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2008

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Rosyati Abdul Rashid
*Universiti Malaysia Terengganu*

Rosna Awang Hashim
*Universiti Utara Malaysia*

Originally published in the Proceedings of the EDU-COM 2008 International Conference. Sustainability in Higher Education: Directions for Change, Edith Cowan University, Perth Western Australia, 19-21 November 2008.
This Conference Proceeding is posted at Research Online.
http://ro.ecu.edu.au/ceducom/36

# The Relationship between Critical Thinking and Language Proficiency of Malaysian Undergraduates

Rosyati Abdul Rashid[1] and Rosna Awang Hashim[2]

[1]Dept of Languages & Communication
Universiti Malaysia Terengganu
E-mail: rosyati@umt.edu.my

[2]College of Arts & Sciences
Universiti Utara Malaysia
E-mail: rosna@uum.edu.my

## ABSTRACT

In the present information era, university students are expected to be able to think critically so that they will be able to keep up with the changes brought about by new technological innovations and have better chances of employability. Since language is an important tool for acquiring knowledge at the tertiary level, it is therefore important to gain insight into the nature of the critical thinking ability of undergraduates and its possible link to their language proficiency. This study examined the critical thinking ability of Malaysian undergraduates and its relationship to language proficiency. The Bahasa Malaysia version of the Cornell Critical Thinking Test (CCTT) Level X was administered to 280 undergraduates. Results indicated that the critical thinking ability of the undergraduates was much lower than that of their American counterparts. Nevertheless, significant correlations were found between their critical thinking ability and English language proficiency as measured by two national-level tests. Implications for teaching and future research are discussed in this paper.

**Keywords:** Critical thinking and language proficiency

## INTRODUCTION

The emergence of the information age has created great demands for "knowledgeable workers" and "smarter graduates". This has urged many nations to invest in their human capital via education so that they can have a competitive edge over the other nations. However, complaints have been made by employers in many parts of the world such as America (Curry, 1999), United Kingdom and Europe (Bennett et al., 2000) and Malaysia (Nazaria Baharudin, 2004) regarding their distrust in the school, college or university systems of being able to prepare future workers who could meet the demands of the global job market. It seems that there is a mismatch between the skills required by the employers and those acquired by the graduates. Included in this mismatch is critical thinking, a skill which has been claimed to be lacking among the graduates. This harsh reality concerning university graduates has sparked off worldwide interests in research on critical thinking ability of university students.

## LITERATURE REVIEW

Critical thinking skills and mastery of English language are expected to become important outcomes of university education in Malaysia. This is so because the country, in its rigorous attempts to realize the nation's goal to achieve the status of an industrialized country by the year 2020, recognizes the need to use English as the language of science, technology and trade, and the need to generate workforce who are proficient in English and critical in their thinking (Abdul Shukor Abdullah, 2000; Awang Had Salleh, 2006). This recognition is reflected in the Malaysian government's decision to

allow the use of English in the teaching of professional courses such as medicine and information technology at the tertiary level (Choi Kim Yok, 2005; Gill, 2002) and replace B.Malaysia, the national language, with English as the medium of instruction for the teaching of Mathematics and Science in all primary and secondary schools beginning from the year 2003 (Choi Kim Yok, 2005; Lim & Normizan Bakar, 2004). These changes made to the education system will definitely affect the teaching and learning process at the university when the first group of school students learning Mathematics and Science in English gain admission to university in 2009 or 2010.

The present importance placed on the need for university students to be critical in thinking and proficient in English is partly attributed to the problem of high unemployment rate in the country. Malaysia has experienced a continuous increase in unemployment rate among graduates ever since the financial crisis which hit the Asian region in 1997. Several studies done to determine the causes of high unemployment rate produced findings which indicate that competency in critical thinking and English language are among the abilities highly sought after by employers. A study involving 2,274 graduates who graduated in 2001 (Morshidi Sirat et al. 2004) revealed communication skills as one of the main skills needed by the graduates to secure a job; i.e., most of the unemployed graduates in the study were found to have low proficiency in English. Another study on 241 employers' view on requirements sought in the graduates (Ambigapathy Pandian and Aniswal Abdul Ghani, 2005) confirms the finding of the former study indicating communication skills, particularly English communication skills, as one of the main six competencies required of the graduates; in addition, thinking skills were also rated to be important competencies by the employers who were interviewed. Similar results were found in a survey study on the perceptions of fifteen human resource personnel of national and multi-national organization in Malaysia (Ain Nadzimah Abdullah & Rosli Talif, 2001) - proficiency in English was a quality that the personnel sought after when hiring new employees and was perceived to be an important contributing factor to an individual's success in the related organizations. These studies have raised awareness among many relevant parties on the crucial need to improve the standard of English and thinking skills among Malaysian undergraduates to enable them secure a job upon completing their studies at the university.

Critical thinking ability has been identified as one of the constructs which has been proven to be a good predictor of academic performance (Tsui, 1998; Giancarlo & Facione, 2001; Moore, 1995). Hence, it is important for relevant university authorities to be informed of the critical thinking ability level of their undergraduates. At present, due to insufficient amount of empirical evidence forwarded, the general critical thinking ability of Malaysian undergraduates is still not that transparent. Relevant information on the matter will, beyond doubt, help the university authority to both improve the academic performance of the students and better prepare them for future work.

Critical thinking is also claimed to be important in the acquisition of language skills particularly writing and reading (Elder & Paul, 2006; Shaharom Abdullah, 2004; Seung-Ryul Shin, 2002; Stapleton, 2001; Moore, 1995), two indispensable language skills that can help undergraduates secure their academic success. However, studies on the relationship between critical thinking and these two language skills, especially those which use second language learners as the sample are still not sufficient. Similarly, there are not many studies conducted on the relationship of the aforementioned construct with general language proficiency.

Research on critical thinking in relation to second language learning is still in its infancy stage. Most of the studies done had been triggered by the claim made by some western scholars who have gone to the extreme of taking a universalist stance claiming that Asian students "are deficient in critical thinking abilities" (Stapleton, 2001, p. 509). Scholars such as Fox (1994) and Atkinson (1997) consider critical thinking as a form of western cultural thinking and they hold the view that Asians students are not able to think critically because such nature of thinking is a form of cultural thinking that is alien to Asians. Nevertheless, two studies carried out on Japanese students (Stapleton, 2001; Davidson and Dunham, 1997) produced results which are able to refute the claim that Asians are deficient in critical thinking skills. The findings of the studies did not only show that Japanese students

had critical thoughts but also indicated that critical skills could be taught to these students in an English language class. However, more research needs to be conducted in other Asian contexts, especially in the Malaysian university context, to investigate if the same results apply to the undergraduates in the related contexts.

## OBJECTIVE OF THE STUDY

The present correlational study was conducted to ascertain the critical thinking level of Malaysian undergraduates and determine whether the students' prior ability in English language influences their scores on a test which measures their general critical thinking ability.

## METHOD

### Participants

The target population of this study was the second year undergraduates of Universiti Utara Malaysia (UUM). This group was chosen based on the assumption that they had undergone at least three semesters of university education which was deemed as an adequate period to have had the students exposed to the kind of learning at the tertiary level which promotes the development of critical thinking. The participants of the present study were 280 undergraduates of four different English proficiency levels: Excellent (N=30), Good (N=50), Fair (N=85) and Poor (N=115). A stratified sampling technique was employed in the study to ensure that the sample used is representative of the target population. The undergraduates were selected based on their grades in the SPM English, a national-level examination. The sampling frame for the study was obtained from the university Students' Academic Affairs Department. The rather small number of undergraduates in the Excellent group compared to that in the Poor proficiency group reflects that majority of the undergraduates at the university were not highly proficient in English.

### Instrument

A demographic questionnaire was used to gather data on the undergraduates' performance on two national-level English language proficiency tests run by the Malaysian Examinations Council. The first one was the SPM English which is one of the examinations that all high school students have to sit for at the end of their 5$^{th}$ year to be awarded a certificate (i.e., Malaysia Certificate of Education or 'Sijil Pelajaran Malaysia' -SPM). The grades awarded to the students range from A1 (very good) to 9G (fail). The second English language proficiency test was the Malaysian University English Language Test (MUET), taken prior to admissions to any Malaysian public universities and colleges. The scores attained by the students on the MUET are represented by the bands (1-6) printed on their MUET slips: Band 6 indicates that the test taker is a very good language user while Band 1 reflects that the individual is an extremely limited language user. Both tests are considered as English proficiency tests covering main language skills such as speaking, reading, writing and grammar. The students' self-reported grades on these two tests were then counter checked with those obtained from the Students' Academic Affairs Department to ensure that they were true reflections of actual grades earned. This was done due to doubts raised over the construct validity of self-reported grades (Kuncel et al., 2005).

*Cornell Critical Thinking Test (CCTT), Level X*

Cornell Critical Thinking Skills Test (CCTST), Level X was used as an instrument to measure the critical thinking ability of the undergraduates involved in the present study. The CCTT is a standardized test developed by Ennis, Millman, and Tomko (1985) and is based on the developers' conceptual definition of critical thinking as "…the process of reasonably deciding what to believe and do" (1985, p.1). The test was considered suitable to be used in the present study because it is claimed by its developers to be a general critical thinking test which attempts to measure "critical thinking skills as a whole" (1985, p. 1). Thus, it is an appropriate test to employ in measuring the critical

thinking ability or level of the undergraduates in this study irrespective of their disciplines, a rationale shared by Nuraihan Mat Daud and Zamnah Husin (2004) and Royalty (1995). Moreover, the test has been widely used throughout the world for more than twenty years for determining critical thinking ability of a group or individuals for the purposes of admission to academic programmes or as a criterion for employment. The reliability coefficient of the CCTT Level X ranges from .67 to .90 (Ennis et al, 1985).

The present researcher strongly believes that in measuring critical thinking ability of individuals, the test administered to the individuals must be in the language that they have competence in so that the scores obtained on the test will not be distorted in any way due to the test takers' deficiencies in the language. Therefore, a test conducted in the national language, that is, Bahasa Malaysia, will be the most suitable one for Malaysian undergraduates since the language concerned is the medium of instruction at the public universities and colleges in the country. Furthermore, mastery of Bahasa Malaysia at a satisfactory level is a requirement for entry to Malaysian universities. For these reasons, the CCTT adopted in the present study was the Bahasa Malaysia version of Level X. The test was translated by Shaharom Abdullah (2004) using Brislin's (1980) back-translation technique and the committee approach (Azlina, 1992). The CCTT Level X was chosen by several Malaysian researchers (Nuraihan Mat Daud & Zamnah Husin, 2004; Syahrom Abdullah, 2004; Faizah Mohamad, 2004) to assess the local undergraduates' critical thinking ability since the test, as claimed by the test developers, has been used among undergraduates and graduates whose language use are not yet sophisticated (Ennis et al, 1985, p.3).

The CCTT is a 76-item multiple-choice test which is to be completed within 50 minutes. 5 of the test items are sample items and the other 71 are the real test items that the test takers have to work on. Each test item has three alternative response choices, A, B, and C, respectively. The test is divided into four parts labelled as Induction (23 items), Credibility (24 items), Deduction (14 items) and Assumption Identification (10 items). Each of the test items that are correctly answered is given a score of 1. In this study, the individual undergraduate's total score obtained on the CCTT was used as a measure of his or her general critical thinking ability; that is, a higher score on the test indicates a better critical thinking ability.

The use of part scores of the CCTT to represent performance on each of the four CCTT dimensions is not encouraged by the test developers since the parts are argued to be overlapped and interdependent (Ennis et al., 1985, p.3 ) – a non unusual thing to occur for a complicated construct like critical thinking. This, in fact, helps to explain the theoretical difficulty of performing factor analysis on the data based on the CCTT scores. Nevertheless, Ennis et al., (1985) argue for the construct validity of the CCTT based on its content validity (i.e., the fact that the test was developed based on a sound rationale and that the test items were intensively discussed by the test developers who were scholars involved in the Illinois Critical Thinking Project) and correlations with other tests especially those that are also developed to measure critical thinking.

## Procedure

This study used part of the data collected for another main study. The translated Bahasa Malaysia version of the CCTT Level X was administered to 280 undergraduates from various programmes of studies. The students were briefed on the test and allowed to ask questions. Most of the students took not more than 50 minutes (as recommended in the test manual) to complete the test. In addition, the students were asked to write the grades that they obtained for the MUET and SPM English in the demographic part of a questionnaire which also included a survey on their general metacognitive awareness.

## Data Analysis

The present study employed both descriptive and inferential data analysis procedures. Descriptive statistics like means and standard deviations were computed to provide information concerning the sample and distribution of data and they were also used in the testing of the underlying assumptions of inferential tests employed in the study. The students' SPM English grades were recoded so that the grades were of equal importance to their MUET bands. Five case outliers were identified in the preliminary analysis of the data. These were excluded from the main data leaving the remaining 275 cases (N=275) to be used in further inferential analyses. The reliability of the CCTT and the mean of the total test score were computed before further analyses were carried out. Correlational and structural equation modelling (SEM) analyses were performed on the data to investigate the relationship between the undergraduates' general critical thinking ability and their language proficiency. One-way analysis of variance (ANOVA) was employed to determine if significant differences in the mean of the CCTT scores exist between the four proficiency groups.

## RESULTS

The means computed for SPM English and MUET Bands were 5.43 (SD= 2.01) and 2.76 (SD= .846), respectively. These mean values and the results of the stratification procedure indicate that the majority of the sample, which represented its real population, were from the two low proficiency groups. Cronbach's alpha coefficient was used to examine internal consistency reliability for the items within each of the CCTT subscales and for the overall scale. As tabulated in Table 1, the alpha coefficient for the overall scale is adequate ($r$ =.70) and is within the range of reliability estimates reported in the CCTT test manual (i.e., .67-.90). However, the alpha values for the sub-scales ranged from .34 to .58; these values are far lesser than .70. This could be due to the fact that the test employed in this study was the translated version of the original CCTT and the sample used was different from those mentioned in the test manual. Furthermore, the original test developers have never claimed the four sub-scales to be distinct and caution test users of treating them so.

*Table1: Reliability coefficients for the Bahasa Malaysia Version of the CCTT*

| Scale | No. of items | M | SD | α |
|---|---|---|---|---|
| **Induction** | **23** | **12.67** | **3.24** | **.56** |
| **Credibility** | **24** | **12.33** | **3.08** | **.57** |
| **Deduction** | **14** | **9.12** | **2.50** | **.58** |
| **Assumption Identification** | **10** | **4.07** | **1.71** | **.34** |
| **CCTT** | **71** | **38.17** | **6.65** | **.70** |

**Note: N=275**

The computed mean (M) for the total score on the CCTT obtained by the 275 Malaysian undergraduates was 38.17 (SD= 6.65) with the minimum total score of 20 and maximum score of 55. The computed mean was much lower than the mean of 52.2 (SD=6.5) obtained by the sample norm (i.e., the American undergraduates) which was provided in the CCTT test manual for the basis of comparison purposes. In fact, the mean obtained by the Malaysian sample was lower than any of the norms given in the manual; the lowest mean tabulated in the manual was for the American senior high school students (M= 40.6, SD= 7.9).

A summary of the results of correlations between the variables studied are presented in Table 2. The results revealed that the CCTT was significantly and positively correlated to all measures of language proficiency. This indicated that high scores on the CCTT were associated with high scores on measures of proficiency. Nevertheless, the computed coefficients were within the small range (i.e., <.30) suggesting that the relationships between the variables studied were not that strong. The two measures of English language proficiency (i.e., MUET and SPM English), however, were found to be significantly and strongly correlated ($r$ = .633, n= 275, p<.05) implying both were measures of proficiency in English.

*Table 2: Pearson Product-Moment Correlations Between CCTT and Measures of Language proficiency*

| | 1 | 2 | 3 |
|---|---|---|---|
| (1) MUET | 1.000 | | |
| (2) SPM English | .633** | 1.000 | |
| (3) CCTT | .238** | .288** | 1.000 |

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

*. Correlation is significant at the 0.05 level (2-tailed).

A structural equation modelling (SEM) analysis was also performed on data of the study through the employment of AMOS 7.0 (Arbuckle, 2007) to test the fit of the hypothesized structural model for the entire sample. The scores on each of the four sub-scales of the CCTT were used as the indicators which were regarded as observed or measured variables of the critical thinking construct since the use of the total scale on the CCTT together with scores on the MUET and SPM English, as measured variables of language proficiency, could not generate the text output of model fitness for any interpretation to be made (i.e., ran into identification problem since df= 0). The results of this analysis are to be interpreted with care since the researcher has stated earlier that the four sub-scales of the CCTT would not be taken as distinct dimensions of the CCTT.

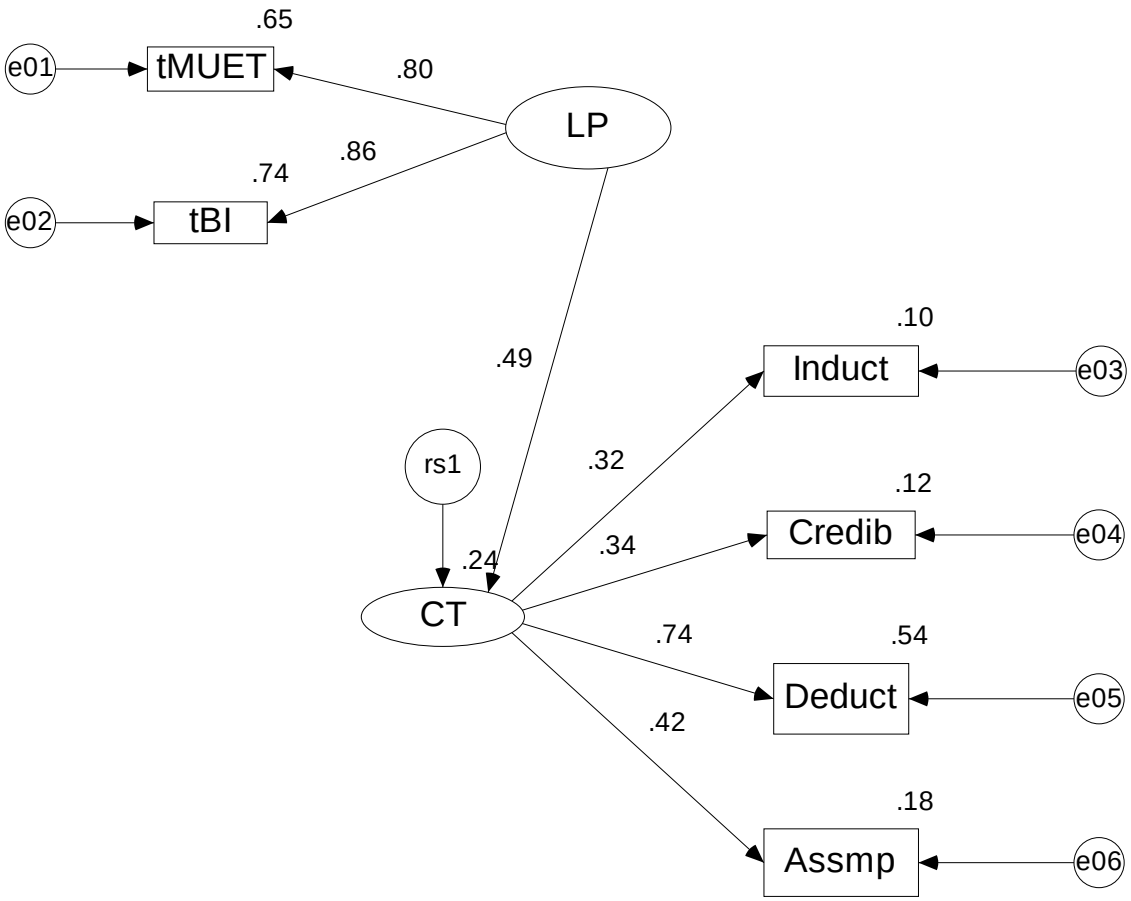


*Figure 1: Structural Model of hypothesized relationship between critical thinking and language proficiency.*
Chi-square = 13.03, df = 8, chi-square/df = 1.63, p= .111, NFI = .96, TLI = .97, CFI = .98, RMSEA = .048

As shown in Figure 1, the model fits the data well. This is indicated by the non-significant result of the chi-square test (p>.05) and the chi-square/df ratio of less than 2 (Crowley & Fan, 1997). The good fitting model obtained is also indicated by other fit indexes or measures such as NFI, TLI and CFI, each of which showed a value greater than .95. The computed RMSEA value which is lesser than .05 also reflects a good fit to the data (Schumacker & Lomax, 1996).

The SEM output shows a very close resemblance to the results obtained through correlation analysis conducted earlier. The SEM analysis indicated that language proficiency, as measured nicely by the MUET and SPM English, had a significant positive relationship with critical thinking assessed through the CCTT (ß= .49, p < .05). However, as reflected by the multiple squared correlation coefficient of critical thinking with language proficiency (i.e., the value of .24), the latter only accounted for 24 per cent of the variance in the former construct. The beauty of employing SEM analysis in this study is that took into account all errors produced in data analysis and thus produced more reliable results than any other multivariate procedures.

A one-way analysis of variance (ANOVA) was conducted on the CCTT scores obtained by the four different English language proficiency groups to determine whether there were significant differences in the mean scores across the groups. Levene's test was not significant, F(3,271) = .984, p>.05 indicating that the assumption of homogeneity of variances had not been violated. The results showed a statistically significant difference in the mean scores for the four groups, F( 3,271) = 10.156, p<.05. The effect size, which was computed by using eta square, was .10.

A Tukey HSD post-hoc test performed on the data yielded results which indicated that the mean score for the Excellent group (M = 43.80, SD = 5.32) was significantly different from the other three groups, Good (M =38.62, SD = 7.17), Fair (M = 37.92, SD=6.53) and Poor (M = 36.65, SD = 6.05). Nevertheless, the mean scores of the three lower proficiency groups were not found to differ significantly from each other.

## DISCUSSION

Results suggest that the translated Malay version of the CCTT Level X is a reliable measure of general critical thinking ability of Malaysian undergraduates. Evidence of construct validity of the test could not be forwarded since the data gathered was not found suitable for performing factor analysis procedure. This is not surprising since the test developers of the CCTT have already cautioned the test users of the difficulty in securing distinct factors; that is, they have stated in the test manual that many of the test items can be assigned to more than one of the four proposed aspects of critical thinking. This is argued so because critical thinking is a complex construct. Since measuring a specific aspect of critical thinking is difficult if not impossible, the test developers recommend that the CCTT be used as a general critical thinking ability test. This provides explanation for the use of the CCTT total score instead of the four sub-scale scores in the analysis of the data gathered in the present study. The present researcher relies on the test developers' claim that the CCTT is construct valid based on its content validity and correlations with other cognitive tests as presented in the test manual.

Results of the present study also provide valuable information on the nature of critical thinking ability of Malaysian undergraduates. As indicated by the results, Malaysian undergraduates did display critical thoughts even though their level of critical thinking ability, as indicated by the mean obtained for the test total score, was not found to be equivalent to that of their American counterparts. In actual fact, the computed ability level was found to be lower than that of the American Senior High School students. Similar findings were obtained by Nuraihan Mat Daud and Zamnah Husin (2004) who studied the development of critical thinking skills in reading classes of 40 international undergraduates (from Malaysia, Indonesia, Bosnia, China and Africa) studying at the International Islamic University in Malaysia. Although the researchers did not specifically calculate the mean for the total score obtained by the undergraduates on the CCTT, they did provide the mean for the score on each of the sub-scales. When the means were added by the present researcher, a mean for the overall or total score on the CCTT was obtained for both the experimental and control group involved in the study, respectively. The mean for the former group was 30.04 before the intervention and 35.18 after the intervention. While the mean for the latter group was 20.84 prior to treatment and 23.99 after the treatment. These computed means were found to be much lower than those presented in this study. Shaharom Abdullah (2004) who first used the Bahasa Malaysia version of the CCTT to measure 112 Malaysian undergraduates' critical thinking ability, also found that the undergraduates had a much lower level of critical thinking ability (M=41.80, SD= 5.25) when compared to their American counterparts. A large scale study (Aida Suraya Mohd Yunus et al., 2005) which attempted to determine the critical thinking ability and skills of undergraduates in seven public universities in Malaysia using a newly designed inventory also did not find the undergraduates to have a high level of critical thinking ability; the study revealed that the critical thinking ability of the undergraduates was at a low moderate level.

The present study also provides evidence on the importance of improving the undergraduates' English language proficiency. As revealed by the results, proficiency in English is positively related to critical thinking ability implying that if the undergraduates are proficient in English, their critical thinking ability will also be heightened. Some may disagree with this proposition because the computed correlation coefficients were not large enough to imply anything meaningful. Furthermore, the two different competencies can be acquired independently of each other; that is, there are undergraduates who are proficient in English and yet poor in their ability to exercise critical thinking skills. Nevertheless, one may concur with the weaker version of the proposition made if one considers the

possible interactions between the two competencies – of how they "feed each other" (Brumfit et al., 2005, p.158). The rather weak correlations between language proficiency and critical thinking established in this study lend support to the weaker interpretation of Whorf's theory of linguistic relativity (1941) argued by Hakuta (1986), which proposes that language is not solely responsible for determining one's thought but functions instead as one of the elements that helps to shape one's thought. Thus, the small correlation coefficients computed in this study indicated that proficiency in English partly contributed to undergraduates' ability to think critically.

The valuable contribution that language proficiency may make to the undergraduates' critical thinking ability is further reinforced by the results produced through the one-way analysis of variance (ANOVA) procedure which showed that students of the highest English proficiency level also obtained high scores on the CCTT. The actual difference in the mean scores of the four proficiency groups (i.e., eta square =.10) was approaching Cohen's (1988) large effect size coefficient (eta square = .14) indicating a rather substantial practical importance of the difference between the most proficient group and the other three less proficient ones.

## IMPLICATIONS & CONCLUSION

The findings of the present study imply that more work needs to be done towards upgrading the standard of English language and critical thinking ability among UUM undergraduates. The observed facts that the undergraduates did not have critical thinking ability level equivalent to that of their western counterparts and that the majority of them were not highly proficient in English are consistent with the findings of a study done on Malaysian undergraduates studying in Australia (Jones et al., 1999). The study revealed that Malaysian students had problems coping with their studies in Australia not only because they had poor critical thinking skills but also due to the fact that their English language skills were poor and that they relied heavily on rote-learning, which Pugh and Fenelon (as cited in Moore, 1995) claim to be the kind of learning style developed through one's experience studying under the Malaysian educational system. If Malaysian undergraduates are still merely rote learners who have poor English language skills in spite of the initiatives taken by the Malaysian Ministry of Higher Education to upgrade the standard of English at the university, include critical thinking in the curriculum and promote assessments with emphasis on higher order thinking, the country's future is then at risk – Malaysia will lack competitive edge if its workforce does not have the skills and ability to take up the challenges of the information era.

Therefore, the Malaysian university should play its role well. To sustain its present role as the most important 'producer' of human capital, which is a valuable asset to the country, the university must dare take the challenges of bringing about drastic or real changes that will eventually improve the standard of English among the undergraduates and enhance their critical thinking ability. More serious attempts should be made towards creating an educational system that promotes life-long learning; that is, a system which will generate graduates who can flexibly meet the demands of the global job market. To establish such a system, the university authority needs to re-evaluate the effectiveness of the present curriculum and teaching practice, particularly, those pertaining to the teaching and learning of English and development of critical thinking. Any initiatives taken towards realizing the aforementioned educational system will also serve as preparatory efforts taken to accommodate the needs of future undergraduates, especially the first batch of students learning Science and Mathematics at schools in English who will enrol in their first year of study at the university by the year 2010. This group of students will be exposed to the learning demands similar to that of their western counterparts because they will have to learn all science and Mathematics related subjects at the university completely in English. If these students are critical in their thinking and proficient in English, they will be at par with their western counterparts and will later be able to make substantial contribution to the nation when they become part of the human resource; that is, they will be the graduates who will help Malaysia meet the challenges of the 21st century, sustain her economic prosperity and realize her goal to become a developed nation by the year 2020.

The findings of the present study should never be taken as conclusive. This study only investigated the relationship between critical thinking ability and prior second language proficiency of UUM undergraduates. Future research should focus on measuring both critical thinking ability and actual language proficiency of undergraduates at other Malaysian universities so that better comparisons and generalizations can be made. This will require the use of a general proficiency test that is different from the tests employed in this study. A replication and extension of this study, particularly involving longitudinal data and the use of a sophisticated multivariate procedure like Structural Equation Modeling is needed to provide more evidence on the relationship between the two main variables examined in the present study.

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