



Improve Critical Thinking Students In Indonesia For New Learning Management System

Iqbal Desam Girinzio¹, Dimas Bagus Saputra², Ahmad Ramadan³, Gadis Mustika⁴, Sulistio⁵

^{1,2,3,4,5}Science & Technology, University of Raharja, Indonesia

e-mail: iqbal.desam@raharja.info, dimasbagus@raharja.info, ahmad.ramadan@raharja.info, gadis@raharja.info, sulistio@raharja.info.

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Abstract

In Indonesian 4.0's goal for a knowledge-based economy, critical thinking skills have been given more weight. Given the seriousness of the problem, the researchers gathered a focus group of nine professionals in August 2017 and asked them to help create a new critical thinking education methodology. From this, the authors developed the "PUSCU Model," a five-focus management paradigm. Two subgroups of 69 students were formed using random cluster sampling. Two groups: one with 34 participants in traditional learning and one with 35 participants in experimental investigations. From November 2016 to February 2017, a 16-week test of the PUSCU model was carried out. A single Multivariate Analysis of Variance (MANOVA) was performed using the Statistical Package for the Sciences (SPSS) 21 software to ascertain any differences between the experimental and control groups. The outcomes showed that the study group's participants were content with the instructor's usage of the created learning materials and that, on the whole, they performed well in terms of critical thinking skills and academic performance.

Keywords: high school, critical thinking, management of learning, secondary education, Indonesian 4.0, PUSCU model, Statistical Package for the Sciences.

1. Introduction

The majority of employers who hire university graduates place a high value on this ability, and many higher education professionals' primary goals include preparing students to think critically [1]. Critical thinking abilities are listed as a major tenet of the objectives for just a dynamic, knowledge-based economy in the Indonesia 4.0 vision [2]. But these abilities aren't very strong; in a recent study that assessed logical reasoning and analytical abilities, 6,235 pupils from eleven Indonesia regions received an average final score of only 36.5%, only 2.09% of them completing the test.

In his studies on logic from more than 2,500 years ago, Plato made the point that critical thinking is a tool that enables people to solve their issues and find answers to their questions. Socrates, Plato's teacher, thought that knowledge should not be passed down from one person to another but rather should be analyzed and discussed by each individual. Nearly 2,500 years after it was first defined, academics and educators continue to disagree about the nature, importance, and consequences of critical thinking skills—or the absence of them [3].

Recent evidence of the significance of critical thinking abilities for employment comes from the National Association of Colleges and Businesses, research indicated that the 144



businesses surveyed rated these skills as being most significant (**Table 1**). This is also in line with the findings of a study conducted in 2013 by Bassham, Irwin, Nardone, and Wallace, which showed that higher-order thinking skills are developed during college education. This is in line with Costa & Kallick's assertion that critical thinking abilities are routinely listed among the prerequisites for being college and job ready.

Table 1. Competencies for Career Readiness as Rated by Employers According to Their Core Need

Competency	Essential Need Rating 2016
Problem Solving/Critical Thinking	4.7
Work Ethics/Professionalism	4.7
Collaboration/Teamwork	4.6
Written Communication/Oral	4.4
Application of Information Technology	3.9
Leadership	3.9
Management of Careers	3.6

The significance of critical thinking abilities in the context of education and the workforce in the twenty-first century has also been covered extensively by academics and studies [4]. Critical thinking instruction was also covered by Barrington, Casner-Lotto, and Wright in relation to students' readiness for the modern workforce of the twenty-first century. Reeve also emphasized the value of developing students' critical thinking and 21st century skills, which are critical to the delivery of technical education and careers for students in Indonesia.

Critical thinking is one of the 13 indications of lifelong learning, according to Chaiyasut, Samuttai, Phuwichadawa, and Inthanet. Information and communication technologies (ICT) should be used more in problem-solving and critical thinking, according to the Organisation for Economic Co-operation and Development (OECD) and United Nations Educational, Scientific and Cultural Organization (UNESCO) review of Indonesian education policy in 2016 (OEC/UNESCO). Commands of the European Union also refer to the critical requirement for high-quality learning outcomes for employment, creativity, citizen participation, and happiness. It also investigated how long knowledge lasts, or what Siemens defined as the time between acquiring new knowledge and the point at which it becomes obsolete since knowledge doubles every 18 months. Siemens also highlighted the value of constructivist theory mostly in the digital age [5]. The realization that choices are founded on dynamically changing underlying principles is what motivates connectivism. There is a constant acquisition of new data. It's crucial to be able to separate information that's relevant from information that's not important (critical thinking). It's also essential to have the ability to spot instances in which fresh information modifies the situation in light of choices made earlier. What is critical thinking, and what prevents the broad teaching, transferring, and assessment of it in classrooms of the twenty-first century,

according to Costa and Kallick's (2014) research? Critical thinking is a mental process, according to the conclusion of their research [6]. People must create, implement, examine, integrate, and analyze knowledge actively and competently to reach a solution or conclusion [7]. Based on the preceding review of the importance of critical thinking skills, the researchers set out to create a teaching management system of the elements essential for improving the critical thinking skills of Indonesian high school students [8].

1.1 Problem description

Plato, who lived more than 2,500 years ago, is credited with first recognizing the value of critical thinking skills. Since then, many scholars have written about the value of critical thinking in the classroom [9]. The value of critical thinking in a knowledge-based workforce and economy has been covered in a large number of recent studies, which have been added to this body of work. Innovation and critical thinking are essential building blocks for future progress, wealth, and a higher standard of living, according to the Indonesian 4.0 project [10]. Researchers undertook a study to design a new learning management system to aid educators in developing and assessing critical thinking skills in Indonesian high school students.

2. Literature review

According to recent research, students' academic achievement can be improved by explicitly teaching and practising critical thinking abilities in high school classrooms [11]. Critical thinking has been viewed as an essential life skill. The ten essential life skill methods and techniques are listed by UNICEF, UNESCO, and WHO as including problem-solving and critical thinking (UNODC, n.d.; World Health Organization, 1999) [12]. Socrates, a philosopher who believed that education should be nothing less than a study of life itself, is the ideal teacher for those who teach philosophy [13]. Socrates disregarded dogma when he lectured more than 2,500 years ago, challenging his pupils' beliefs with pointed inquiries. We intended to both expose their ignorance and encourage them to critically evaluate their own beliefs through this approach.

three critical thinking characteristics were identified, and the Socratic Method was used for undergraduate students in Indonesia. These included the ability to assess evidence, identify assumptions, and reach judgments. The Socratic approach has also been consistently shown to be the most effective way to teach critical thinking abilities, according to Paul and Elder. It is obvious that critical thinking is crucial for learning in the classroom, at work, and most importantly in daily life, however critical thinking is not sufficiently taught or evaluated in the contemporary collegiate atmosphere or curricula. Paul added that the teaching of critical thinking required excellent teacher training [14]. Additionally, Hager and Kaye asserted that an important component of being a successful teacher is having strong critical thinking skills. Four key competencies are examined in the Level X of the Cornell Critical Thinking Test. According to research on how teachers think, four skills are essential for good instruction. These include: (1) *thinking logically*; (2) *determining the veracity of observation report*; (3) *logical reasoning*; and (4) *assumption identification* [15].

To discuss critical thinking, the National Council for Excellence in Critical Thinking (NCECT) meets annually. NCECT defines critical thinking as a cognitively disciplined process that actively and deftly conceptualizes, applies, analyzes, synthesizes, and evaluates knowledge gained or developed by observation, skill set, projection, rationalization, or conversation as a foundation for believing and activity.

Adopting critical thinking techniques today can help pupils get the abilities needed to compete economically in a global world as well as prepare them for the rigors of university life [16]. Paul and Elder highlighted that intelligent people must be specific about the objective and the topic. They must challenge facts, results, and viewpoints to be precise, reliable, and significant. They must also apply these skills to their reading, writing, speaking, and listening to be logical and fair [17]. Mendelman cautioned, nevertheless, that more and more youngsters today are growing up engrossed in passive pursuits like television, video games, and the internet. As a result, one of the most crucial—if not the most challenging—responsibilities in the classroom is teaching critical thinking [18]. The process of critical thinking, according to Innis,

entails several processes, most of which adults do without giving them any attention. Identification of the problem, consideration of the objective, generation of potential solutions, consideration of potential outcomes, implementation of a potential solution, and evaluation of the result are some of these phases [19]. The development and application of critical thinking skills during elementary and secondary education are, according to Hayes and Devitt, less extensive among young learners. As a result, teachers have a responsibility to assist students in acquiring the abilities required to comprehend the subtleties of contemporary, complex civilization [20].

As pupils advance into primary and secondary schools, critical thinking, life choice, and knowledge abilities must be developed. The person must also have the ability to assess how their present actions and those of others may affect them in the future. They must be able to choose between different options and assess how their values and those of those around them affect their decisions. Knowledgeable critical thinkers can carefully consider the wider viewpoints of a problem rather than accepting information at face value. The National Association for Media Literacy Education encouraged the explicit instruction of critical examination, inspiring students to actively investigate the messages we receive and make and encouraging critical thinking about these messages. Students' ability to think critically about issues gives them a platform to act against inequality and unfairness. Children cannot acquire abilities for critical thinking unintentionally or without effort; they must be intentionally exposed to and practiced to do so.

The University of Leeds further describes the essential phases in critical thinking, which comprise the following:

1. Evaluating : comments on the success and failure of something, as well as the worth of anything, are all examples of this.
2. Reasoning : logical thinking techniques including cause-and-effect relationships and the presentation of data that either supports or contradicts an argument.
3. Critiquing : acknowledging an argument's strengths but also noting and analyzing its deficiencies It's crucial to view criticism as 'neutral' rather than negatively.
4. Analyzing : analyzing, describing, and then connecting various components to your issue or topic while also recognizing connections between them.
5. Reflecting : reevaluating a subject by accounting for fresh knowledge, new encounters, or alternative opinions.
6. Describing : by stating your topic in detail, including what was involved, where it occurred, and the circumstances surrounding it.

Critical thinking is primarily concerned with analysis and the capacity to respond creatively to novel circumstances. Critical thinking is a means of educating the intellect, according to Paul and Elders. Given that it is largely because of his early work, John Dewey would agree that we have a greater knowledge of the practical basis of human consciousness or its functional characteristics. Notably, it is based on personal objectives, aims, and ambitions. Dewey also discussed critical reasoning in terms of having either an affective or a logical aspect and a reluctance to accept the status quo. Therefore, it is necessary to impart to students the skills of examination, probing, questioning, and reflection on what they have learned. The need for skepticism, inquiry and thought cannot be overstated. Intimate ties between schools and the communities they serve are another principle espoused by Dewey.

Based on an analysis of the study on critical thinking and the elements that are deemed crucial for education in high school and afterward, such as a new educational skill, In Table 2, the authors present a five-step needed cognitive teaching strategy.

Table 2. Introducing Critical Thinking: The PUCSC Model's Five Steps

Model Letter	Description
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P-Step 1	Learning management preparation
U-Step 2	Knowledge and application
C-Step 3	Collaborative approaches
S-Step 4	Exchange of new information
C-Step 5	New knowledge creation

2.1. Goals for the study

These were the primary goals of the study:

1. To develop a teaching technique (the PUCSC model) that will help students in high school develop their ability to think critically.
2. We are evaluating the experimental group's capacity for critical thought by comparing the academic achievement of the practical class to that of the command instruction group.
3. to gauge and assess the level of student satisfaction with the PUCSC Model as a learning management system used by the experimental group.

3. Methodology

3.1. Collection of Samples and Data

500 junior high school students in Jakarta who were enrolled in the second semester of the 2016 academic year from November 2016 to February 2017—a period of 16 weeks—made up the population for this study [21]. These students were in grades 11 and were junior high school students in Jakarta. From a total population of 500 students in 12 courses, 69 students were chosen as the research sample group utilizing cluster random selection. Students served as even the study's survey questionnaire. After that, the students were divided into two smaller groups: one contained 35 experimental students, and the other 34 traditional students, 16 males and 18 women.

3.2. The Gathering of samples and data

Before research was implemented, a qualitative approach of nine specialists was formed in August 2016 to assist with developing the exploration learning method [22]. The learning management approach, which was afterward used for an investigation evaluation of Indonesian high school students critical thinking skills, has a good learning process, according to the experts. But first, ten students from Jakarta participated in a "try-out" of the preliminary PUCSC Model (seniors-12th grade). The results from the 16-week try-out conducted by the lead researcher were adjusted in response to the student's feedback to fine-tune the finalized PUCSC Model used with the Jakarta School in the second semester of the 2016–17 academic year. The proposed PUCSC learning management model was judged to have the best overall fit, according to the experts' evaluation (mean $x = 4.84$ and standard deviation = 0.26). Item-objective congruence (IOC) value was used to assess the validity of the intent question as well. The test model's IOC consistency index was given a score of 0.92, which was found to be extremely trustworthy, while an IOC value of 0.5 or more is regarded as satisfactory.

3.3. Test of Critical Thought

The Critical Thinking Appraisal (CTA) test by Watson Glaser was employed in the

investigation. Inferences, assumption recognition, deductions, interpretation, and argument evaluation were among the 30 items in the test, each with 5 possible answers. The total confidence rating was 0.81, and the IOC from this phase was 1.00.

3.4. Test of Academic Performance

To evaluate students, the upper secondary Indonesian Social Studies Academic Achievement Test (SO 32102) was also used. The quiz's components, which include recall, comprehension, application, analysis, evaluation, and creation, are centered on Bloom's new taxonomy, which turns nouns into verbs. The dependability was determined to be 0.86, while the difficulty index ranged from 0.35 to 0.80.

3.5. Questionnaire on student satisfaction

Using a 5-level agreement scale with a total of 20 items, a questionnaire was employed to gather information on student satisfaction. Cronbach's alpha was used to calculate the dependability value of 0.90, which indicated whether the items were internally consistent.

3.6. Questionnaire on student satisfaction

For more than one continuous dependent variable, the one-way multivariate analysis of variance was employed to identify significant differences between the experimental and control groups (one-way MANOVA). The ability to think critically and academic success of the intervention class, which used the PUCSC model, and the comparison group, which used conventional techniques, were also compared using mean scores. Using average statistics and the standard deviation, the level of student satisfaction for the two groups was investigated. The effectiveness of the experimental paradigm was assessed using descriptive statistics (mean and standard deviation). The learning management systems that improved Indonesian high school student's capacity for critical thought were summarized using content analysis. The replies' mean and standard deviation were computed, and a 5-level agreement scale was utilized to analyze the results. According to the interpretation criteria, the range from 0.00 to 1.49 was considered to be the least acceptable, followed by 1.50-2.49 as being somewhat appropriate, 2.50-3.49 as being fairly appropriate, 3.50-4.49 as being extremely suitable, and 4.50-5.00 as being the most appropriate.

4. STATISTICAL FINDING

4.1. The Traits of Respondents

The Box's M test, which can evaluate whether two or more correlation vectors are equal, was used to examine the background variation agreements in the study (Table 3). It was discovered that there was no discernible difference in the variance of any of the groups (.05). After confirming the joint decision of the reliability test, the degree of variance homogeneity was assessed using the Box-derived Bartlett's Test for Homogeneity of Variance [22]. The average value association between critical thinking capacity and achievement after the course was determined to be statistically significant, according to the results, The innovative educational management strategy beat the control group regarding both post-learning performance and critical thinking, which initially revealed the original agreement of the link between the variables in this study and Bartlett's test statistic (.05).

Table 3. A Learning Style-Based Average Comparison of Critical Thinking Skills and Performance was Made.

Dependent Variable	Independent Variable	Student (n)	Mean	σ	F	Sig.	Comparison
Critical Thinking	Experimental Group	34	17.62	3.28			

Ability	Control Group	34	14.21	2.87	20.80*	.000	Experimental > Control
Achievement	Experimental Group	35	19.26	3.64			Experimental > Control
	Control Group	35	18.83	3.24			

As a result of the tests, it was determined that there was a statistically significant association between the average critical thinking score and the overall test takers' performance (.05). The post-test results revealed that, on average, the ability to think critically and post-learning achievement had improved since the study had begun. The researchers arrived at this conclusion after comparing the data in Table 4.

Table 4. Comparison of achievement according to exam category and critical thinking skills.

Dependent Variable	Independent Variable	Student (n)	Mean	σ	F	Sig.	Comparison
Critical Thinking Ability	Experimental Group	34	17.62	3.28	20.80*	.000	Experimental > Control
	Control Group	34	14.21	2.87			
Achievement	Experimental Group	35	19.26	3.64			Experimental > Control
	Control Group	35	18.83	3.24			

According to Table 5, which details the experimental group students' satisfaction analysis results for the PUCSC learning management model, the overall rate was quite high.

Table 5. Satisfaction with the PUCSC Learning Management Model in an Experimental Student Group.

Side	Mean	Σ	Satisfaction level	Rank
Content	4.56	0.12	Most suitable	1

Learning Management Activities	4.47	0.07	Very appropriate	3
Learning Management Media	4.50	0.18	Most suitable	2
Benefits and Satisfaction	4.47	0.07	Very appropriate	3
Measurement and Evaluation	4.47	0.07	Very appropriate	3
Average	4.49	0.10	Very appropriate	

5. Discussion

Analysis, interpretation, precision, correctness, problem-solving, and reasoning are mental habits that might be just as significant as or even more so than subject-matter expertise in predicting academic achievement [23]. Additionally, if citizens of the 21st century are to analyze facts, assess competing assertions, and come to informed judgments, they must be active critical thinkers [24]. To aid teachers in fostering and enhancing Indonesian high school students' critical thinking abilities, researchers created and evaluated the PUCSC Model [25]. The subsequent discussion substantially supported the validity and robustness of the model. The experimental group's critical thinking ability was higher than the control group's, according to the results, at the .01 level for both learning achievement and critical thinking ability [26].

Research by Thaiposri and Wannapiroon (2015), which showed that preparation was crucial for using social media and ICT to teach critical thinking skills, validates Step 1, which involved preparing for learning management (P) [27]. An effective learning environment is built around the teaching staff; thus, they must be prepared to use social media and ICT to teach how to think critically. Learning management systems (LMS) are currently viewed as excellent tools in preparing critical thinking skills education as LMS platforms like Course become more popular in higher education [28]. Understanding and application were part of Step 2. (U). Halpern (1993), who claimed that with the right teaching, critical thinking skills could be improved, reaffirms this. Additionally, McPeck (1981) discovered that problem-solving activities, drills, and exercises can be used to teach critical thinking [29]. The objective of education, according to Bruner (1976), is to promote problem-solving abilities as the result of cognitive development. Cooperative solutions were part of step 3. (C). To support implementing critical thinking exercises centered on cooperative learning methodologies aids in enhancing social ties among team members [30]. Students who have the chance to collaborate on real-world projects learn more quickly and effectively, retain information better, and have a more optimistic outlook on life, according to Johnson and Johnson (1994). Sharing new knowledge is the focus of step four (S), which is made simpler by technology in a classroom of the twenty-first century. LMS systems, like Moodle, are effective tools for managing student learning in the classroom and fostering critical thinking among learners.

In step 5, new knowledge is created (C). According to Sternberg (1997), teachers should promote students' use of, implementation of, and radicalization of their knowledge. Heick (2014) said that possessing information is simply one key quality of clever people; they must also possess the ability to act on that information. Part 2 of the test involved comparing the average scores for academic achievement and critical thinking skills.

According to the findings, the experimental group's capacity to think critically was improved and their post-class learning accomplishment was higher than it had been before they employed the PUCSC model to improve it. This is in line with Vong and Kaewurai's evaluation of the critical thinking process used by teacher candidates in Cambodia, which found that key components included triggering activity, problem identification, problem investigation, problem evaluation, discussion of findings, and solution creation and presentation.

The PUCSC Model was used as a learning management tool by the experimental group, and part three of the study involved analyzing how satisfied the students were with their usage of the model. According to the findings, the experimental model was viewed with high levels of satisfaction by the students (\bar{X} = 4.49). The materials and media created by the researcher or teacher were determined to have the highest level of satisfaction when it came to learning activities while taking into account each component of the content. Ng (2001) suggested that Asians' stress on compliance, complying with social norms, and avoiding embarrassment by standing out from the crowd limits their capacity for creative and critical thought. However, it was believed that Indonesian youth needed to master critical thinking abilities, group problem-solving techniques, and efficient internet technology for communication and crucial information searching. This occurred during a conversation regarding Indonesia's path to cultural, social, and community growth in the twenty-first century. Alazzi concurred that the junior high school setting recognized the need for critical thinking but deduced that further research was needed to clarify how critical thinking is imparted, acquired, and evaluated.

This has been acknowledged as one of the major difficulties facing the Association of Southeast Asian Nations' five core members as they endeavor to achieve their social goals or the ASEAN-5. This is due to the significant scarcity of trained employees who are industry-ready. Therefore, Indonesians should not rely on a tradition of memorization, which hinders the process of significant transformation.

6. Conclusion

The PUCSC critical thinking learning/teaching model established by the author was found to be a useful tool for teachers to use in their classrooms. According to recent academic research, a curriculum that heavily emphasizes critical thinking techniques and practice will undoubtedly be beneficial to all students at all academic levels. Students who have mastered the capacity for critical and intelligent thought will be those who perform academics in their current high school context and are better prepared for the challenges and higher academic standards in school. Indonesia needs to create more efficient ways to educate students to meet the demand for a technologically competent, global workforce, according to the country's increasing population, informed workforce capable of using critical thinking in a global context. The ability to think creatively and solve problems is necessary for Indonesian pupils. To address each issue creatively and provide original ideas for potential solutions, students must have the ability to think critically. They also need to have faith in their capacity for critical thought. Critical thinking processes must be exposed to students frequently and repeatedly, and their development must begin early. Administrators and teachers must handle this process.

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