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The Relationships between Influencing Factors and Critical Thinking Skills among Undergraduates of Early Childhood Education in Public Tertiary Institutions

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Abstract

Critical thinking skills are essential skills for life, work, and function effectively in all other aspects of life. The purpose of this study was to identify some of the important correlates of critical thinking skills, in terms of environment, quality teaching, and motivation among undergraduates early childhood education (ECE) in public tertiary institutions. This study employed correlation design. A total of 226 respondents' early childhood education in public tertiary institutions gets involved. The data analyzed using descriptive statistics, correlation and multiple regressions by using software Statistical Package for the Social Science (SPSS) version 21.0. Descriptive analysis was done to obtain mean and standard deviation value for each variable. Descriptive analysis showed the respondents have moderate level of critical thinking skills 50.60%. There is a significant and positive relationship between environment and critical thinking skills ($r = .575$, $p=0.000$), quality teaching and critical thinking skills ($r=.454$, $p=0.000$), motivation and critical thinking skills ($r=.425$, $p=0.000$) among undergraduates early childhood education in public tertiary institutions. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. The outcome showed the multiple regression analyses indicated that the set variables predicted 43.10% of the factors influencing and the best predictors of factors influencing was environment. This study is expected to be form of assessing the factors influencing critical thinking skills of the undergraduates early childhood education in the implementation of effective teaching pedagogy as well as contribute to effectiveness of the education system, particularly the field of early childhood education.

Keywords: Critical Thinking Skills, Environment, Quality Of Teaching, Motivation, Early Childhood Education

Introduction

Education sector is one of the sectors which contribute to the development of human capital. Regarded as development agent, this sector also bridges knowledge, training, potential, interest

and other human quality elements as human capital to a more dynamic, innovative and progressive dimensions in order to achieve the country's aspiration in becoming a developed and high income nation.

The twin forces of globalization and internationalization have put a critical demand on the education system in Malaysia to transform dynamically in measuring up to the global needs of the 21st century and achieving the advanced nation status vision by 2020. One of the key challenges in this perspective is to prepare students with real life skills for tomorrow's knowledge based economy that will enable them to be relevant individuals who are capable of creativity and innovative skills to be able to compete in the global labour market.

Critical thinking has been called one of the most important attributes for success in the 21st century (Huitt, 1998). Critical thinking is reasoned, reflective thinking focused on deciding what to believe or what to do (Ennis, 1996). Meyers (1986) argued that for students to reach their fullest potential in today's society, they must learn to think and reason critically.

People think critically when they are trying to solve a problem, assess an argument, decide about a belief, or make a decision in general. In this respect, individuals who have the tendencies of critical thinking can cause differences in economics and social studies having higher cognitive skills. In other words, it is a conscious and deliberate process involving the interpretation and evaluation of information or experience.

Problem Statement

Early childhood education is a challenging educational field. From early childhood through adolescence, children's cognitive functioning changes greatly. Social and intellectual activities need a great deal of cognitive functioning. Children form concepts of the nature of knowledge that contributes to abilities to reflect on one's thought processes and evaluate the reasoning of others (Pillow, 2008).

Education system in Malaysia focuses on rote learning instead of thinking skills (Rajendran, 2004; Marlina & Shaharom, 2011). Consequently students are fundamental may not be able to generate creative ideas on what have been learned and apply skills. Lack of ability critical thinking skills leads to many social problems such as suicide, which is an acute worldwide issue and it has become an epidemic in Asia (Jin & Lee, 2011). In fact, the basic concepts of critical thinking being able to understand or figure out what the problem, conflict or contradiction is and to direct thinking to the specific purpose of solving the problem.

The tertiary institutions still practices in exam-orientated learning which emphasizes more on low level cognitive activities like memorizing, remembering and understanding (Mohd. Ali & Shaharom, 2003). Students learn to rote memorization as preparation to pass in the examination. Thus, students' ability is measured by performance in examination. In fact, the role of tertiary institutions especially in education is to constantly improve the quality of students in order to provide quality teachers for the schools (Rasimah, Rohaizad, Yeop & Anuar, 2008).

In Malaysian context, a study found that after eleven years of school, students are still unable to apply critical thinking in their schools or real world situation (Rosnani & Suhailah, 2003; Mohd Majid Konting, Norfaryanti, kamaruddin, Azirawani, Adam & Abdullah, 2007). The preliminary

study was conducted in year 2016, there was 120 undergraduates early childhood education from one of the public tertiary institution in Malaysia took the critical thinking skills survey. The result showed that the majority undergraduates early childhood education of critical thinking skills at poor level. This supported by the studies of (Goh, & Matthews, 2011; Choy and Cheah 2011) stated that undergraduates did not seem to understand the requirement need to cultivate critical thinking skills among students during practicum.

None of the research is regarding the factors influencing critical thinking skills among undergraduates early childhood education in public tertiary education in Malaysia. In fact, students' ability to think critically has become a major concern among educators and psychologists especially in higher education level. Therefore, there is a need to explore undergraduates early childhood education current critical thinking skills and factors influencing the development of these abilities.

Research Objectives

The objectives of this study are:

1. To identify the critical thinking skills level among undergraduates of early childhood education in public tertiary institutions;
2. To determine the relationships between environment and critical thinking skills among undergraduates of early childhood education in public tertiary institutions;
3. To determine the relationships between quality of teaching and critical thinking skills among undergraduates of early childhood education in public tertiary institutions;
4. To determine the relationships between motivation and critical thinking skills among undergraduates of early childhood education in public tertiary institutions; and
5. To determine the contribution of environment, quality of teaching and motivation towards critical thinking skills among undergraduates of early childhood education in public tertiary institutions.

Research Hypothesis

This research was guided by the following hypothesis:

H1: There is significant relationship between environment and critical thinking skills among undergraduates of early childhood education in public tertiary institutions.

H2: There is significant relationship between quality of teaching and critical thinking skills among undergraduates of early childhood education in public tertiary institutions.

H3: There is significant relationship between motivation and critical thinking skills among undergraduates of early childhood education in public tertiary institutions.

H4: The variance in the critical thinking skills among undergraduates of early childhood education in public tertiary institutions are significantly explained by environment, quality of teaching and motivation.

Methodology

Research Design

This research was quantitative approach which is survey methodology for data collection. The sampling technique used in this study was purposive sampling. Purposive sampling was chosen

because the respondents are undergraduates who are in their final year ECE program in public tertiary institutions in Malaysia. Furthermore, these undergraduates already completed the practicum process.

Context of the Study

The populations are 855 undergraduates, only a total of 237 undergraduates of ECE in final year were identified in these two local universities and five institute teacher educations. Thus, the number of sample size for this study consisted of 237 undergraduates. In the present study, it was found that four cases had a probability value of less than 0.001 (Cases 67, 105, 157 and 206) and they were thus excluded from further analysis leaving 226 cases with valid data. The researcher gets the entire samples, because the best sample is a representative sample of the entire samples and the number of possible (Ghazali & Sufean, 2016). Furthermore, the number of samples also exceeded the minimum requirements of sample required for analysis.

Table 1: Distribution of Institutions and Number of Undergraduates of Early Childhood Education in Public Tertiary Institutions that Involved in the Survey

No	Institutions	Numbers of Undergraduates
1.	University A	65
2.	University B	62
3.	Institute of Teacher Education A	20
4.	Institute of Teacher Education B	24
5.	Institute of Teacher Education C	22
6.	Institute of Teacher Education D	21
7.	Institute of Teacher Education E	23
	Total	237

According to Cochran (1977), in planning of a sample survey, a stage is always reached at which a decision must be made about the size of the sample and it is important. Too large a sample implies a waste of resources, and too small a sample diminishes the effectiveness of the results. The sample size in this study was determined using the sample size formula by Cochran (1977), the formula is which represents the population with 95% level of confidence.

$$n = \frac{n_0}{(1 + \frac{n_0}{N})}$$

With $n_0 = \frac{t^2 s^2}{d^2}$, where:

n = value for sample size

t = value for selected alpha level of .025 in each tail
= 1.96 (Bartlett, 2005)

s = estimate of the standard deviation = 1.25
(estimate of variance deviation for 5 points scale calculated by 5 divided by 4)

$$d = 0.15 \text{ (acceptable margin or error for mean being estimated)}$$

$$= 0.03 \text{ (acceptable margin error) } \times 5 \text{ (points scale)}$$

(Bartlett, 2005)

$$N = 855$$

$$\text{So, } n_0 = \frac{(1.96)^2 (1.25)^2}{(0.15)^2}$$

$$= 266.24$$

$$n_0 = 266$$

$$\text{Thus, } n = \frac{266}{1 + \frac{266}{855}}$$

$$= 203$$

Therefore, the minimum sample size required for this study according to Cochran (1977) is 203 respondents.

Research Instruments

This study uses a questionnaire as an instrument in data collection. The researcher chose the questionnaire method in conducting this study because the information obtained was accurate and complete. Questions submitted to the respondents are statements that refer to the objectives of this study. The questionnaires in this study consist of three parts which have 93 items as a whole. The items are divided into sections in the questionnaire

Demographic information is collected from participant about their age, sex and name of institution. Secondly is critical thinking skills test adapted from Malaysian Critical Thinking Skills Instrument (Rahayah, Rosadah, Zolkefli, Rodiah, Shahrir, Basri & Azaheen, 2008a). The instrument consists of four subscales in this instrument which are reasoning, analytical and logical, disposition and assumption. This section consists of 43 items which are designed to measure the level of critical thinking skills. All the items contained in the questionnaire critical thinking skills are prepared in accordance with their respective subscale. Follow by the factor environment, quality of teaching and motivation. Total of 93 items included demographic and mixed with some negative items.

Validity and Reliability of the Instrument

The researcher has examined all the items in the original instrument and found that most of the items were suitable to be used in Malaysian context. The validity of the instrument was determined using face validity, content validity and construct validity. Reliability in this study was measured by Cronbach alpha reliability test using the SPSS computer software. Data from the pilot study were analyzed to determine the value of Cronbach alpha coefficient. Table 2 shows

the reliability or internal consistency values of the Critical Thinking Skills and factors influencing critical thinking skills.

Table2: Reliability of the Instruments

Construct	Total Items	Cronbach's Alpha Coefficient (α)
Critical Thinking Skills	Reasoning (10 items)	0.812 (KR-20)
	Analytical & Logical (10 items)	0.804 (KR-20)
	Disposition (13 items)	0.796 (KR-20)
	Assumption (10 items)	0.823 (KR-20)
Environment	Classroom (5 items)	0.837
	Family (5 items)	0.828
	Peers (5 items)	0.853
	Mass Media (5 items)	0.813
Quality of Teaching	14 items	0.828
Motivation	13 items	0.793

Findings

The descriptive statistics reported frequency distribution, percentages, mean, and standard deviation according to gender, age and institutions. The frequency and percent of institutions by gender and age group was also provided. Frequency distributions were calculated for all cases in this study and were summarized in Table 3.

Table 3: Summary of the Samples Profiles of the Study

Information of Profile			Percent
Gender	Male	31	13.7
	Female	195	86.3
Age	22 years old	9	4.0
	23 years old	93	41.2
	24 years old	108	47.8
	25 years old	16	7.0
Institutions	University A	63	27.9
	University B	61	27.0
	Institute of Teacher Education A	19	8.4
	Institute of Teacher Education B	22	9.7
	Institute of Teacher Education C	20	8.8
	Institute of Teacher Education D	20	8.8
	Institute of Teacher Education E	21	9.4

The total respondents of the study (n=226). The demographic information of the undergraduates was illustrated in the table 3. They consisted of 86.30% female and male 13.70% undergraduate. The majority of respondents were 24 years old (47.80%) and most of them (34.07%) from institutions of teacher education.

Table 4 shows the mean score of variable sub-element of critical thinking skills. The result indicate the disposition (M=66.50; SD=8.120) is at good level, reasoning (M=59.30; SD=8.641) and assumption (M=50.30; SD=8.273) at moderate level. Analytical and logical at poor level (M=26.20; SD=8.832).

Table 4: Mean Score of variable Sub-element of Critical Thinking Skills

Sub-element of Critical Thinking Skills	N	Mean	Standard Deviation	Level
Reasoning	226	59.30	8.641	Moderate
Analytical and Logical	226	26.20	8.832	Poor
Disposition	226	66.50	8.120	Good
Assumption	226	50.30	8.273	Moderate

In this finding is to shown any relationship between environment and critical thinking skills among ECE of undergraduates in public tertiary institutions. The hypothesis of the study has been set. Hypothesis is expressed in the form of alternative statements and has been tested using the software SPSS version 21.

H1: There is significant relationship between environment and CTS among undergraduates of ECE in public tertiary institutions.

Table 5: Correlation between Environment and Critical Thinking skills

Variable	Critical Thinking Skills	
Environment	Pearson Correlation (r)	.575**
	Significant	.000
	N	226

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

The Table 5 shown that the relationship between environment and critical thinking skills among ECE of undergraduates in public tertiary institutions was investigated using Pearson product-moment correlation coefficient. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. There was strong, positive correlation between the two variable, $r = .575$, $n = 226$, $p < .01$, with high levels of correlation strength between the two variables. Then, the hypothesis H1 is accepted.

The hypothesis of the study has been set. Hypothesis is expressed in the form of alternative statements and has been tested using the software SPSS version 21.

H2: There is significant relationship between quality of teaching and CTS among undergraduates of ECE from public tertiary institutions.

Table 6: Correlation between Quality of Teaching with Critical Thinking Skills

Variable		Critical Thinking Skills
	Pearson Correlation (r)	.454**
Quality of Teaching	Significant	.000
	N	226

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

The Table 6 shown that the relationship between quality of teaching and critical thinking skills among ECE of undergraduates in public tertiary institutions was investigated using Pearson product-moment correlation coefficient. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. There was moderate, positive correlation between the two variable, $r = .454$, $n=226$, $p < .01$, with moderate levels of correlation strength between the two variables. Then, the hypothesis H2 is accepted.

The hypothesis of the study has been set. Hypothesis is expressed in the form of alternative statements and has been tested using the software SPSS version 21.

H3: There is significant relationship between motivation and CTS among undergraduates of ECE in public tertiary institutions.

Table 7: Correlation between Motivations with Critical Thinking Skills

Variable		Critical Thinking Skills
	Pearson Correlation (r)	.425**
Motivation	Significant	.000
	N	226

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

Table 7 shown that the relationship between motivation and critical thinking skills among ECE of undergraduates in public tertiary institutions was investigated using Pearson product-moment correlation coefficient. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. There was moderate, positive correlation between the two variable, $r = .425$, $n=226$, $p < .01$, with moderate levels of correlation strength between the two variables. Then, the hypothesis H3 is accepted.

Multiple Regression analysis (Stepwise) has been used to identify changes in two or more factors that contribute to the change a dependent variable. Multiple Regression Analysis with procedures "Stepwise" settlement has been used to answer the following hypothesis:

H4: The variance in the CTS among undergraduates of ECEC in public tertiary institutions is significantly explained by environment, quality of teaching and motivation.

The variables included in the multiple regression analysis were the independent variables measured by score means of three main factors and critical thinking skills measured by score mean was the dependent variable in this study. First, the multiple correlation coefficient ($R =$

.657) as shown in Table 8 is a measure of the strength of the linear relationship between CTS and the set of three predictor variables. The R-square statistic ($R^2 = .431$) or coefficient of multiple determination indicates the total amount of variance the independent variables explain in the dependent variable. The R^2 value is expressed as a percentage. Hence 43.10% of the variation in critical thinking skills is explained by three independent variables combined in the model. The adjusted R^2 value was .423. This adjusted R^2 value which gives the most useful measure for the strength of the model is slightly lower than R^2 . This indicates that 42.30% of the variance in academic performance was explained by the model. In other words, 42.30% (a fair amount) of the variance in CTS is explained by any changes in the three factors variables.

Table 8: Multiple Regression Model Summary for Questionnaires

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.657	.431	.423	.195

Note. Predictors: (Constant); environment, quality of teaching, motivation Dependent variable: critical thinking skills.

The unstandardized and standardized regression coefficients as well as t-ratios for the predictor variables are presented in Table 9. The results show that of the three independent variables, all three, Environment ($B = .224$, $t = 7.597$), quality of teaching ($B = .125$, $t = 3.805$) and motivation ($B = .123$, $t = 3.708$), appears to be significant predictors of CTS.

Table 9: Summary of Coefficients Final Model

Predictors	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	R Square Change	Contribution (%)
	B	Std. Error	Beta				
Constant	1.672	.126		13.285	.000		
Environment	.224	.030	.426	7.597	.000	.331	33.10
Quality of Teaching	.125	.033	.217	3.805	.000	.065	6.50
Motivation	.123	.033	.207	3.708	.000	.035	3.50

The highest independent variable contributes to CTS is environment ($B = .426$, $t = 7.579$, $p < 0.005$) and its contribution is 33.10%. This situation shows when environment increase by one unit, then score CTS will increase by .426 units. This finding gives justification that environment are important factor influencing CTS.

The second important variable is the quality of teaching ($B = 0.217$, $t = 3.805$, $p < 0.005$). This variable contributes 6.50% to CTS. This situation shows when the score of the quality of teaching increased by one unit, then the score of CTS will increase by 0.217 units. As a result of this finding shows that quality of teachings are important factor influencing CTS and can be widely used.

The third important variable is motivation ($B = 0.207$, $t = 3.708$, $p < 0.005$). This variable contributes 3.50% to CTS. This situation shows when the score of the motivation increased by one unit, then the score of CTS will increase by 0.207 units.

Implication of the Study

Early childhood education plays an important role in the development of the minds of children in the early stages. Vision 2020 vision requires a highly educated citizen who can be inventive and able to compete, be dynamic, agile and resilient in the face of competition from other developed countries. To create a critical thinking citizen, the National Education Philosophy has emphasized the formation of a knowledgeable, skilled citizen and contributing to national development.

Recommendations for Further Research

At this stage, the researcher found that limited studies related to the students' critical thinking skills in Malaysia especially factors influencing critical thinking skills. Most of the studies do not discuss in detail the critical thinking skills in Malaysian contexts. Based on the literature review of the previous studies, the results and discussion of this research, as well as the limitation of the research, the following recommendations are provided for further research.

The present study measured critical thinking skills tools who did not adequately measure critical thinking skills among undergraduates of early childhood education. It is recommended to use an instrument that really measure the level of critical thinking skills associated with early childhood education in the future. Tertiary institutions need to agree on a consistent definition of critical thinking in education and develop or be actively involved in the development of an assessment tool that is specific to the discipline of education. Comparisons of studies that measure critical thinking in education students cannot be done easily or effectively if the studies are all using different language and different measures.

The results of this study however did find that the factors explored here only account for 40% of the variance in critical thinking skills scores, indicating 60% was not explained by any of the factors explored in this study. There are several of the factors which are not explored in this study because they have not been investigated extensively and this may warrant further investigation.

Conclusion

Identifying the factors that influence critical thinking skills in undergraduates early childhood education is important for developing professional education programmes. It is appeared that is best returned in young children. Therefore, it is every important to make sure the undergraduates of early childhood education have high level of critical thinking skills in order to teach the children.

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