Conference Paper

Linguistic Intelligence and Critical Thinking amongst Students of the Inland Water and Ferries Transport Polytechnic of Palembang

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Abstract

This study investigates the students' Linguistic Intelligence (LI) and Critical Thinking (CT) as Higher Order of Thinking Skills (HOTS) in the acquisition of English as a foreign language. 70 participants of Inland Water and Ferries Transport Polytechnic of Palembang took part in the current study. To measure the participants' linguistic intelligence scores, the researchers used the Thomas Armstrong Intelligence Test derived from Howard Gardner's MI Model. The instrument consists of 20 Likert type questions, for each of which 4 options are included. When testing participants' critical thinking, they used the scheme and the measures that trail after the Watson-Glaser Critical Thinking Appraisal. This test consists of five parts that are inferences, assumptions, deductions, interpreting information, and arguments. The results indicated that 11.43% of students displayed below average performances and 58.57% displayed high linguistic intelligence.

Keywords: Linguistic Intelligence; Critical Thinking; Language Acquisition.

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1. Introduction

Language knowledgeable individuals enjoy and are skilled with words. They love to read, write, and learn languages. They also sound to teach others and describe things. There are eight different kinds of intelligence, one of which is linguistic. This intelligence involves the ability to efficiently use language as a means of reminiscence, rhetorically, or poetically. Linguistic intelligence also means speaking and understanding its language, one's native language, and perhaps other languages. Moreover, those with a high level of language intelligence represent a facility with languages and words. They usually read, write, tell stories, and store words with dates excellently. This intelligence is in line with higher order of thinking skill, that is critical thinking.

The main aim or goal of education is that the learners learn how to think. Learners need higher order of thinking skills that can help them to make reliable decisions

and acquire new knowledge quickly, especially in English language learning. Basically critical thinking is categorized into Higher Order of Thinking Skills (HOTS). (King F.J., Goodson, L and Rohani, F. (2009). Higher Order Thinking Skills. Florida: Florida State University Press)

Previous study entitles The Relationship between Critical Thinking and Language Proficiency of Malaysian Undergraduates was conducted to find out the critical thinking ability of Malaysian undergraduates and its relationship with their language proficiency. (Rashid, R.A. and Hasyim, R.A. (2008). The Relationship between Critical Thinking and Language Proficiency of Malaysian Undergraduates. Edu-COM 2008 International Conference. pp. 373-384) It was conducted at Utara Malaysia University and was assigned 280 undergraduates. A demographic questionnaire and a test were used in the study. The demographical questionnaire was intended to gather and compile the language ability knowledge of undergraduates from the *Sijil Pelajaran* Malaysia (SPM) and Malaysian University English language Test (MUET); then the test (*Bahasa* Malaysia version of the Cornell Critical Thinking Test Level X) was used to find out the undergraduates' critical thinking. Pearson product-moment correlation was used in the data analysis of the study. Based on the study results, a significant relationship between the critical thinking skills of undergraduates and language skills has emerged.

Furthermore, derived from personal experience of one of the writers as an instructor of Language Unit of English at Inland Water and Ferries Transport Polytechnic of Palembang while she involved in instructing the students in running the daily speech activity. In a past year, from the routine activity of language unit, she recognized that student's ability in delivering speech was unsatisfactory. Some of students were not able to differentiate to pronounce definite article "the" when it is followed by a vocal or consonant sound. When they wrote an opening of "The honorable", they missed the rule how to pronounce it. Although not many of them do that. However, the writer also conducts an informal interview with another lecturer whom also become the instructor. From the interview, she noticed that another lecturer found that matter was happening the same way too.

Depart from Rashid's study and one of writer's personal experience, the writers are interesting to conduct a research not only to find out students' critical thinking, but also broadening the scope to also find out students' linguistic intelligence, limited to 2nd level students of Inland Water and Ferries Transport Polytechnic of Palembang?

2. Research Methods

This study is included in quantitative research as it uses a testing tool to generate the mastery score of the subject in summary. The approaches to data processing (mixed methods) are quantitative and qualitative. Quantitative data were analyzed employing simple descriptive statistics, while qualitative statistics clarified the students' cognitive levels.

3. Results and Discussion

To measure the participants' linguistic intelligence scores, the researchers use Thomas Armstrong Intelligence Test. (Armstrong, T. (2009). Multiple Intelligences in the Classroom: 3rd Edition. Virginia: ASDC) It derived from Howard Gardner's MI Model. (Gardner, H. (2005). Intelligence Reframed;Multiple Intelligences for The 21 First Century. New York: Basic Books) The instrument consists of 20 Likert type questions, for each of which 4 options are considered questionnaire. The schemes and the test requirements of this test follow and are related to the Watson-Glaser critical thinking appraisal in assessing the participants' critical thinking. (Watson, G, and Glaser, E.M. (2012). Watson-Glaser^{TM} User Guide and Technical Manual UK Supervised and Unsupervised Versions. UK: Pearson Education Inc) Five parts of this test are inferences, assumptions, assumptions, information interpretation, and arguments. The instrument test are presented in table 1 as follows.

3.1. Population and Sample

The population refers to the group where the researcher aims to generalize the study outcome results or the broader group to which the studies are aimed. (Fraenkel, J.R., Wallen, N.E., and Hyun, H.H. (2012). How to Design and Evaluate Research in Education. New York: McGraw-Hill Companies, Inc., 129)

The 2nd level students of Inland Water and Ferries Transport Polytechnic of Palembang in the academic year of 2019/2020 become the population of the study. The total population is 137 students from Inland Waterways classes.

As mentioned before, the writers are having 2nd level classes as the population of the study. Every class has a chance to be taken as a sample of the population in this study. If subject is less than 100, it is better to take all subjects, but if the subject is a big population (more than 100), the researcher can take them between 10-15% or 20-25%

TABLE 1: Instrument Test Specifications

Variable	Indicators	Test Number	Total of test item
Linguistic Intelligence	1. Considering that books are important	1-20	20
	2. Claiming that learning English, social science, and history at school is easier than mathe- matics and natural science		
	3. Spelling words accurately and enjoying words games		
	4. Enjoying debate and discussion		
	5. Producing writing that better than peers		
	6. Communicating with people in a highly verbal way		
Critical Thinking	1. Analyzing inferences	1, 2, 3, 4	4
	2. Analyzing assumptions	5, 6,7, 8	4
	3. Analyzing deductions	9, 10, 11	3
	4. Interpreting information	12, 13, 14	3
	5. Evaluating arguments	15, 16, 17	3
TOTAL			40

or more to be the sample. (Arikunto, S. (2012). Prosedur Penelitian Suatu Pendekatan Praktek, Edisi Revisi 2010. Jakarta: Rineka Cipta)

In line with the statement above, from five classes of total population, multiple students took part in the research as a sample. They are assigned using a systemic non-random sampling technique as a sample for this analysis. Every n-th individual is picked for inclusion in the sample during systematic sampling in the population list. (Frankel et al, Op.Cit., 97) Each second person is selected in this case from the population list.So the writers got a total number of 70 students as sample or around 51,09 %.

3.2. Data Collection

Prior to data collection, the researchers firstly obtain a letter of consent No. UM.002/6/16 Poltektrans SDP – 2020 from the Director of Inland Water and Ferries Transport Poly-technic of Palembang to conduct this study. The data collection is conducted on July, 4th, 2020, It is listed sequentially as follows:

1. Test of Critical Thinking

   (a) First, the identification of participants, including the name of the student, the student's register number (*NPT / Nomor Pokok Taruna*), class, and the signature of the student, is included. They are required to fill out the attendance list representing the identity of these participants;

(b) Secondly, after participants are already done writing their identity on the participation list, they are told of the directions relevant to the critical thinking test and, when ready for the test, the researcher begins the testing process and watches the test site;

(c) All problems consist of 17 points relating to critical thinking in the response sheet presented for about 50 minutes is answered by the participants.

(d) After completing the exam, the researcher evaluate their response sheets and analyze the result;

2. Questionnaire of Linguistic Intelligence

(a) The questionnaire of linguistic intelligence is carried out after the participants had already finished doing the critical thinking test;

(b) The procedures to perform the linguistic intelligence questionnaire are explained by the researcher before participants fill out the questionnaire;

(c) The participants must answer all 20 items related to critical thinking on the response sheet provided in about 15 minutes;

(d) After this test, the participants are evaluated, and their responses analyze through their response sheets.

3.3. Validity

Validity is the extent to which inferences made from assessment result should be appropriate, meaningful, correct, and useful. (Ibid., 148) Whilst Sugiyono claims that valid means the instrument which is used in the research can be used to measure what should be measured. (Sugiyono. (2012). Metode Penelitian Kuantitatif, Kualitatif dan R&D. Bandung: Alfabeta) Validity test is the degree to which a test measures what it is supposed to measure, or it can be used succesfully for the purposes for which it is intended.

Furthermore, the validity of each item in test and questionnaire is analyzed by using Pearson Product Moment Correlation. The result of the calculation is compared to the rtable. The test item is valid if $r_{count} > r_{table}$.

3.4. Validity of Critical Thinking Appraisal

In line with the SPSS result of analyzing the validity of critical thinking test, it was found that all test items were valid. The result is claimed to be valid if $r_{count} > r_{table}$. In this case,

since N = 70 then the value of df = N -2 = 70 − 2 = 68, so the value of r_{table} at df = 68 is 0.235. (Ghozali, I. (2014). Ekonometrika Teori, Konsep dan Aplikasi dengan IBM SPSS 22. Semarang: Badan Penerbit Universitas Diponegoro) The result as presented in Table 3 indicates that all the test items are valid because the value of r_{count} > 0.235.

TABLE 2: Case Processing Summary of Critical Thinking Test

Case Processing Summary			
		N	%
Cases	Valid	70	100.0
	Excluded[a]	0	.0
	Total	70	100.0

a. Listwise deletion based on all variables in the procedure.

TABLE 3: Validity of Critical Thinking Test

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	r Count	r Table	Cronbach's Alpha if Item Deleted
Item1	19.7500	41.850	.420	.235	.692
Item2	19.7500	41.964	.399	.235	.693
Item3	20.0556	42.397	.371	. 235	.698
Item4	20.1111	42.444	.370	.235	.698
Item5	20.1389	41.609	.411	.235	.691
Item6	20.1389	42.066	.336	. 235	.695
Item7	20.0278	41.971	.336	.235	.694
Item8	19.7500	41.736	.441	.235	.691
Item9	19.7500	41.736	.441	. 235	.691
Item10	20.0278	41.971	.336	.235	.694
Item11	19.7500	41.736	.441	.235	.691
Item12	20.0556	42.397	.371	. 235	.698
Item13	19.7500	41.850	.420	.235	.692
Item14	20.0000	41.771	.366	.235	.693
Item15	19.6667	42.343	.395	. 235	.695
Item16	19.7222	42.435	.331	.235	.696
Item17	19.8056	42.275	.338	.235	.696

3.5. Validity of Linguistic Intelligence Questionnaire

In relation to the SPSS result of analyzing the validity of linguistic intelligence question-naire, it was found that all test statements were valid. The result is claimed to be valid

if $r_{count} > r_{table}$. The result as presented in Table 5 indicates that all the test statements are valid because the value of $r_{count} > 0.235$.

TABLE 4: Case Processing Summary of Linguistic Intelligence Questionnaire

Case Processing Summary				
			N	%
Cases	Valid		70	100.0
	Excluded[a]		0	.0
	Total		70	100.0

a. Listwise deletion based on all variables in the procedure.

TABLE 5: Validity of Linguistic Intelligence Questionnaire

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	r Count	r Table	Cronbach's Alpha if Item Deleted
Item1	116.5556	333.740	.840	.235	.753
Item2	116.0000	328.857	.757	.235	.749
Item3	115.9444	331.654	.716	. 235	.752
Item4	116.5278	334.828	.802	.235	.754
Item5	116.4167	335.050	.611	.235	.755
Item6	116.5278	334.942	.795	. 235	.754
Item7	116.1667	333.400	.702	.235	.753
Item8	116.4722	337.913	.676	.235	.757
Item9	116.0556	326.683	.818	. 235	.747
Item10	116.5278	334.942	.795	.235	.754
Item11	116.0556	325.883	.849	.235	.747
Item12	116.5556	333.625	.846	. 235	.753
Item13	116.1667	333.400	.702	.235	.753
Item14	116.5556	333.740	.840	.235	.753
Item15	115.9722	330.828	.713	. 235	.751
Item16	116.1667	333.286	.707	.235	.753
Item17	116.2500	328.536	.700	.235	.749
Item18	116.4722	337.913	.676	.235	.757
Item19	116.0000	328.743	.761	.235	.749
Item20	116.5278	335.113	.598	.235	.755

3.6. Reliability

A useful study purpose is to provide reliable measurements or findings. Reliability implies that instrument scores are accurate and consistent. (Creswell, J.W. (2012).

Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research 4th Edition. Upper Saddle River, NJ: Merrill) Reliability is explained as a zero-to-one coefficient. The nearest the reliability coefficient to 1.00, the reliable the measurement, and the lower the measurement measuring error. When tests are used in employment contexts reliabilities above 0.89 are generally considered excellent, 0.80 – 0.89 good, and 0.70 – 0.79 adequate. Values below 0.70 suggest the test may have limited applicability. A standard value of 0.60 indicates 60% consistency in the scores that are produced by the instrument.

Then, Cronbach Alpha with an assistance of SPSS 22 is used to calculate the reliability of the critical thinking and linguistic intelligence instruments from an examination of internal consistency of the test.

3.7. Reliability of Critical Thinking Appraisal

In line with the SPSS result of analyzing the reliability of critical thinking test, it was found that the test instrument was reliable as shown Table 6.

TABLE 6

Reliability of Critical Thinking Test	
Cronbach's Alpha	N of Items
.706	17

The result is claimed to be reliable if the value of Cronbach's Alpha is higher than standard value 0.60. Table 6 shows that the Cronbach's Alpha value is 0.706 > 0.60. Therefore, the tests are reliable.

3.8. Reliability of Linguistic Intelligence Questionnaire

In relation to the SPSS result of analyzing the reliability of linguistic intelligence questionnaire, it was found that the test instrument was reliable as shown Table 7.

TABLE 7

Reliability of Linguistic Intelligence Questionnaire	
Cronbach's Alpha	N of Items
.764	20

The result is claimed to be reliable if the value of Cronbach's Alpha is higher than standard value 0.60. Table 7 shows that the Cronbach's Alpha value is 0.764 > 0.60. Therefore, the tests are reliable.

The critical thinking performance of the 2nd level students of Inland Water and Ferries Transport Polytechnic of Palembang is calculated by measuring the number of the right responses in the critical thinking assessment shown in Figure 1..
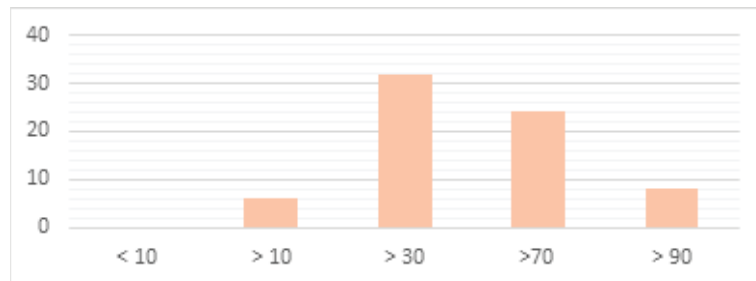

Figure 1: Students' Critical Thinking

In accordance with the score obtained from student's critical thinking test, the writer found that there are eight students who gain score > 90, twenty-four students who gain score >70, thirty-two students who gain score >30, and six students who gain score > 10. Table 8 described the complete result of data description of students' critical thinking. The performance categorizations are follow and related to the Watson-Glaser Critical Thinking Appraisal. (Watson et al. Op Cit., 11)

TABLE 8: The Score Summary of Student's Critical Thinking

No.	Performance	Score	Frequency	Percentage
1.	Well above average	91 and above	8	11.43 %
2.	Above average	71 – 90	24	34.28 %
3.	Average	31 – 70	32	45.71 %
4.	Below average	11 – 30	6	8.57 %
5.	Well below average	Below 10	0	0

Furthermore, student's linguistic intelligence is determined by calculating total number of responses in the linguistic intelligence questionnaire which illustrated in Figure 2.
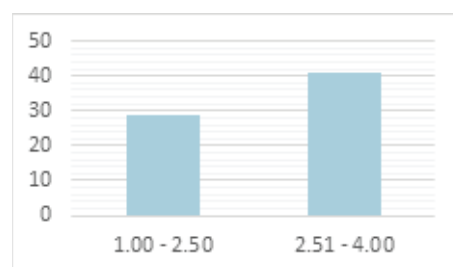

Figure 2: Students' Linguistic Intelligence

In accordance with the total number of responses from student's linguistic intelligence questionnaire, the writer found that there are twenty-nine students who gain score

under the investment from 1.00 to 2.50 and forty-one students who gain score under the investment from 2.51 to 4.00.

In analyzing the questionnaire result of student's linguistic intelligence, the writer used Armstrong Linguistic Intelligence Inventory. (Armstrong, T. Op Cit., 22) There were 20 questions, for each of which 4 options are considered. The options are 1 for strongly disagree, 2 for disagree, 3 for agree, and 4 for strongly disagree. The minimum score is 1 if student's response is entirely 1, and the maximum score is 4 if student's response is entirely 4. The result of the test was categorized as follows:

1. The student who gains score under the investment from 1.00 to 2.50 was determined as low intelligence of linguistic.

2. The student who gains score under the investment from 2.51 to 4.00 was determined as high intelligence of linguistic.

Table 9 described the complete result of data description of students' linguistic intelligence.

TABLE 9: The Score Summary of Student's Linguistic Intelligence

No.	Performance	Score	Frequency	Percentage
1.	High Intelligence	2.51 - 4.00	41	58.57 %
2.	Low Intelligence	1.00 - 2.50	29	41.42 %

4. Conclusion

In relation to the results and discussion described in the previous, it is concluded that there were 8.57 percent students who are in the performance of below average and 41.42 percent who are categorized into low linguistic intelligence. Even though the figure is relatively low, it must become a serious concern for the teacher and/or instructor to improve it and do some treatments, and from the percentage contribution as stated in the conclusion, the teacher and/or instructor of language unit of Inland Water and Ferries Transport Polytechnic of Palembang are suggested to design more interactive as well as exciting courses that not only enable students to develop their speech skills but also to explore and develop their critical thinking skills by, for example, using the correct written material, reasoning, and argument, will encourage them to talk remarkably. Then, to develop students' linguistic intelligence, the teacher and/or instructor can support them by encouraging them to enjoy real communicating through speaking and also applying other skills all at once. This allows students to see the purpose of language, and helps

them take an interest in it and also to cope with it in their real life. However, more studies will provide more evidence for generalization.

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