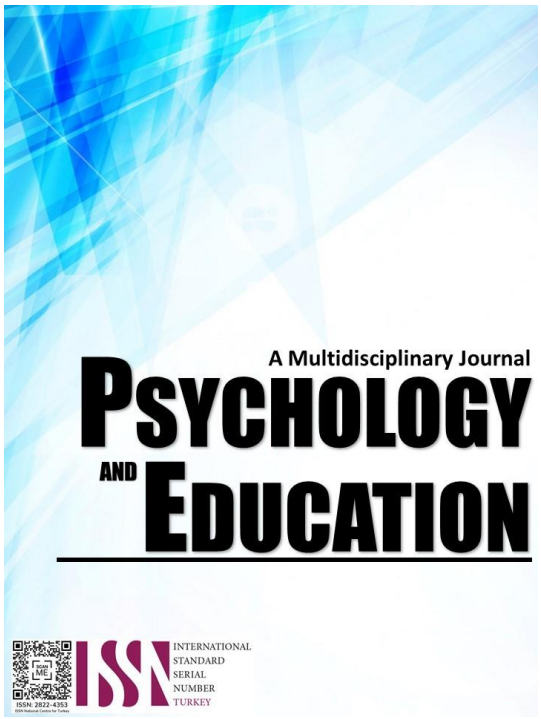
COGNITIVE ACADEMIC LANGUAGE PROFICIENCY AND CRITICAL THINKING SKILLS OF FILIPINO MARITIME STUDENTS



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Research Article

Cognitive Academic Language Proficiency and Critical Thinking Skills of Filipino Maritime Students

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Abstract

Language proficiency in the academic context is essential for the execution of critical thinking. This descriptive-comparative and correlational study aimed to determine the level of cognitive academic language proficiency in terms of grammar and vocabulary and the level of critical thinking skills in terms of evaluation of arguments, assumptions, deductions, inferences, and interpretation. The respondents were the 327 maritime students selected via stratified random sampling. A researcher-made English Proficiency Test and the Standardized Watson-Glacer Critical Thinking Test were used to gather data. Major results revealed that students are independent users of grammar and vocabulary in terms of cognitive academic language proficiency. It was also found that students are beginner thinkers in terms of critical thinking skills. The respondents are also beginner thinkers in the areas of evaluation of arguments, assumptions, deductions, inferences, and interpretation. Furthermore, it was revealed that the respondents' level of cognitive academic language proficiency has no significant relationship with their level of critical thinking skills. This study concluded that the obvious absence of cognitive academic language proficiency and critical thinking skills comprises a serious problem that should be given attention by learners and educators.

Keywords: *cognitive academic language proficiency, grammar, vocabulary, critical thinking skills, maritime students, Philippines*

Introduction

The cultivation of cognitive capacity and language proficiency is the outcome that must be achieved by learners at all levels of education. Bauer, Holmes, and Warren (2006), as well as Paul (2004), stressed that good language ability is crucial to accomplish critical thinking. Along with this, the study of Grosser and Nel (2013) argued that language proficiency linked to the ability to understand (receptive) and use (expressive) language in an academic context is essential for the execution of critical thinking.

Language ability is found to be a contributing factor to efficient critical thinking skills (Feuerstein, 2007). This implies that at the university level, the demands for students to reason critically and argue about topics in an academic context and good language ability are crucial. However, critical thinking skills are one of the skills that need to be addressed in the teaching-learning process. Students are trained only to memorize, but critical thinking skills have been developed quickly (Tamayo et al., 2014).

Moreover, academic language is used in school to acquire a new or deeper understanding of the content and to communicate that understanding to others (Bailey & Heritage, 2008; Gottlieb, Katz, & Ernst-Slavit, 2009; Schleppegrell, 2004 as cited in Gottlieb, & Ernst-Slavit, 2013). In other words, academic language is characterized by the specific linguistic features associated with academic disciplines, including discourse features, grammatical constructions, and vocabulary across different language domains or modalities (listening, speaking, reading, writing) and content areas (language arts, mathematics, science, and social studies/history, among others).

In the same way, critical thinking skill is essential in students' learning, and it needs to be mastered. Critical thinking skills can enhance students' ability to interpret and evaluate information, problem-solving skills, and adapt to the development of society. Critical thinking is part of Higher Order Thinking Skills (HOTS) (Binkley, 2012; Brien, 2013; Masa, 2014; Hindun et al., 2020). With good Higher Order Thinking Skills, students can comprehend their learning concepts. Training skills related to critical thinking are so important that some scholars call it the main objective of university education and experience (Binkley, 2012).

In the study of Paul (2004) and Csapó and Nikolov (2009), they assert that critical thinking involves an intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and evaluating information gathered, and that, to accomplish these critical thinking actions, good language proficiency which depends on a good language ability is crucial. Elder and Paul (2006) asserted that critical thinking is also important in acquiring language skills, particularly writing and

reading.

In the Philippines, English is the primary communication medium in business and education; hence mastering the language has become a prerequisite to success in academic and business environments. It opens doors for many career opportunities and helps improve one's employability skills (Dela Rosa, 2013; Digap, 2016; Cabigon, 2018).

The maritime industry in the Philippines should also focus on acquiring the English language proficiency of the students. The reason is that English is required in their chosen course, which is useful in securing a job. It is also the language of business and government and even maritime communication (Navarro et al., 2015; Dela Rosa, 2013; Sia & Said, 2018). This is why the Maritime Training Council upgrades Filipino marine officers' English proficiency to help them attain the required communication skills while performing their duties and responsibilities on board a ship (Navarro et al., 2015). According to the Standards of Training, Certification, and Watchkeeping Code of 1995, administrations are considering the benefits of ensuring seafarers can use at least an elementary English vocabulary, emphasizing nautical terms and situations. Thus, developing critical thinking skills through writing tasks for maritime students will rise a hypothesis that critical thinking skills may affect students' cognitive academic language performance (Dela Rosa, 2013; Alidmat & Ayassrah, 2017).

Given this, the researchers felt the need to conduct a study on the level of cognitive academic language proficiency and the level of critical thinking skills in terms of inferences, recognition of assumptions, deductions, interpretation, and evaluation of argument among maritime students. An intervention program was proposed to address the low areas in cognitive academic language proficiency and critical thinking skills to utilize the major results.

Research Questions

The study's main purpose was to determine the level of cognitive academic language proficiency and the level of critical thinking skills of 3rd Year Maritime students in a private academic institution in Bacolod City, Philippines. Specifically, the researchers sought answers to the following research questions:

1. What is the level of cognitive academic language proficiency of respondents in terms of grammar and vocabulary when grouped according to program and when they are taken as a whole?
2. What is the level of critical thinking skills in terms of inferences, recognition of assumptions, deductions, interpretation, and evaluation of arguments of 3rd Year maritime students when grouped according to their program and taken as a whole?
3. Is there a significant difference in the level of cognitive academic language proficiency in terms of grammar and vocabulary of 3rd Year maritime students when grouped according to their program?
4. Is there a significant difference in the level of critical thinking skills in terms of inferences, recognition of assumptions, deductions, interpretation, and evaluation of argument when grouped according to their program?
5. Is there a significant relationship between the level of cognitive academic language proficiency and the level of critical thinking skills of the respondents?

Methodology

This study utilized descriptive-comparative and correlational research designs to satisfy the research questions. The descriptive method describes the characteristics of the population or phenomenon that is being studied; this methodology focuses more on the "what" of the research subject rather than the "why" of the research subject (Bhat, 2019). The comparative research design was used to compare the difference in the level of cognitive academic language proficiency in terms of grammar and vocabulary and the level of critical thinking skills in the inferences, recognition of assumptions, deductions, interpretation, and evaluation of the argument. On the other hand, correlational research design determined the relationship between cognitive academic language proficiency and critical thinking skills.

Respondents

The respondents of this study were the 3rd Year maritime students taking up BS Marine Transportation and BS Marine Engineering from a private maritime academic institution in Bacolod City, Philippines. The sample size of 327 was chosen via stratified random sampling out of the total population of 635 students.

Instrument

The study utilized the 60-item researcher-made test questionnaire for English Proficiency Test. The test was divided into two parts: a 30-item grammar test and a 30-item vocabulary test. The level of CALP was

measured using the scale of interpretation anchored on the Common European Framework of Reference for Language (CEFR) standards.

In assessing the level of Critical Thinking Skills (CTS), the Standardized Watson-Glacer Critical Thinking Test was adapted and utilized to determine the critical thinking skills. The level of critical thinking skills is based on a range of scores. The Watson-Glaser Critical Thinking Test evaluates the capacity to consistently dissect inferences, recognition of assumptions, and deductions, interpretation, and evaluation of arguments.

Validity and Reliability

To establish the validity of the English Proficiency Test, the research instrument was subjected to content validity by thirteen (13) experts with master's degree in English. Using Content Validity Ratio (CVR) proposed by Lawshe (1975), the validators evaluated the questionnaire based on how 'essential' each item is to the measured construct, then gave necessary suggestions, corrections, and recommendations. The computed CVR of each item ranges between 0.53 and 0.99, while the whole test's content validity index (CVI) is at 0.99, which is interpreted as all items are essential. Thus, the test was considered valid.

The WGTCA has been widely used to indicate individuals' critical thinking competence. Magno (2010) reported high validity of the Watson Glaser Critical Thinking Appraisal based on numerous studies related to Critical Thinking Skills.

Meanwhile, to ensure the research instrument's reliability, an online pilot test using the researcher-made questionnaire was conducted to randomly select thirty (30) students not included in the sample population. Afterward, the data obtained were subjected to item analysis and Kuder-Richardson 20 (KR-20) formula for the internal consistency reliability test. The KR-20 revealed that the Cognitive Academic Language Proficiency test has a value of 0.94 which is interpreted as "very good"; hence, reasonably reliable. El–Hasan and Madhum (2007) reported reliability for the WTCGA coe□cient Alpha was calculated, yielding a reliability of a=0.74 with a 95% confidence interval of 0.689-0.791.

Item analysis is the act of analyzing student responses to individual exam questions to evaluate exam quality. It is an important tool to uphold test effectiveness and fairness (Arora, 2018). The item analysis result revealed that each item's discrimination index ranges from 0.20 (marginal items) to 0.67 (very good). In contrast, the difficulty index of the test is 0.30 to 0.83, which is interpreted as "average." The researchers revised marginal items before administering the test to the respondents.

Data Gathering Procedure

Before the data gathering process, the researchers secured a letter of permission from the Vice President of Academic Affairs and the Dean of Maritime Studies of a private maritime institution to conduct the study. Upon the approval of the letter, the researchers asked permission from the College of Maritime Studies for the lists of 3rd Year Bachelor of Science in Marine Transportation and Bachelor of Science in Marine Engineering students enrolled in the 2nd Semester of the Academic Year 2020-2021. Before the questionnaire was administered, the researchers explained to the respondents the purpose of the study, and informed consent was secured from them to indicate their willingness to participate in the research undertaking. After the informed consent was secured from the respondents, the researchers proceeded with the test with the help of the English teachers through an online survey platform. The questionnaire was retrieved upon the students had finished answering. After the data were collected, these were analyzed using appropriate statistical tools and were interpreted by the researchers to answer the problem and to come up with a valid conclusion.

Statistical Treatment

The data underwent descriptive analysis using the statistical tools of Mean and Standard Deviation to determine the level of Cognitive Academic Language Proficiency in terms of grammar and vocabulary when the respondents were grouped according to program. They were taken as a whole and the level of Critical Thinking Skills in terms of inferences, recognition of assumptions, deductions, interpretation, and evaluation of argument when taken as a whole and grouped according to program. The research data went through a comparative analysis using the Mann-Whitney U-test and t-Test to determine the significant difference in the cognitive academic language proficiency in terms of grammar and vocabulary when taken as a whole and grouped according to program and to determine the significant difference in the level of critical thinking skills in terms of inferences, recognition of assumptions, deductions, interpretation, and evaluation of argument when they are taken as a whole and grouped according to program. Finally, Spearman rho was utilized to determine the significant relationship between cognitive academic language proficiency

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levels and critical thinking skills.

Results and Discussion

Level of Cognitive Academic Language Proficiency of the Respondents

On the level of cognitive academic language proficiency as a whole, the respondents are independent users with a mean rating of 39.38 (SD=10.671). In terms of grammar, the respondents are independent users with a mean rating of 19.14 (SD=5.266), while the respondents are proficient users in terms of vocabulary with a mean rating of 20.54 (SD=6.455).

In terms of grammar and when grouped according to their program, BSMARE students have higher scores (M=19.09, SD=5.313) than BSMT students (M=18.83, SD=5.173). Results revealed that BSMARE students delivered higher scores than BSMT. The researchers assumed that BSMARE students are more focused on their grammar to communicate well in their work area than BSMT students. The student exhibits acceptable knowledge and understanding of language structure and meaning.

On the other hand, both BSMT students (M=20.42, SD=6.693) and BSMARE students (M= 20.54, SD=6.455) are proficient users in terms of vocabulary. It means that they are independent users or at the intermediate level. The student exhibits acceptable knowledge and understanding of language structure and meaning. However, Sia et al. (2019) argued that most students could not answer and speak effectively as they need to learn the specific terminology of Maritime English or, in other words, to gain knowledge about basic marine terminology for efficient maritime communication.

Dela Rosa (2013) affirmed that Maritime English is Standard English adapted to maritime purposes. It is not different or special English for the use of mariners only; it is the same language used by common people, except that the maritime world has a vocabulary of its own, just as do other fields like business, law, and medicine. Serbu (2015) specialized lexis that marine engineers have to master inherently based on general-use vocabulary, so besides being proficient in maritime English, they need to have a good command of general English. At the core of elaborate technical topics are everyday pieces of vocabulary and grammar to deal with.

Table 1. *Level of Cognitive Academic Language Proficiency of the Respondents in Terms of Grammar and Vocabulary When Grouped According to Program and When they are Taken as a Whole*

Aspects	*Program*						*As a Whole*		
	BSMT			BSMARe					
	Mean	SD	VI	Mean	SD	VI	Mean	SD	VI
Grammar	18.83	5.173	Independent User	19.09	5.313	Independent User	19.14	5.266	Independent User
Vocabulary	20.43	6.693	Proficient User	20.48	6.481	Proficient User	20.54	6.455	Proficient User
Cognitive Academic Language Proficiency	38.93	10.726	Independent User	40.13	10.762	Independent User	39.38	10.671	Independent User

Level of Critical Thinking Skills of the Respondents

On the level of critical thinking skills as a whole, Table 2 shows that the respondents are beginner thinkers with a mean rating of 38.24 (SD=6.372). In terms of evaluation of arguments, respondents are practicing thinkers with a mean rating of 12.85 (SD=3.132). In terms of assumptions, the respondents are beginner thinkers with a mean rating of 5.85 (SD=2.060). As well as in terms of deductions, the respondents are beginner thinkers with a mean rating of 9.63 (SD=2.831). Moreover, in terms of inferences, students have challenged thinkers with a mean score of 3.21 (SD=1.519). Lastly, in terms of interpretation, respondents are beginner thinkers with a mean rating of 5.37 (SD=1.370).

On the level of critical thinking skills, when grouped according to their program, both BSMT students (M=37.92, SD=6.026) and BSMARE students (M=38.84, SD=6.959) are beginner thinkers. On the level of critical thinking skills, when grouped according to program and areas, BSMT students are practice thinkers (M=12.56, SD=3.198) as well as BSMARE students (M=13.39, SD=2.946) in terms of evaluation of arguments. In terms of assumptions BSTM students (M=5.63, SD=1.976), BSMARE

students (M=6.29, SD= 2.152), deductions BSMT students (M=9.26, SD=2.882), BSMARE students (M=5.32, SD=1.385) and interpretation (M=5.40, SD=1.365) students are beginner thinkers. However, in terms of inferences, BSMT students (M=3.15, SD=1.450) and BSMARE students (M=3.32, SD=1.642) are unreflective thinkers.

The results imply that students can go beyond the nascent intellectual humility and actively look to take control of their thinking across areas of their lives. They know that their thinking can have blind spots and other problems and take steps to address those but in a limited capacity. The respondents did not excel in the critical thinking test. The researchers contended that the respondents might need resources attributed to a lack of dispositions for effortful thinking and habits of mind to execute critical thinking (Facione, 2009; Tsui, 2002, as cited in Grosser et al., 2013)). The normal to poor results acquired by the members potentially show that they still need to fully develop the interrelated intellectual and meta-psychological abilities important to execute basic reasoning (Grosser et al., 2013).

Table 2. *Level of Critical Thinking Skills of the Respondents in terms of Evaluation of Arguments, Assumptions, Deductions, Inferences, and Interpretation When Grouped According to Program and When They are Taken as a Whole*

Aspects	Program						As a Whole		
	BSMT			BSMARe					
	Mean	SD	VI	Mean	SD	VI	Mean	SD	VI
Evaluation of Arguments	12.56	3.198	Practice Thinker	13.39	2.946	Practice Thinker	12.85	3.132	Practice Thinker
Assumptions	5.63	1.976	Beginner Thinker	6.29	2.152	Beginner Thinker	5.85	2.060	Beginner Thinker
Deductions	9.26	2.882	Beginner Thinker	10.32	2.609	Beginner Thinker	9.63	2.831	Beginner Thinker
Inferences	3.15	1.450	Unreflective	3.32	1.642	Unreflective	3.21	1.519	Challenge Thinker
Interpretation	5.40	1.365	Beginner Thinker	5.32	1.385	Beginner Thinker	5.37	1.370	Beginner Thinker
Critical Thinking Skills	37.92	6.026	Beginner Thinker	38.84	6.959	Beginner Thinker	38.24	6.372	Beginner Thinker

The study's results indicated that the respondents who participated were not yet very much developed critical thinkers (Paul & Elder, 2005) and could consequently have experienced trouble executing the critical thinking process that supported the completion of the WGCTA. The poor to average outcomes could likewise highlight that widespread principles of value thinking may, in any case, arise in the respondents who took part in the test. This infers that the respondents may not yet have an order of the critical thinking guidelines that assume a part in basic reasoning, in particular, clarity, accuracy, exactness, significance, profundity, broadness, and rationale (Paul and Elder, 2005, as cited in Grosser, et al., 2013).

Moreover, Kong and Seng (2006) with pre-teachers emphasized that problems are identified with making inferences. In support of Kong and Seng (2006), the researchers argue that the poor performance could be credited to how the sub-test "inferences" is the only sub-test that presents five options as potential answers. This allows a respondent a 25% opportunity of finding the right solutions contrasted with the other sub-tests with two potential answers and a half possibility of finding the solution right (Grosser et al., 2013). Likewise, Kong and Seng (2006) argued that there are better approaches than a target answer requiring one specific right answer to quantify the ability to make inferences (Kong & Seng, 2006).

Difference in the Level of Cognitive Academic Language Proficiency of the Respondents

Table 3 shows if there is a significant difference in the level of cognitive academic language proficiency in the aspects of grammar and vocabulary when they are grouped according to program. The researchers 'fail to reject" the null hypotheses as there is no significant difference in the aspects of grammar (p-value=0.177) and vocabulary (p-value=757) when they are grouped according to program.

In support, Bernardo (2019) emphasizes that only the English language can be utilized to convey that teams are coming from various nationalities onboard ships. The crews that are not native English set out on an onboard merchant fleet to work for the first time; certainly, they would experience difficulty addressing their crew mates.

In addition, the Standards of Training, Certification, and Watchkeeping Code of 1995 affirmed the benefits of ensuring that seafarers can use at least elementary

English grammar and vocabulary, with an emphasis on nautical terms and situations (Dela Rosa, 2013; Alidmat & Ayassrah, 2017). Thus, ultimately, the seafarers could not perform their work well, like reporting ships nearby, reporting company about groups' performance, carrying out the laws and guidelines, stacking and dumping of cargo, and by observing the quality administration and other related works relating to the ship's activity onboard. These things, one way or another, will prompt maritime accidents if the sailors need a better foundation in the English language (Benaldo, 2019).

Table 3. *Difference in the Level of Cognitive Academic Language Proficiency of the Respondents in terms of Grammar and Vocabulary When They are Grouped According to Program*

Aspects	*p-value*	*Significance*	*Statistical Decision*
Grammar	0.177	Not Significant	Fail to Reject H_o
Vocabulary	0.757	Not Significant	Fail to Reject H_o

Difference in the Level of Critical Thinking Skills of the Respondents

Table 4 shows if there is a significant difference in the level of critical thinking skills of the respondents in terms of evaluation of arguments, assumptions, deductions, inferences, and interpretation when they are grouped according to program. The result shows that the level of critical thinking skills is the same in terms of evaluation of arguments (p-value = 0.024), assumptions (p-value = 0.013), inferences (p-value = 0.366), and interpretation (p-value = 0.684). However, in deductions, the results show a significant difference.

This result contradicts the results of Glosser et al. (2013), that there were no significant differences between the results for all the test sections. This can also be supported by the study of Thinh (2018) that there is a significant difference in terms of deductions of Vietnamese students who also took the same test. It is emphasized that the performance in deduction is connected with the trouble of evaluating and deciphering the statements' credibility (Facione, 2011).

Table 4. Difference in the Level of Critical Thinking Skills of the Respondents in terms of Evaluation of Arguments, Assumptions, Deductions, Inferences, and Interpretation When They Are Grouped According to Program

Aspects	*p-value*	*Significance at 0.05*	*Statistical Decision*
Evaluation of Arguments	0.024	Not Significant	Fail to Reject H_o
Assumptions	0.013	Not Significant	Fail to Reject H_o
Deductions	0.001	Significant	Reject H_o
Inferences	0.366	Not Significant	Fail to Reject H_o
Interpretation	0.684	Not Significant	Fail to Reject H_o

Relationship between the Level of Critical Thinking Skills and Cognitive Academic Language Proficiency

Table 5 shows if there is a significant relationship between the level of cognitive academic language proficiency and the level of critical thinking skills of respondents. With the p-value = 0.127, the variables were not significantly correlated.

Contradicting the study of Grosser et al. (2013), all areas of critical thinking skills except for the evaluation of arguments was the only critical thinking skill for which no relationship with cognitive academic language proficiency was noted. Moreover, the researchers assumed that respondents' cognitive academic language proficiency has nothing to do with their critical thinking skills. The results could likewise contradict the results acquired by HESA (2009) in Grosser et al. (2013), that first-year understudies at South African colleges are not capable of academic language, and Lun et al. (2010) who discovered that students' cognitive academic language proficiency is a significant contributing factor in critical thinking skills.

Table 5. *Relationship between the Level of Critical Thinking Skills and Cognitive Academic Language Proficiency*

		Critical Thinking Skills Sig. (2-tailed)	*Sig. at 0.05*	*Statistical Decision*
Cognitive Academic Language Proficiency	p-value	0.127	Not Significant	Fail to Reject H_o

Conclusion

Based on the findings, the researchers found that maritime students are independent users of cognitive academic language proficiency. While in the level of critical thinking skills, the respondents are beginner thinkers. Moreover, the researchers conclude that there is no significant difference in the level of cognitive academic language proficiency in grammar and vocabulary. In the same manner, no significant difference in the level of critical thinking skills of respondents in terms of evaluation of arguments, assumptions, inferences, and interpretation. However, in terms of deduction, it was revealed that there is a significant difference. Lastly, the researchers found no significant relationship between cognitive academic language proficiency and critical thinking skills of maritime students.Thus, the researchers infer maritime students exhibit good knowledge and understanding of language structure and meaning. Likewise, respondents can go beyond the nascent intellectual humility and actively look to take control of their thinking across areas of their lives. Finally, they know that their thinking can have blind spots and other problems and take steps to address those, but in a limited capacity. Overall, learners and educators should pay attention to cognitive academic language proficiency and critical thinking skills.

In the light of the findings and conclusion, several recommendations are offered:

The School Administrators should continually formulate policies to improve students' critical thinking skills and cognitive academic language proficiency in the College of Maritime Studies. These policies will integrate academic language proficiency in developing the student's critical thinking skills.The Curriculum Planner and Developers should continually update their plans in making instructional materials, instructors' guides, modules, and methods to improve the student's academic language proficiency and critical thinking skills. A student's performance mainly depends on his critical thinking skills and language proficiency. It should provide teachers with better directions to give quality education to their students.Language Teachers should continually update themselves with new strategies, techniques, approaches, and methods for teaching academic language. This can be done through attending training, seminars, and workshops relating to academic language and critical thinking skills. Through this, they can bring out new ideas and innovations to enhance students' cognitive academic language proficiency and develop their critical thinking skills.The researcher should make a developmental program blueprint to enhance students' cognitive academic language proficiency and critical thinking skills.Lastly, future researchers are encouraged to conduct a similar study on a wider scope. This may serve as a guide to other similar studies. They can apply the concept and importance of critical thinking skills and cognitive academic language proficiency in their research study.

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