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Relationship on Learning Environment's Distribution and Thinking Skills in Accounting Instruction

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Abstract

Purpose: Higher Order Thinking Skills is one of the important aspects in education that must be mastered by the students in order to be qualified in competing at international level. Success in mastering HOTS among the students is always linked to preparation of a good and conducive learning environment. However, does this connection impacts the students' HOTS achievement? Therefore, this research is carried out in order to evaluate the relationship between HOTS and learning environment with the main focus on Accounting Principle Elective Subject (MPEI PP). **Research design, data and methodology:** Research in the form of correlation is implied in this study and it involves 59 Form 5 students that has learned all syllabus in Form 4's MPEI PP. **Results:** Evaluation of HOTS level is based on Taxonomy Bloom that covers applying skill, analysing skill, evaluating skill, and creating skill. Result from data analysis found that there is a very weak correlation ($r = 0.02$) between the two variables with regression equation of average grade point = $75.023 + (-.273)$ Learning Environment. **Conclusion:** Thus, a non-significant relationship between HOTS and learning environment is successfully proven through correlation and regression statistical analysis.

Keywords : Learning Environment, Learning Environment's Distribution, Higher Order Thinking Skills, Correlation Statistical Analysis, Regression Statistical Analysis

JEL Classification Code C00, I21, M41, O31

1. Introduction

The vision to make Malaysia a high-income developed country through the implementation of educational transformation (Tajudin & Chinnappan, 2016) has led to the emphasis on the application of Higher Order Thinking Skills (HOTS). With this in mind, the aim to produce citizens embracing principles of nationalism together with a global mindset is achievable through innovation and

competitiveness across all fields, granting a pathway towards Malaysia's continuous prosperity, and accordingly charting as a developed country. More so, curriculum transformation initiatives introduced by government are among efforts to advance the learning program's distribution to boost the success of students in achieving six student aspirations such as knowledge, thinking skills, leadership skills, bilingual skills, ethics, and spirituality as well as national identity (Jamaluddin et al., 2019). Therefore,

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in parallel with the development of the global education, Malaysia under the Ministry of Education (MoE) had taken steps to strengthen the national education system through the Critical and Creative Thinking Skills program (KBKK). This was done through the introduction of the teaching and learning (TnL) approach of HOTS as recommended in the Malaysian Development Education Plan (PPPM) 2013-2025 (Jamaluddin et al., 2019).

2. Literature Review

2.1. Malaysian Development Education Plan (2013-2025)

A long-term strategic plan, namely The Malaysian Development Education Plan (PPPM) (2013-2025) enables a holistic implementation of Transformation of the National Education System, making it possible to translate the essence of National Education Philosophy (FPK) for the purpose of strategizing a balanced education system (Jamaluddin et al., 2019). Therefore, in order to drive excellence in national education, and with emphasis on the concept of life-long learning (Mohd Arshad & Mohd Yasin, 2015), educators need to continuously brace with knowledge, skills, and new practices with respect to teaching and learning that are relevant to 21st century practices, to be imparted to students (Katai & Osztian, 2021). Corresponding with the objectives of National Education Philosophy (FPK), the implementation of curriculum transformation from the Integrated High School Curriculum (KBSM) to the Standard High School Curriculum (KSSM) is a manifestation from the life-long learning concept. These programs focus on the ability of students to interact in various situations, problem solving skills, as well as thinking and reasoning skills in addressing a problem or a situation (Mohd Arshad & Mohd Yasin, 2015; Bourke, 2019; Jamaluddin et al., 2019).

2.2. Learning Environment

Learning environment has proven to be applicable in the development and increase in level of HOTS through learning outcome that has been set (Che Ahmad et al., 2013; Mokhtar, 2012; Fraser, 1998). Malaysia Educational Development Plan Annual Report (MEDP) in 2013-2015 explain that learning environment is an important element that must be taken into consideration as this element contributes towards the effectiveness of HOTS implementation in Teaching and Learning (TnL) session as targeted through MEDP (2013-2015) (Jamaluddin et al., 2019). This is reiterated by Chen et al., (2017) that stated, a positive and quality learning environment can increase the

level of academic achievement of every student as a result from the existence of environment that supports a planned learning opportunity (Alkharusi et al., 2019; Vinales, 2015).

Learning environment refers to all students' environment aspects that promote learning (Joyce & Weil, 1996) and this includes physical, social, psychology and pedagogy aspects in which learning occur, by means of influencing students' achievement and attitude (Fraser, 1998). Certain learning environment exists simultaneously during the beginning of Teaching and Learning process (Puteh et al., 2014) within the prescribed time frame. This is because learning environment is considered as basic platform towards students' learning (Srikongchan et al., 2021; Vinales, 2015) and it is always linked to students' achievement and attitude (Chen et al., 2017).

The significance of the learning environment in generating academic excellence is evidenced by the voluminous studies conducted by past researchers (Tessmer & Harris, 1992; Kock et al., 2004; Thuen & Bru, 2009; Rugutt, 2013; Puteh et al., 2014; Vinales, 2015; Chen et al., 2017; Jamaluddin et al., 2019; Yurniwati & Soleh, 2020; Jamaluddin et al., 2021) given the great impact this learning environment has on the development of student learning through their learning outcomes. In this study, the learning outcome focused specifically on HOTS level. All students responded uniquely to their environment where a comfortable environment can encourage and stimulate positive learning behaviors (Kock et al., 2004; Che Ahmad et al., 2013; Chen et al., 2017). Empirical studies have also supported the positive effects of compassionate characteristics and caring nature and the healthy relationship between teacher and students that are advantageous on academic achievement (Okula, 1999; Kadir et al., 2019). These studies have demonstrated that the teacher's compassionate attitude towards students have a positive relationship with academic endeavours and social responsibility and prosocial goals. Teachers who care about them and are caring are construed by students as democratic people in interacting, who understands each student's distinctive capability in the learning process. These teachers are also being regarded as a model that the students can look up to, and as individuals who are skilful in giving constructive feedback to the students.

Relationship between teacher and students, teacher's teaching, assessment, teamwork between students (Chen et al., 2017) and unambiguous goals and appropriateness of the curriculum (Chen et al., 2017) are among the dimensions of the learning environment that affect HOTS and student's satisfaction. The findings obtained through the study of Rahim et al. (2015) found that the existence of a passive learning environment was due to challenges in paying attention during teaching and learning sessions, apart from students' tendency to experience boredom during the

learning process. Jamaluddin et al. (2021) supports the finding, highlighting the quality of student's learning is affected due to students' inability to concentrate in class due to various factors. Jamaluddin et al. (2021)'s findings are supported by Social Constructivist Theory, justifying teacher's emphasis is to pay attention to the student's learning environment, given that the effect of the student's learning environment which enables the transformation of the mind in each student.

A research conducted by Elengoven and Nagendralingan (2014) on 20 medical students and five teaching staff focusing on the improvement of HOTS through clinical simulation discovered that a conducive clinic environment includes the sufficiency of materials, a tranquil atmosphere, surroundings that encourage other positive elements, subsequently facilitate in mastering HOTS while effectively completing the task with excellence. Therefore, the conducive learning environment provides students the comfort and relaxed atmosphere for them to carry out tasks and solve problems while successfully applying HOTS in clinical simulation activities. Kock et al. (2004) study focused on teacher's behaviour when managing the learning environment in secondary schools found that almost 90% of respondents perceived that teachers and students should be regarded as learning partners. This is explained by the fact that when the relationship is considered as a learning partner, there is a two-way interaction that contributes to the formation of the student's mind in facing and solving a problem in learning as well as proving success in mastering HOTS.

Centred on Vygotsky's (1978) theoretical approach, the interaction between teachers and fellow students is important in the learning process, whereby the effects of the interaction can stimulate students' mental activities at a higher level in improving their understanding of learning. The interaction between teachers and fellow students includes active social interaction with peers and people who are competent in teaching and learning process. Similarly, the Constructivist view focuses on meaningful learning that covers cognitive processes through student involvement in the environment based on their prevailing knowledge (Aladejana & Aderibigbe, 2007). This meaningful learning is closely associated with the student's experience in fusing old ideas with fresh ideas to create innovative concepts obtained for the purpose of adapting the innovative ideas to the current learning environment.

2.3. Higher Order Thinking Skills

HOTS is defined as a metacognitive process (Yee et al., 2015) that connects the usage of mind potential (Onosko & Newmann, 1994) through learning and observation method, information processing to infer, analyse, and manipulate

information to solve problems (Lewis & Smith, 1993). HOTS concept is also classified as a thinking process that comprise of concept development, understanding, decision making, and problem solving (Marzano, 1988). An individual's ability in connecting and restructuring the existing knowledge with a new knowledge with the purpose of problem solving, analysing argument, and making prediction is the correct concept and suitable with higher order thinking (Newman, 1990; Underbakke et al., 1993) This is because HOTS is highly related to the importance of learning which is to think more effectively in ensuring a more quality method is applied in managing information (Lewis & Smith, 1993).

Rugutt and Chemosit (2009) define HOTS as a cognitive skill that enables the students to analyse and give feedback in various existing situation. This is because HOTS is synonym with technical thinking (Bean, 2001) and can be developed through students' active participation in learning process through educational transformation (Kaplan & Kies, 1994). Che Ahmad and Sanip (2014) based on their research on HOTS level of mastery among Biology students found that the students' analysis level is at moderate stage (Mean= 52.33, SD=25.66). As for application (Mean= 29.86, SD= 21.88), evaluation (Mean= 9.80, SD= 13.16), and creation (Mean= 27.93, SD= 27.79) level, all of them is at a weak level. This result has proven that almost all students cannot master HOTS effectively.

Rahim et al. (2015) in their research towards 195 final year students in University Putra Malaysia (UPM) and University Teknologi Malaysia (UTM) also found that almost 50% of the students' reflective thinking mastery level is at a satisfactory level in their learning. Nevertheless, constant training and guidance in mastering critical level reflective thinking skill must be taken into consideration in order to increase the students' marketing value in the working world (Hashim et al., 2016). Thus, explanation and awareness regarding the importance of mastering reflective thinking among students must be explained so that the process of self-preparation to compete in world and global market can be executed during learning period in school or even at higher learning institution.

Bakry and Bakar (2015) study related to the students' thought process in solving mathematical problems involving the application of HOTS discerned that through focusing on the application of HOTS in mathematics teaching and learning sessions, students were able to appreciate mathematical concepts in depth and apply the knowledge they have in real life. This is due to the fact that the ability of students to develop the capacity of HOTS is closely related to the thinking process when solving mathematical problems. Similarly, Bakry and Bakar (2015)'s findings indicate that students' ability to solve math questions at high level, medium level and low level differs from each student.

Students who are adept at solving math questions at a high level can make meaning, give opinions and can conclude the knowledge gained. While students who have mathematical ability at a medium level can make meaning, give opinions but were not able to conclude the knowledge gained, and students who have mathematical ability at a low level were incapable to generate meaning and give opinions and are unable to conclude the knowledge gained.

Rahim et al. (2015) offers his findings through his research on 195 final year students in UPM and UTM regarding the relationship between involvement in learning with students' level of reflective thinking highlighting the students' reluctance to actively participate in learning is due to lack of support given by the teacher towards positive improvement displayed by the students. Disinclination to actively participate in learning causes the students' cognitive development becomes hindered and the students' mind transformation cannot be developed effectively and successfully. Apart from that, research by Skinner and Belmont (1993) explained the importance of classroom relationships as a succession from the students' basic psychological needs while socializing with others. Therefore, by making Accounting Principle Elective Subject (MPEI PP) as the research focus, a few questions can be raised:

- i. Is there any relationship between learning environment and students' HOTS achievement in MPEI PP?
- ii. How strong is the relationship between learning environment and students' HOTS achievement?
- iii. Is the relationship linear? In order to answer this question, investigation must be carried out to study the relationship between learning environment and HOTS in MPEI PP.

3. Methodology

This research is in the form of correlation with the aim to evaluate the existing relationship between two or more variables. For this research, the researcher evaluates the relationship and the strength between learning environment variable and HOTS variable without manipulating any or both variables. Hence, this research that aims to evaluate the relationship between the two variables can contribute towards the research finding in order to complete past studies through the implementation of correlation statistic. This research also involves 59 Form 5 students aged 17 or better known as twelfth grade internationally as research sample that is chosen through purposive sampling. Applying purposive sampling method is suitable in choosing the research sample as it does not involve the need to implement basic theories in deciding the number of research samples

aside from application of specific element in choosing the samples. Thus, in order to answer the research's objectives, students that are willing to give information and fulfil the research criteria are chosen as research sample.

This research also involves two variables; each one is classified as predictive variable and criteria variable. Learning environment is categorized as predictive variable while students HOTS achievement is categorized as criteria variable. Therefore, in this research focus, learning environment is the predictive in predicting the level of students' HOTS achievement. This research utilizes two research instruments which are learning environment questionnaire and MPEI PP HOTS test. Learning environment questionnaire is used to gather the students' perception regarding the schools' HOTS MPEI PP learning environment that includes learning facility, students' autonomy, and cooperation between the students.

As for MPEI PP HOTS test, it is used to measure the students' four abilities in MPEI PP HOTS which includes applying, analysing, evaluating, and creating skills. MPEI PP HOTS test is in the form of objective and subjective that contain 26 questions that is created based on Form 4 syllabus or the eleventh-grade syllabus of MPEI PP (introduction towards accounting, account classification and accounting equation, and accounting document as source of information). A time limit of 1 hour and 15 minutes is given to the students to answer the HOTS questions and 15 minutes to complete the learning environment questionnaire. The level of HOTS achievement is evaluated in accordance with Table 1.

Table 1: Interpretation of HOTS Achievement Test

Marks	Grade	Results
90 – 100	A+	EXCELLENT
80 – 89	A	
70 – 79	A-	
65 -69	B+	CREDITS
60 – 64	B	
55 – 59	C+	
50 – 54	C	
45 – 49	D	PASS
40 – 44	E	
0 – 39	G	FAIL

The research data is then gathered to carry out the process of data analyzation using regression and correlation statistical test. Regression and correlation statistical test are used to estimate the relationship and to measure the strength of linear relationship between the variables. The implementation of regression and correlation analysis is to evaluate the relationship between students' HOTS achievement and the existing learning environment that is applied in MPEI PP. Explanation regarding the relationship

between the variables is shown in Table 2.

Table 2: Relationship Status between Variables using Coefficient Correlation

Coefficient (r)	Relationship
0.00	No Correlation
0.00 – 0.25	Very Weak Correlation
0.26 – 0.50	Sufficient Correlation
0.51 – 0.75	Strong Correlation
0.76 – 0.99	Very Strong Correlation
1	Perfect Correlation

Source: Sarwono (2009)

4. Discussion and Conclusion

The Results and the discussion on the empirical data discussed as below discussion.

4.1. Descriptive Statistics

Descriptive statistic was chosen by the researcher with the purpose to represent the summary of the gathered data. Also, descriptive statistic provides result in the form of numbers that applies graphic element and is suitable to be used to summarize a large amount of data. The finding from the descriptive statistic is indicated in Table 3.

Table 3: Descriptive Statistic for Learning Environment and HOTS Variable

Variable	N	Min.	Max.	Mean	Std. Deviation
Learning Environment	59	6.00	9.90	8.0315	.75467
HOTS	59	39.0	90.0	72.83	10.090

Source: SPSS output

Based on the finding from the descriptive statistic, the maximum and minimum value for learning environment is 9.90 and 6.00. As for the maximum and minimum value for HOTS variable, the value is 90.0 and 39.0. Based on the finding from the standard deviation value, both learning environment and HOTS variable portrays the value of set of scattered data in a small range. This shows that both variables have good level of variability. Thus, correlation and regression analysis are suitable to study the relationship between the two variables. Nevertheless, the research finding through descriptive analysis statistic does not provide information about research data normalization. Hence, Kolmogorov-Smirnov and Shapiro-Wilk statistical method was implemented to examine data normalization (Henry, 2002).

Table 4: Data Normalization Testing using Kolmogorov-Smirnov and Shapiro-Wilk Test

	Tests of Normality					
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Learning Environment	.081	59	.200 [*]	.991	59	.946
*. This is a lower bound of the true significance.						
a. Lilliefors Significance Correction						

Source: SPSS output

Normal or abnormal scattered data status is determined by Sig. value denoted in Kolmogorov-Smirnov and Shapiro-Wilk Test. Through these tests, the Sig. value must denote a value that is > 0.05 (insignificant value) to show an image of normal data distribution. Therefore, according to Table 4, the research data is distributed normally as both Sig. values that are generated are more than 0.05 which is .200 for Kolmogorov-Smirnov test and .946 for Shapiro-Wilk test.

4.2. Correlation between Learning Environment and HOTS

Correlation is a statistic method that is used to study the existence or non-existence of relationship and the direction of relationship for two or more variables. The finding from this statistic method that portrays the level of relationship is measured and represented by coefficient correlation. Analysis in the form of correlation between learning environment and HOTS variable is summarized in Table 5.

Table 5: Correlation between Learning Environment and HOTS

	Learning Environment	HOTS
Learning Environment	Pearson correlation	1
	Sig. (2-tailed)	.878
	N	59

Source: SPSS output

The number of cases with non-missing values, Pearson correlation coefficients and significance values are displayed in the correlation table. The coefficient correlation value is between -1 and 1 (Best & Kahn, 1998). A weak linear relationship occurs when the correlation coefficient value approached 0. However, if r value moves from 0 to -1 or 1, it shows that there is an increase in linear relationship between 2 or more variables. A perfect linear relationship occurs when coefficient correlation value r=1 or r=-1 which shows that the plot point is directly on the straight line. Positive symbol at coefficient correlation value explains that there is an existence of a positive relationship while negative symbol at coefficient correlation value explains the

existence of negative relationship between the variables. Hence, according to the correlation analysis that had been conducted, relationship between learning environment and HOTS variable was very weak ($r = -0.020$) with p value of .878. Statistically, there was no significant relationship between learning environment and HOTS.

The findings of this study are contrary to the findings of Wirussawae et al. (2016) regarding the perception of the learning environment as a factor that is seen to affect students' HOTS. The study found that students' mastery of HOTS depends on learning environment management factors that include aspects of the environment in the classroom, the environment outside the classroom, information technology, classroom atmosphere, learning delivery, and teaching and curriculum. Where, the study of Wirussawa et al. (2016) explained that students is closely related to the management of a good and quality learning environment.

According to Abu and Eu's (2014) research on the performance of fourth grade students in Additional Mathematics classes, great performance in the subject is influenced by the motivation and attitude of the student. Next, it is discovered that student enthusiasm for studying is a component that also affects kids who perform well in academics (Albaili, 1997).

The results of Albaili's study (1997) also show that top students achieve high mean values in all significant areas, including motivation, attitude, time management, concentration, worry about failing, information processing, exam coping methods, and self-tests. However, the results of the study by previous researchers ran counter to those of Albaili (1997), who noted that learning strategies such as time management, anxiety reduction, and concentration have a major impact on academic success when studying accounting concepts. While this was going on, a negative link was seen between the success of accounting principle subjects and the practise of learning attitudes, motivation, information processing, the ability to choose the main ideas, and self-evaluation.

Every student responds differently to their environment, and a welcoming setting can promote and drive healthy learning practises (Kock et al., 2004; Che Ahmad et al., 2013; Chen et al., 2017). One aspect of the learning environment that influences HOTS and student happiness is the connection between student participation, specific goals, and the applicability of the curriculum (Chen et al., 2017).

However, the findings from previous researchers were not found in this study may be due to the use of different study constructs and instruments to measure learning environment factors on higher level thinking skills that make the subject of accounting principles the main focus. Similarly, the study of Wayne et al. (2013) regarding the perception of the learning environment and the performance

of higher order thinking skills among medical students in Mexico showed a positive relationship between the learning environment (meaningful learning environment, emotional climate, and peer interaction students) to higher level thinking skills.

4.3. Regression between Learning Environment and HOTS

Similarity that indicates a statistical relationship between one or more explanatory variable and responding variable can be produced through regression analysis. Consequently, regression analysis could develop a model relationship between explanatory variable and responding variable. For the purpose of developing a regression equation, two types of coefficients were produced by SPSS which were unstandardized coefficients and standardized coefficients as shown in Table 6.

Table 6: Coefficient of the Estimated Regression Model of Leaning Environment and HOTS

Model		Unstandardized Coefficients		Standardized Coefficients		
		Beta	Std. Error	Beta	t	Sig.
1	Constant (Learning Environment)	75.023 -.273	14.28 1.77	-.020	5.25 -.154	0.00 0.88

Source: SPSS output

In accordance to Table 6, the intercepting value is 75.023 and the slope value is -.273 for learning environment. Therefore, relationship between HOTS and learning environment is presented through the following regression equation:

$$\text{HOTS} = 75.023 + (-.273) \text{ Learning Environment (1)}$$

A collection of statistical techniques known as regression analysis is used to estimate the associations between a dependent variable and one or more independent variables. It can be used to simulate the future relationship between variables and gauge how strongly the relationships between them are currently. Based on the analysis, the relationship between higher order thinking skills and learning environment is in low level.

5. Conclusion and Recommendation

In line with the finding and discussion, it was found that learning environment's distribution that comprised of learning facility, students' autonomy, and cooperation between the students did not have a significant relationship

with students' HOTS level of achievement in accounting principle. Nonetheless, this result does not mean that the importance of HOTS mastery among students should be taken lightly. Instead, emphasis on HOTS application in teaching and learning session in school must be empowered. Moreover, there was constraint to the researcher in order to execute full regression analysis as the correlation analysis indicated inexistence of a significant relationship between the tested variables.

Hence, the researcher suggests that a research that is related to HOTS and learning environment is continued with other subjects as the main focus to ensure the finding from the research could be generalized. Other than that, the researcher also suggests that the research on HOTS and learning environment in accounting principle subject must take into consideration the involvement of bigger research sample together with the involvement of learning by modules (Jamaluddin et al., 2023). These suggestions are one of the ways the researcher could support a bigger research that is conducted in Malaysia through Malaysia Education Development Plan (MEDP) (2013-2025) that puts HOTS mastery as one of the students' aspiration to be achieved.

For the purpose of advancement, the researcher suggests that the findings of this study can be benefitted to advance studies focusing on Higher Order Thinking Skills considering other subjects as the main focus. Additionally, the researcher also suggested for future studies to consider having male and female students at the higher education level as study respondents.

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