HASIL CEK_12116-Article Text-21501-1-10-20220210-1

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Submission date: 20-Apr-2022 10:26AM (UTC+0700)
Submission ID: 1815111733
File name: 12116-Article_Text-21501-1-10-20220210-1.pdf (268.09K)
Word count: 2734
Character count: 16051

Turkish Journal of Computer and Mathematics Education *Vol.13 No.02 (2022), 26-30*

Research Article

Critical Thinking Ability among Gifted and Slow Learner Students in Higher Education. What is the Recommended Learning Model?

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Abstract: Inclusive education in Higher Education began to be developed in Indonesia. However, the readiness of universities to hone students' critical thinking has not been emphasized by most universities. This can be seen from the differences in students' critical thinking skills. The present study aims to find out the difference between slow learner's and gifted student's critical thinking. This difference then becomes the basis for recommending an innovative learning model. Therefore, quantitative approach through comparative study to see differences in students' critical thinking skills that are classified as slow learners and gifted was employed. The participants of the study were four gifted students and four slow learners who were selected through a purposive proportional random sampling using the Culture Fair Intelligence Test. The critical thinking data from slow learner students and gifted were collected using the Critical Thinking Scale. The result of the study exhibited a significant difference in gifted students 'and slow learners' critical thinking; the former exhibited higher performance than the latter did. The results of this study indicate that learning that must be applied in inclusive classes must apply innovative learning models that can accommodate students' different abilities. This study recommended the lecturers to apply the CermaT learning model to improve slow learner's critical thinking. CermaT learning model is a development of the modified Computational Tinking and Rigorous Mathematical Thinking learning models.

Keywords: Inclusive Education in Higher Education Learning Innovation, Computational Thinking, Rigorous Mathematical Thinking, Slow Learner, CermaT, Critical Thinking

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1. Introduction

Critical thinking is important for 21st-century education. Critical thinking skill is one of the 4C (critical thinking, creativity, communication, and collaboration) which determine one's life success. Critical thinking refers to a set of cognitive skills and disposition (Lucas, 2018). Kim (in Demir, 2015) explains that it is an activity for collecting information, actively learning something, solving problems, making decision, and utilizing information to settle an issue. Critical thinking is reflected by university student's activity that covers not only collecting information but also actively filtering, absorbing, finding alternative solutions, comparing, and implementing information in life.

Şahin&Doğantay (2018) state that critical thinking is viewed as high-order thinking skill. This skill is needed to analyze and manipulate information. Further, Facione and Facione (2008) argue that critical thinking is an assessment process aiming at deciding what to trust in/ what to do in a certain context, concerning with available evidence, using right conceptualization and method, and is evaluated based on certain criteria.

Prospective teachers should train their critical thinking, according to a psychologist, critical thinking emphasizes the cognitive process such as reflection, reasoning, comparison, evaluation, assumption, conclusion, hypothesis formulation, synthesis and making of novel ideas, testing, and systematic, comprehensive conclusion (Olalekan, 2017). Critical thinking is pivotal for teachers because it allows student to effectively deal with social, scientific, and practical problems (Shakirova, as cited in Olalekan, 2017). However, a teacher should be critical, given that they face various student's potential at school.

Zhang and Kim (2018) discover that critical thinking can be trained by establishing a constructive learning environment, designing flexible learning strategies, and continuously adjust the formative assessment. In other words, students may improve their critical thinking through a constructive learning model. The use of learning media can also affect the student's critical thinking. Jainal& Louise (2019) found that critical thinking was improved when using guided inquiry model with Macromedia Flash. In addition to supportive learning environment and media, critical thinking can also grow when an individual is aware of self-monitoring and self-evaluating. Gotoh(2016) found that metacognitive regulation can develop critical thinking. Metacognitive regulation consists of two aspects, critical thinking rubric as the criteria, and evidence of problem-solving process.

he result showed that metacognitive regulation with critical thinking rubric as the criteria,and the evidence of problem-solving process, may enhance critical thinking skills.

2.Significance Of The Study

Students' critical thinking greatly influences the effectiveness of learning. The existence of critical thiniking differences between students also has an impact on the lecturer strategy when teaching a learning material. Research states that critical thinking can be trained by using innovative learning model.

3.Review Of Related Studies

Basri et al. (2019) conducted a study to find out the high school students' critical thinking. The study found that their critical thinking skill was categorized as low, particularly regarding the aspect of analysis, inference, evaluation, explanation, and self-regulation. It was only their interpretation that is categorized as medium. Critical thinking skills could be different from one another. This difference is affected by various factors. Bećirović, Hodžić, &Brdarević-Čeljo (2019) state that critical thinking is affected by grade, where students in higher grade possess higher level of critical thinking skill. Besides, critical thinking is affected by nationality. However, it is not affected by gender differences.Radulović and Stančić (2017) describe the results of research by Abrami et al. that the most ineffective programs were programs based on logic and programs that measured performance on measures of intelligence, while the more practical skills-oriented programs were found to be more effective. Recently published was a rigorous methodological meta-analysis of 117 quasi-experimental research studies with children older than six years, which included some form of intervention aimed at the development of critical thinking, lasting no less than three hours. The analysis includes the study of the effects of programs that encourage critical thinking, of different types (general, infusion, immersion, and mixture). The analysis shows that mixed programs that combine specific content from learning and critical thinking are more effective than other types of programs. The least effective are the immersion programs, where critical thinking is the preparation as a by-product of the process. The author concludes that, with regard to program effectiveness, the problem is important whether or not to think critically by being attached to some specific content; it is much more important to practice critical thinking as an objective and part of the subject / course. Significant learning skills for thinking and thinking when faced with a particular problem prove to be the best strategy, while engaging students in critical-provocative activities in critical activities that perform and demonstrate the importance of critical thinking is an ineffective strategy. Yet another important finding from this meta-study suggests that programs include teacher-specific training to organize structures that encourage critical thinking in students more effectively. Therefore, critical thinking is also important as a goal in learning in lectures because individuals are no longer children but adolescents.

4.Objectives Of The Study

- The present study aimed to compare the gifted student's critical thinking and the slow learner's critical thinking.
- To recommend a learning model that can be applied in the classroom to develop student's critical thinking.

5.Hypotheses Of The Study

- Critical thinking skill level of gifted students was higher than the slow learner's.
- Critical thinking can be improved through an innovative learning model.

6.Population And Sample

The participant of the study were students in Inferential Statistic Class. They were selected using purposive proportional random sampling technique, Those who were categorized into slow learners were students with IQ ranged from 70-90, while those categorized as gifted students were students with IQ more than 120. The data on student's IQ was obtained through CFIT. Based on the test, it was found that four learners were categorized as slow learners, and four learners were categorized as gifted students. We then selected four slow learners and four gifted students. Students are at the age of 19-20 years, four female students are in the slow learner category, one female student is in the gifted category, and three male students are in the gifted category.

6.1.Statistical Techniques Used in the Present Study

The data on students' critical thinking was obtained through critical thinking scale adapted from California Critical Thinking Scale (Facione, Facione, and Giancarlo, 1998) which was adopted to Turkish by Kökdemir (2003), and Kim (2009). Once the data were collected, the data analyzed using Mann Whitney-U.

6.2.Data Analysis and Interpretation

The participants of the study were eight university students.**Table 1** shows the participants' IQ test score.

Table 1. Participants' IQ test score

Subject	IQ	Category
1	127	Gifted
2	133	Gifted
3	123	Gifted
4	169	Gifted
5	85	Slow Learner
6	82	Slow Learner
7	83	Slow Learner
8	85	Slow Learner

Next, the student's critical thinking score was calculated. **Table 2** shows the calculation result.

Table 2. Calculation Result of Critical Thinking Scale

No	The Score of Gifted Sudent's	The Score of Slow LearnerSudent's
1	153	142
2	161	122
3	156	141
4	169	138

After obtaining critical thinking score, we analyze the data using Mann Whitney-U. **Table 3** shows the average score of gifted studentsand slow learner's critical thinking.

Table 3. The Calculation of Critical Thinking Average Score through Statistics Descriptives

KategoriIQ				Statistic	Std. Error
Critical Thinking	Gifted	Mean		159,75	3,497
		95% Confidence Interval for Mean	Lower Bound	148,62	
			Upper Bound	170,88	
		5% Trimmed Mean		159,61	
		Median		158,50	
		Variance		48,917	
		Std. Deviation		6,994	
		Minimum		153	
		Maximum		169	
		Range		16	
		Interquartile Range		13	
		Skewness		,844	1,014
		Kurtosis		-,131	2,619
	Slow Learner	Mean		135,75	4,661
		95% Confidence Interval for Mean	Lower Bound	120,92	
			Upper Bound	150,58	

5% Trimmed Mean	136,17	
Median	139,50	
Variance	86,917	
Std. Deviation	9,323	
Minimum	122	
Maximum	142	
Range	20	
Interquartile Range	16	
Skewness	-1,809	1,014
Kurtosis	3,292	2,619

As shown in Table 3, the average score of gifted students' critical thinking was 159 and that of slow learners was 135. In other words, gifted student's critical thinking skill level was higher than the slow learner's. This score was then tested to find out the significance of the difference. **Table 4** shows the result.

Table 4. The Results of Data Analysis with Non-Parametric Mann Whitney-U

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of CriticalThinking is the same across categories of KategoriIQ.	Independent-Samples Mann-Whitney U Test	,029[1]	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is ,05.

[1]Exact significance is displayed for this test.

Table 4. Data analysis result as shown in Table 4, the significance level was 0.029. It means that the gifted student's critical thinking is significantly different from the slow learner's.

Although slow learners' critical thinking is lower than the gifted student's, it should be noted that critical thinking is trainable.

7.Recommendations

The development of critical thinking in university for students with special needs is very important to consider. Some of these components include campus disability-friendly policies, accessible facilities, and educators (Barida, Rofiah, &Fitrianawati, 2020). Educators can act as agents to improve student critical thinking.An innovative learning model needs to be applied by educators as an effort to increase the effectiveness of learning. The researchers recommend an Innovative, CermaT learning model, which is adapted from computational thinking that is rigorous mathematical thinking-nuanced. Computational thinking is a robust approach to think and solve problems (Papert,1980). It aims to teach children manage problems so that they can solve it. Computational thinking can be taught as a part of mathematics, science, and art, or in other settings. It aims not only to encourage children to be a coder but also to make them master the art of thinking that allows them to overcome complex challenges all aspects of their life. Computational thinking is a mean to see the world, how information is produced, related, analyzed, represented, and programmed together (Cozzens, Kehle, & Garfunkel, 2010).

The specification of CermaT learning model are: 1) Prioritizing both teacher's and student's active participation (teacher-student centered); 2) The teacher acts as mediator and motivator and does not force the students to master a certain competence; 3) The students act as an active and mindful actor throughout the process, and possess a thinking skill that fits their capacity; 4) Guide students to think systematically, starting from general themes to specific themes; 5) Respect the students' experience by inviting them to review their past learning experience; 6) Prioritizing experiences that is relevant with the theme, and prevent the students from focusing on irrelevant learning experience; 7) Mediating the students to implement and to transform the concept to other settings; and 8) Mediating the students to optimize their thinking skill in evaluating the implementation and transformation for material concepts.

The purposes of CermaT learning model are: 1) To teach students mastering a material more easily,starting from complex thing to simpler thing; 2) to develop student's systematic thinking skill, starting from general thing to more specific ones; and 3) to implement and transform a concept in other settings.

The functions and benefits of CermaT learning model are 1) The slow learners can understand a mathematical concept more easily; 2) the slow learners can systematically understand and implement a concept; 3) The slow

learner can flexibly apply and transform a concept in other settings; and 4) the slow learners become a critical thinker.

Further, the advantages of CermaT learning model are: 1) the model can be applied in all level of educations, from elementary level until university level; 2) The model views students as a learning subject, not object that should be given a knowledge; 3) The model is fit to accommodate students who find themselves difficult to understand a certain concept (learning difficult); 4) the model teaches students to think easily, systematically; and flexibly without ignoring details of a concept; and 5) the model possesses a structured syntax, allowing the teachers to implement it easily.

8.Conclusion

Gifted student's critical thinking skill level was higher than the slow learner's. Student's critical thinking can be developed through a set of learning activities. Lecturers can create a collaborative relationship by mediating students and the targeted competence through CermaT innovative learning model. This study has not tested the effectiveness of the CermaT learning model in learning.

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