achievement of the students in the test was still less favourable where Malaysia was ranked 22 compared to 39 participating countries, there was a slight increase in overall student scores at 465 points compared to 440 points in 2011

(Ministry of Education, 2015). Therefore, based on the results of TIMSS 2015 test, student's self - concept and the influence of learning environment can be a factor for improving student achievement in schools or higher education.

Self-concept is defined as the belief, feeling of perception, attitudes and values held by an individual associated with him. Self-concept also refers to how people thinks and judges themselves (Mcleod, 2018). Azizi (2010) states that, self-concept is divided into two, positive self-concept and negative self-concept. Individuals with positive self-concept have a better attitude towards learning and often gain success (Azizi, 2010) and easier to create excellence (Rodzah Yahya & Norzilah Hussin, 2013). Meanwhile individuals with negative self-concept are the opposite. They often fail in the field.

This can be seen when the TIMSS report (2015) shows that there is a correlation between student self-esteem towards student achievement in mathematics. The higher the student's confidence in mathematics the higher the achievement in mathematics. The report also showed that there were differences between genders in algebraic achievements, where girls (476 points) showed better results than boys (458). This achievement score is similar to the cognitive score where female students (470 points) outperform male students (461 points) by 9 points. (Ministry of Education, 2015).

On year 2010, studies on individuals aged 16 to 24 years in Norway, Canada, Italy, Switzerland, and USA found that there were significant differences between gender in mathematical concepts (Lundetræ, Mykletun, & Egil, 2010). Based on studies of 153 students from Tuanku Sultanah Bahiyah Polytechnic, the result showed no significant difference between the self-concept of male and female students but this study revealed that the self - concept of female students slightly outperformed male students with mean score 2.906 and 2.897 respectively (Maisarah, Adyani, & Azlina, 2016). However, a study of 1211 high school students in Taiwan showed a significant relationship between the male and female students' mathematical self-concept. It is shows the male self-concept was surpass the self-concept of female students (Ching & Hsin, 2018).

The difference in self-concept of male and female students may be due to the views in mathematics, the learning environment, and the student's learning style. It would be better if educators know the stage or level of self-concept of a student. This is because, based on the level of self-concept of the student, a more effective learning approach can be implemented during the teaching and learning process (Yahaya, Boon, Ma'alip, & Ramli, 2000). The establishment of self-concept is an important process in adding to the knowledge and the skills of students, especially in the context of education (Nor Hayati , Bani Hidayat , Jamil Ahmad, & Ab Halim Tamuri, 2014) 21st century.

Self-concept is often linked with student achievement. Thus, educators play an important role in nurturing the student's self-concept or self-esteem towards themselves as well as helping to improve their achievement in the lesson (Jafar & Hasan, 2016). This evident is prove by the study of Tun Hussein Onn University College on a second year student, a Bachelor of Engineering and Vocational Degree, shows that self-concept can influence student achievement and become an element to predict student achievement (Noor Indon, 2018). Therefore, it is clear that the student's self-concept can influence their achievement specifically in mathematics.

Through the study on the factors that influence the students 'achievement, it shows, apart from the student's self - concept, the learning environment also plays a role in influencing student achievement. A positive learning environment has had a positive impact on student achievement (Kementerian Pendidikan Malaysia, 2015). A good learning environment will occurred if there is an effective interaction between the student and the teacher. Thus, teachers or educators need to be more creative and innovative in teaching because they can evaluate the changed and the student needs in the classroom (Nidzam, Asmayati, & Ainoor, 2016).

A study of 81 students from two secondary schools in Uganda shows that a good learning environment makes students more motivated to learn mathematics as well as to improve their achievement (Opolot-okurut, 2010). While the study of 400 students from 20 schools in Perak showed significant differences in the learning environment impacts between male and female students where female students were more affected by the learning environment (Nidzam, Asmayati, & Ainoor, 2016). This shows that the learning environment plays an important role in influencing the student achievement.

While the study of 186 students of the Faculty of Technical and Vocational Education at Tun Hussein Onn University showed that the lecturer become the most dominant factor in influencing student achievement (Hanim, Muda, & Azuanafzah, 2017). In addition, studies conducted by the North Carolina University on semester 2013/2015 for students who took the subject of algebra show wide ranges of achievements when students are placed in different environments

(emporium instructional method vs. traditional method) (Cousins-Cooper, Staley, Kim, & Luke, 2017). The achievement of students who are in a better and active learning environment (emporium instructional method) demonstrate better results than those who are in a traditional learning environment. So it is clear that the student learning environment can be a factor that affects students' achievement in mathematics, especially algebra.

Past studies also show the relationship between the learning environment and student learning styles. Students learn better and have more positive attitudes in positive learning environments (Brok, Fisher, Rickards, & Bull, 2005). However, previous studies on student self - concept are more focused on their relationship with the family environment (Azizi, 2008), concerns over mathematics, and motivation (Oluwasanmi, 2011).

Conversely, a studies conducted to find the relationship between self-concept, and the influence of student learning environment itself with the achievement of students in mathematics, especially algebra are more limited. Algebra is an essential foundation for mathematical learning at the advanced level and is a part of mathematics that uses symbols in representing numbers and quantities (Puteh et al., 2015). Algebra also represents 30% of TIMSS test components (Kementerian Pendidikan Malaysia, 2015). Thus, the mastery of algebra among students is very important. Therefore, it is important to study the factors that influencing the student achievement especially in algebra.

Consequently, this study was conducted to identify factors that influence achievement so that educators can design a teaching and learning method that is more objective to overcome the problem of the student's achievement.

The objectives of this study are:

1. To identify the level of self-concept, the influence of the learning environment, and the achievement of students based on gender.

2. To identify the differences between self-concept, the influence of learning environments, and the achievement of algebra based on gender.

3. To determine the relationship between self-concept and the influence of learning environment with algebraic achievement.

4. To determine the effect of self-concept and learning environment on the algebraic achievement of matriculation college students.

2. METHODOLOGY

This is a quantitative study which using survey design with simple random sampling method. The method of survey can be used to describe various types of questions or issues and problems from various perspectives, especially to describe attitude, views, beliefs, feelings, and behaviours (Chua, 2014). It is well adequate to the purpose of studying self-concept and the influence of learning environment in which it involves all the elements that have been stated. The survey design also allows the data to be analysed descriptively and inference (Noraini, 2013). The results of the study can be generalized more effectively (Chua, 2014).

Population and Sampling

The population refers to a group of objects, individuals, or objects that have the same characteristics to be study. Noraini (2013), states that the population is a group that attracts researchers and has the characteristics required by the researcher so that ultimately the study can be generalized. Sampling is a part of the population or a process of selecting research objects from a large group.

The sample selected for the study population is a matriculation college. Therefore, random sampling is used to ease the sampling process because it provides the opportunity for each member of the population to be selected as the respondent to the study (Noraini, 2013). It is because, a random sampling method not bias and easiest to practice (Bougie, 2012). The number of respondents was determined by Cohen (1992) schedule. For two independent regression test variables with a moderate impact size, the minimum number of respondents set is 67 (Chua, 2014). The sample size selection also coincides with the power level of 0.80 (control type II error) and significant level of 0.05 (control type I error) (Hair, Black, Babin, & Anderson, 2014).

Sample selection based on regression test is also considered to be suitable with the main purpose of the study i.e. to determine whether the factors of self - concept and the learning environment affect the algebraic achievement test. Therefore, the researcher selected 90 respondents who were taught by the same lecturer, out of 155 semester 3 matriculation students at Melaka Matriculation College.

The respondents profile as in Table 1. The Additional Mathematics Grade of Malaysia Certificate of Education (SPM) is taken to ensure that respondents have a good algebraic basis so that internal validity can be enhanced for the algebraic performance test to be conducted.

Table 1: Respondent Profile

Demography Factor	N	Factor	Frequency	Percentage (%)
Gender	90	Male	28	31
		Female	62	69
Math Grad	90	Pass	90	100
Add Math (SPM)		Fail	0	0

Instrument

The information obtained for this study is based on feedback through the Self Concept and the Learning Environment Effect questionnaire, formed using Likert scale 5 points, with 1 representing the lowest value of Very Disagree and 5 is the highest value of Strongly Agree. The questionnaire was adapted and modified from the Gourgey Mathematical Concept Inventory questionnaire (Gourgey, 1982) and WIHIC (What Is Happen In Class) instrument (Brok, Fisher, Rickards, & Bull, 2005). The original WIHIC instrument has 7 constructs with 56 questions.

However, for this study, the researcher selected only 4 constructs namely Student Cohesiveness (CO), Teacher Support (TS), Task Orientation (TO), and Equity (EQ) with 30 items related to this study. This questionnaire consists of four parts. There are Part A (background), Part B (mathematical concept), Part C (learning environment) and Part D (algebraic achievement test).

Part D is an algorithm for the algebraic achievement test that has been combined with a questionnaire instrument for self-concept and the learning environment effect. It is contained of 13 questions with two sections, Part A (12 objective questions) and Part B (1 subjective questions). Questions built on algebraic basics such as fractions, percentages, power numbers, money, velocities, and accelerations (questions 1,2,5,9,10,11) for low level algebras such as titles algebraic expressions, quadratic equations, cubic equations, function graphs, and differential equations for high level algebra (questions 3,4,6,7,8,12, and part B) (Oluwasanmi, 2011), which have been adapted to the students matriculation level.

Based on Table 2, the negative self-concept items will go through the original coding process because the lowest self-concept score is 81, when the highest score is 135 based on the 5-eye Likert scale used.

Table 2: The Conclusions of Self-Concept Questionnaire and Effect of Learning Environment

No.	Variable	Item Name	Item number	Total (N)
B	Self-concept	Positive	2, 4, 5, 7, 10, 12, 13, 18, 20, 24, 26, 27	12
		Negative	1, 3, 6, 8, 9, 11, 14, 15, 16, 17, 19, 21, 22, 23, 25	15
C	Learning Environment	CO	1, 2, 3, 4, 5, 6, 7, 8	8
		TS	9, 10, 11, 12, 13, 14, 15	7
		TO	16, 17, 18, 19, 20, 21, 22	7
		EQ	23, 24, 25, 26, 27, 28, 29, 30	8

Data collection

A pilot study was conducted to 24 students from semester 1 2018/2019 and the sample was different from the sample of the actual study. Pilot study was conducted to ensure that the instrument of the research was obtained with the dependability.

Questionnaires are distributed and administered by college lecturers according to the suitability of their teaching time. The time allocated is one hour to complete the test. Table 3 shows that the alpha coefficient of self - concept pilot instrument ($\alpha = 0.89$) and the influence of learning environment ($\alpha = 0.87$) and actual study ($\alpha = 0.92$) and ($\alpha = 0.93$) respectively. Guilford and Fruchter (1956) suggest that the internal reliability index of a test is most satisfactory if it is worth about 0.7, while Pallant (2001) says the alpha index of 0.7 and above is good for instrument scale having ten or more items (Hair et al ., 2014; Noraini, 2013). Therefore, the alpha value for this study is good and demonstrates the high capability to measure the variables studied.

Table 3: Reliability (Alfa Cronbach, α)

Variable	Pilot Study	Actual Study
Self-Concept	0.89	0.92
Learning Environment	0.87	0.93

Data Analysis

The data obtained were analysed using the Statistical Package for Social Science (SPSS) program 23.0. The normality of the data was done by examining the value of skewness and kurtosis in descriptive statistic. The value of skewness and kurtosis were converted to z score by dividing the skewness statistic and kurtosis with the standard error (SE) respectively to find out whether the score of the algebraic achievement test and the learning environment approximate normal distribution (Hair, Black, Babin, & Anderson, 2014; Othman, 2017). George & Mallery (2010) stated that the z score within the range of $-2.5 < z < 2.5$ is acceptable to meet normality as it approximates the normal graph. Table 4 shows all the statistical / SE values of the scores obtained within the range - / + 2.5, meaning that the data distribution is considered to be of normality. Therefore, the research data is presented descriptively and inferentially.

Table 4: Descriptive Statistic

	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
Algebraic Test	-0.416	0.254	- 0.981	0.503
Stat/SE	1.637		1.950	
Self-concept	-0.401	0.254	0.094	0.503
Stat/SE	1.578		0.186	
Learning environment	0.521	0.254	- 0.180	0.503
Stat/SE	2.051		0.357	

For descriptive data, the analysis used was mean and standard deviation, while for inferential data using T test, Pearson correlation, and Regression Test. Based on the findings, Levene's test showed that the constructs, self-concept (p = 0.342), the influence of learning environment (p = 0.054), and the algebraic achievement test (p = 0.444) were normally distributed when p> 0.05. Thus, inference analysis has been conducted and the findings are as in Table 6, to see the difference between self-concept constructs, learning environments, and algebraic achievement tests on student gender. To perform regression test, the variable must have a correlation between each other (Levine & Stephan, 2015). However, Pallant (2010), suggested that 'adjust R^2' used for regression analysis instead 'R^2', for the sample less than 100 (n <100) (Othman, 2017). The findings for correlation and regression tests are as in Table 7 and Table 8.

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3. RESULTS AND DISCUSSION

The findings were analysed descriptively and inferred. For descriptive analysis, the study uses mean score and standard deviation. Inferential data uses t - test, Pearson correlation and multiple regression to meet the following hypothesis:

HO1: There is no significant difference between self-concept, the influence of learning environment, and the algebra achievement based on gender.

HO2: There is no significant relationship between self-concept, and the influence of learning environment on student achievement of algebra.

HO3: There is no significant influence between self-concept, and learning environment on the achievement of matriculation college students.

Table 5: Self-Concept Min Score, Learning Environment Influence, and Algebraic Achievement Test by Gender

Variable	Gender	N	Min	Standard deviation
Self-Concept	L	28	94.75	13.77
	P	62	84.90	13.63
Learning environment	L	28	124.57	11.75
	P	62	122.24	11.18
Achievement of Algebra	L	28	57.96	15.99
	P	62	49.84	15.70

Table 5 shows that there are differences in mean score by gender for self-concept, the influence of learning environment, and the achievement of student algebra. Based on the mean score for all three constructs, self-concept, learning environment, and algebraic achievement, male students have higher mean score than women. Min score of male students for self-concept, learning environment, and achievement of algebra are 94.5, 124.57, 57.96, and standard deviation of 13.77, 11.75, and 15.99 respectively. Compared to female students, the mean of self-concept is 84.90, and the standard deviation is 13.63, the mean of learning environment is 122.24, and the standard deviation is 11.18, and the mean of algebra achievement test is 49.84, and the standard deviation is 15.70. It can be concluded that male students have a good level but moderate in self-concept, and the influence of learning environment, than female students.

The findings of this study are in line with the results of the TIMSS 2015 test which shows that there are differences in achievement between male and female students. However, the results of this study showed that the self-concept score and the score of the influence of male students learning environment was higher than that of female students. However, the results of this study can illustrate that a more positive self-concept (Azizi Yahaya, 2010) and a good learning environment (Opolot-okurut, 2010) can help students improve their achievement. It can be concluded that the level of self-concept, the influence of the learning environment, and the achievement of the students is different between men and women, even in the same environment.

Table 6: Self-Conceptual Testing, the Effects of Learning Environment and Algebraic Achievement by Gender

Variable	Gender	Min	Standard deviation	df	t	Sig.
Self-Concept	L	3.51	0.51	88	3.162	0.002*
	P	3.14	0.50			
Environmental Influence	L	4.15	0.39	88	0.901	0.370
	P	4.07	0.37			
Achievement of Algebra	L	57.96	15.99	88	2.261	0.026*
	P	49.84	15.70			

*Significant at $p<0.05$

Based on Table 6, the results of independent t - test showed that there were significant differences (t (88) = 3.162, p <0.05, d = 0.73) and (t (88) = 2.261, p <0.05, d = 0.51) between mathematical self-concepts and algebraic achievement towards student gender. Therefore, the null hypothesis for self-concept and achievement cannot be accepted. However, there was no significant difference (t (88) = 0.901, p> 0.05) between the influence of the learning environment on the gender of both men and women. This situation shows the level of self-concept and the algebra achievement of students from Melaka Matriculation College is influenced by gender.

The t - test also showed a higher score of self-concept and achievement score for men but moderately strong with (M = 3.51, SD = 0.51) and (M = 57.96, SD = 15.99) respectively compared to female students (M = 3.14, SD = 0.50) and (M = 49.84, SD = 15.70) respectively. The value of Cohen's effect size for self-concept (d = 0.73) and the achievement of algebra (d = 0.51) suggests a high and medium significant value for both variables.

The findings are consistent with the findings of 2010, in 5 countries, Norway, Canada, Italy, Switzerland, and the USA, on the mathematical self-concept, which in general shows male students overcame female students in self-concept scores. The study indicate that this is because most of the women believe that they cannot do their best in mathematics. This causes them to avoid any situation involving mathematically formally and not making enough training. Thus, eventually the math skills of female students will be less and cannot perform in the examination (Lundetræ, Mykletun, & Egil, 2010).

Although the findings for the learning environment are not support the result obtained from Opolot-okurut (2010), and Nidzam et al. (2016), which shows a significant difference between the learning environment and the achievement, but the higher mean value for male students than women for this variable, shows a slight difference in the scores between male and female gender in the learning environment. This is concluded that male students have better scores than women for all three variables studied.

Table 7: Results of Self-Conceptual Correlation Analysis and Learning Environment Effects with Algebra Achievement Test

Variable	Algebra Achievement		
	N	r	p
Self-Concept	90	0.393	0.000*
Environmental Influence	90	0.142	0.181

*Significant at p<0.05

The results of the Pearson correlation analysis in Table 7 show Pearson's correlation coefficient between self-concept and algebraic achievement is r = 0.393 and this relationship is a significant positive (r (88) = 0.393, p <0.05). While there is no significant relationship between the influence of learning environment and the achievement of algebra with (r (88) = 0.142, p> 0.05). From the findings of this study, it can be concluded that self-concept and algebraic achievement have significant relationships; students with high level of self-concept tend to get good exam results. Hence the interpretation that can be made of self-concept also affects the algebra achievement of student.

However, based on the findings of this study, a decent learning environment does not necessarily guarantee a good test result. This finding is not in line with Azita's & Nor Aini (2016), which indicate the significant relationship between learning environment and student achievement. Alternatively, the variable of self - esteem or self - concept should be taken seriously in education, where the planned programs must have elements that can enhance student self - concept (Jafar & Hasan, 2016).

Table 8: Results of Linear Regression Analysis of Self Concept Factors on Students Algebra Achievement

Variable	Unstandardized β	Standardize β	t	Sig.
Self-Concept	0.442	0.393	4.004	0.000

$R^2 = 0.154$ *Adjusted* $R^2 = 0.145$
Constant = 13.511 p = 0.000

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A study was conducted to examine the degree of influences of Self-concept to the algebraic achievement of matriculation students. Referring to Table 8, from the simple regression test the researcher found that for the population of the study (sample size, n = 90), the self-concept variable had a significant relationship with Algebra Achievement; (r (88) = 0.39, p <0.05). The regression formula for this study was Algebra Achievement (Y) = 13.511 + 0.442 self-concept (x). Therefore the Self-concept is the predictor of Algebra Achievement score. For each unit of improvement in the self-concept will cause the algebraic achievement score to increase by 0.442. The higher the self-concept, the higher the score in the algebra achievement of the student. However, the results rejected the assumption that the Learning Environment was a predictor of Algebra Achievement for the matriculation college students because there was no correlation (Table 7) between the two variables.

The findings of this study are also not in line with the findings of the study conducted in Tehran against 400 nine-grade school students which indicate self-concept alone does not influence student achievement (Kiamanesh, Hejazi, & Esfahani, 2003). Therefore, although a self-concept factor shows the relationship and influence the student achievement, it is hoped that various programs can be designed to improve students' achievement in algebra. This is because, even though self-concept is the best predictor of student achievement then again its value is only about 14.5% (adjusted R2 = 0.145, n <100). The difference in findings can be caused by a various factors such as different syllabus. This is clear, when the score is 14.5%, shows that there are other factors that may affect algebraic achievement, such as teaching style, the learning facilities or learning aid, and student motivation (Matthews & Farmer, 2008).

4. CONCLUSIONS

Generally, the research has shown the factors that influencing the achievement of algebra. While self-concept is seen to have little impact on the successes of students in algebraic mathematics, self-concept development is crucial and still needs to be addressed in the context of mathematical education. Although this study describe that the learning environment does not affect algebraic achievement, it can still be refined due to the high score of male student in the learning environment construct are seen in parallel with the algebra achievement score of male students. Teaching and learning methods that fit the student gender should also be practiced, especially if there is only one dominant gender in a population. Collaborative and cooperative learning methods are particularly suitable, as it encourages students to interact better and actively move (Somasundram & Mahamod, 2017). This is prove when the study shows the diversity in teaching and learning applied by teachers or educators help in enhance the students' achievement in algebra (Cousins-Cooper et al., 2017).

This study emphasize on the influence of self - concept factors and learning environment on algebraic achievement. The study does not evaluate the relationship between self-concept and environmental influences. Hence, in the future it is proposed that the study embraces the relationship between self-concept and the influence of the environment as well as algebraic achievement. The number of samples can be increased with greater population by involving more than one matriculation college as a respondent. Studies on other factors that may affect achievement such as mathematical concerns, teacher teaching styles or teacher teaching methods, and student motivation can also be carried out. Qualitative studies as well as instructional instruments can also be carried out to look more deeply on the influence of self-concept and learning environment on algebraic and mathematical achievements in general so that the problems faced by the students can be handled if at all possible.

REFERENCES

[1] Azizi, N. E. (2008). Hubungan Antara Konsep Kendiri, DImensi Personaliti dan Persekitaran Keluarga Terhadap Pencapaian Akademik Pelajar SPA, SPE dan SPJ, Ijazah Sarjana Muda Teknologi. https://doi.org/10.1007/s13398-014-0173-7.2

[2] Azizi Yahaya. (2010). Penyelesaian Masalah. In *Psikologi Pendidikan* (pp. 1–9). Retrieved from http://eprints.utm.my/10355/

[3] Bougie, U. S. & R. (2012). *Research Methods for Business : A Skill Building Approach* (5th Editio). United Kingdom: John Wiley & Sons Ltd.

[4] Brok, P. den, Fisher, D., Rickards, T., & Bull, E. (2005). Californian Science Students' Perceptions of their Classroom Learning Environments.

[5] Ching, Y. L., & Hsin, Y. K. (2018). Math Self-Concept and Mathematics Achievement : Examining Gender Variation and Reciprocal Relations among Junior High School Students in Taiwan, *14*(4), 1239–1252. https://doi.org/10.29333/ejmste/82535

[6] Chua, Y. P. (2014). *Keaedah Penyelidikan* (Edisi ke 3). Mc Graw- Hill Education (Malaysia) Sdn. Bhd.

[7] Cousins-Cooper, K., Staley, K. N., Kim, S., & Luke, N. S. L. (2017). The effect of the math emporium instructional method on students' performance in college algebra. *European Journal of Science and Mathematics Education*, *5*(1), 1–13.

[8] George, D., & Mallery, P. (1995). SPSS/PC+ Step by Step. https://doi.org/9780335262588

[9] Gourgey, A. F. (1982). *NOTE A 27-item attitude scale was developed reflecting attitude toward one ' s ability to learn , mathematics . This Scale was administered to 92 Mathematical self-concept was moderately related to mathematics acceptance of erroneous beliefs about mathema*. Retrieved from https://eric.ed.gov/?id=ED223702

[10] Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). *Multivariate data analysis. Pearson custom library*. https://doi.org/10.1038/259433b0

[11] Hanim, W. N., Muda, W., & Azuanafzah, M. (2017). Faktor-Faktor Yang Mempengaruhi Pencapaian Pelajar Dalam Matematik Di Fptv Uthm. *Universiti Tun Hussein Onn Malaysia*, (March).

[12] Harun, A. A. & N. A. B. (2016). Hubungan Antara Faktor - faktor Penguasaan Kefahaman Konsep Matematik Dengan Minat Bagi Pelajar Sarjana Muda Pendidikan Teknik dan Vokasional, *4*(2), 485–497.

[13] Jafar, M. F., & Hasan, S. (2016). Kajian Penghargaan Kendiri dan Kepuasan Hidup Pelajar, *30*(2), 22–31.

[14] Kementerian Pendidikan Malaysia. (2015). Laporan TIMSS 2015, 11. Retrieved from http://www.moe.gov.my/images/Terbitan/Rujukan-Akademik/pubfile_file_002124.pdf

[15] Kiamanesh, A. R., Hejazi, E., & Esfahani, Z. N. (2003). The Role of Math Self-Efficacy , Math Self-Concept , Perceived Usefulness of Mathematics and Math Anxiety in Math Achievement. *Anxiety*, (December 2013). https://doi.org/10.1111/gcb.13013

[16] Levine, D. M., & Stephan, D. F. (2015). *Even You Can Learn Statistics and Analytics: An Easy to Understand Guide to Statistics and Analytics* (3rd ed.). New Jersey: Pearson Education, Inc., New Jersey.

[17] Lundetræ, K., Mykletun, R., & Egil, G. (2010). A measure of mathematical self-concept in young adults 16 – 24 years old : A cross-cultural comparison with a focus on gender and numeracy, *5*(1), 36–51.

[18] Maisarah, F., Adyani, N., & Azlina, A. (2016). Hubungan antara Konsep Kendiri dan Motivasi dengan Pencapaian Pelajar Bagi Kursus Makroekonomi. *Politeknik & Kolej Komuniti Journal of Social Sciences and Humanities*, *1*, 128–2875.

[19] Matthews, M. S., & Farmer, J. L. (2008). Factors Affecting the Algebra I Achievement of Academically Talented Learners. *Journal of Advanced Academics*, *19*(3), 472–501. https://doi.org/10.4219/jaa-2008-810

[20] Mcleod, S. (2018). Jean Piaget ' s Theory of Cognitive Development Schemas, (1936), 1–9.

[21] Nidzam, C., Asmayati, & Ainoor, S. (2016). Kesesuaian persekitaran pembelajaran, interaksi guru-pelajar, komitmen belajar dan keselesaan pembelajaran dalam kalangan pelajar biologi, *1*(January).

[22] Noor Indon, A. S. (2018). Konsep Kendiri Di Kalangan Pelajar Pendidikan Teknik Dan Vokasional Di KUiTTHO. Retrieved from /en/research/research-innovation/lecturers-presentation/1694-konsep-kendiri-di-kalangan-pelajar-pendidikan-teknik-dan-vokasional-di-kuiittho.html

[23] Nor Hayati Fatmi Talib, Bani Hidayat Mohd Shafie, Jamil Ahmad, & Ab Halim Tamuri. (2014). Hubungan konsep kendiri dan motivasi pelajar dengan pencapaian kursus di sebuah politeknik. *International Journal of Islamic Studies and Arabic Language Education*, *1*(1), 1–10.

[24] Noraini, I. (2013). *Penyelidikan Dalam Pendidikan* (Edisi Kedu). Mc Graw- Hill Education (Malaysia) Sdn. Bhd.

[25] Oluwasanmi, C. (2011). Achievement, Anxiety, Self-Concept and Motivation Among College Algebra Students Within a Cooperative Learning Structure.

[26] Opolot-okurut, C. (2010). Classroom learning environment and motivation towards mathematics among secondary school students in Uganda, 16675. https://doi.org/10.1007/s10984-010-9074-7

[27] Othman, T. (2017). *SPSS : Analisis Data Kuantitatif Untuk Penyelidik Muda*. Bandar Baru Bangi: MPWS Rich Publication Sdn Bhd (1132290-K).

[28] Puteh, M., Adnan, M., Faizal Nizam Lee Abdullah, M., Ibrahim, A., Matematik, J., & Sains dan Matematik Universiti Pendidikan Sultan Idris, F. (2015). Persepsi Dan Amalan Pengajaran Guru Matematik Dalam Penyelesaian Masalah Algebra. *Jun*, *5*(2), 2232–393.

[29] Rahayu, T., Syafril, S., Pahrudin, A., Satar, I., Osman, K., Halim, L., & Yaumas, N. E. (2018). Kualiti Guru , Isu dan Cabaran Dalam Pembelajaran STEM Di Sekolah Menengah, (November). https://doi.org/10.31219/osf.io/jqcu6

[30] Rodzah Yahya & Norzilah Hussin. (2013). Keberkesanan Konsep Kendiri Dalam Pembelajaran dan Pengajaran Secara Problem Based Learning dalam Kalangan Pelajar Diploma Kejuruteraan Elektrik, Politeknik Merlimau, 1–20. Retrieved from https://rodzah.files.wordpress.com/2016/02/full-paper-_keberkesanan-konsep-kendiri-dalam-pembelajaran-pengajaran-pp.pdf

[31] Somasundram, B., & Mahamod, Z. (2017). Keberkesanan Pembelajaran Koperatif Terhadap Pencapaian Dan Motivasi Murid Sekolah Menengah Dalam Pembelajaran Bahasa Melayu, *7*(Mei), 11–23.

[32] Yahaya, A., Boon, Y., Ma'alip, H., & Ramli, J. (2000). Hubungan di antara Konsep Kendiri dengan Kemahiran Komunikasi Terhadap Pencapaian Akademik Pelajar di Sekolah Menengah di Johor Bahru, (September 2015), 1–13.