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ENHANCING CRITICAL THINKING WITH MENTIMETER PROGRAM IN HIGHER EDUCATION

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Abstract

The discussion about technology, teachers, and critical thinking-oriented learning has evolved into a disposition skill with reasoning and critical pedagogical practices. Critical thinking cannot develop independently but must be fostered and engineered for students' critical reasoning connections to flourish through diverse learning media. This study aims to examine the impact of Mentimeter on critical thinking skills. The research topic is designed primarily for first-semester students. The research method is ex post facto. The data collection method employs a questionnaire that has undergone validation, reliability, normalcy, and homogeneity testing. The study's findings indicate that using Mentimeter can increase critical thinking skills, as seen by the estimated F value>F table, allowing it to be stated that the hypothesis, which claims that there

Keywords: critical thinking, Mentimeter, higher education

INTRODUCTION

One of the competencies of the twenty-first century is the ability to think critically. According to projections, the final model proposes that critical thinking modulates the relationship between problem-solving, creativity, digital literacy, cooperation, and the 21st century (Kocak et al., 2021). Critical thinking can manifest through students' capacity to engage in active inquiry, pose thought-provoking questions, and engage in collaborative problem-solving to identify effective resolutions (Trinova et al., 2020). Critical thinking skills encourage human sensitivity in analyzing various views on various issues (Janah et al., 2019)

For teachers, there are many ways to improve critical thinking skills, including involving technology in learning. Learning practices in improving critical thinking are carried out using mobile, where the results can provide feedback and fast mobility and results that can be accounted for (Kousloglou et al., 2023). Furthermore, implementing SMART-PBL in the science curriculum enhances students' metacognitive thinking and problem-solving abilities and the critical and creative thinking, relationships, and logical thinking capabilities that surface while studying chemistry (Utami et al., 2020). The research results show that using learning technology can improve abilities related to information processing,

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reflective and critical thinking, and creativity. In general, it improves metacognitive skills, as shown by the percentage of 48.1% (13 teachers) using smartphones in the music learning process, thematically based; 33.3 % (9 teachers) use notebooks; and 18.5% (5 teachers) do not use technology devices.

Research on critical thinking is not a new theme; the topic is trendy among researchers with various research objects and variables. Research focus on discussing teacher competencies in formulating order thinking skill (Mulyono et al., 2019), the impact of the incorporation of technology on future teachers (Yılmaz, 2021); Promoting Inspiration and Critical Thought in the Twenty-First Century Classroom (Abe & Birabil, 2022); Approaches towards educational activity which are promising (Voogt et al., 2019); and Provision of self-regulating learning-based digital courses to boost participants' critical thinking skills (Kusmaharti & Yustitia, 2022). In higher education, the themes of critical thinking skills are widely discussed, some of thema which focus on classrooms such as learning in Islamic education programs (Mohammad et al., 2022) and factors that influence achievement (Mujanah, 2020).

To highlight the above statistics, the subsequent data search points out research on critical thinking skills in higher education. This data ranges from 2017 to 2023, taken from the Google Scholar dataset and breaks down from 2017 to 2023.

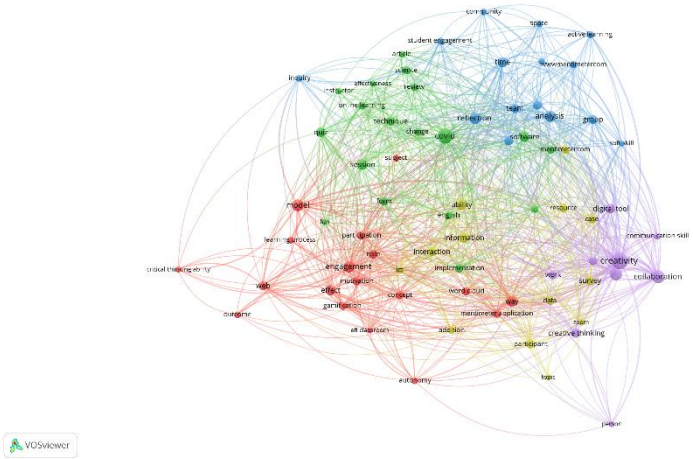

Figure 1. The data were taken by Vosviewer analysis

The statistics demonstrate that much research discusses critical thinking. Critical thinking implies students' thinking skills in understanding problems, focusing on problems, and analysing or drawing conclusions. According to Scriven (Fisher, 2009), critical thinking is skilled and active interpretation and evaluation of observation, communication,

information, and argumentation. Students at school take more for granted the material provided by the teacher, so critical thinking must be grown as early as possible in students. However, the graph above shows a modest network between critical thinking and the Mentimeter program. It implies that employing Mentimeter to increase student critical thinking requires less research. The data is also confirmed by findings, which show that few users use the Mentimeter program during learning.

In contrast, the centimetre has various eminence for creative and active students in the classroom. Mentimeter for enhancing vocabulary (Wong & Yunus, 2020), enhancing the quality of the learning process in a large class (Mohin et al., 2022), being a discussing media in the classroom (Jackly & Lestariningsih, 2022); Mentimeter's impact on pupils' writing achievement in online learning (Chotimah & Cahyani, 2022). Mentimeters also increase creativity and interactive students (Mirayani et al., 2022).

Based on the empirical data and previous research above, this research focuses on improving critical thinking with meters. This is because there has not been much research examining the use of meters in learning for first-semester students. Early-class students were chosen because they were considered to be still carried away by the atmosphere of high school and had not yet adapted to the campus world.

LITERATURE REVIEW

Critical thinking in 21st-century learning

Critical thinking abilities are vital to civic duty since they allow for innovation and contribution. Many specialists have different perspectives on critical thinking skills, one of which was advanced by Steve Padget (Padget, 2012), Werbach and Hunter (Werbach & Hunter, 2012); Diane Grigg and Lewis (Grigg & Lewis, 2022; Halpern & Sternberg, 2019). Among the many experts mentioned above, this study employs Steve Padget's theory from his “Creativity and Critical Thinking” book.

According to Padget, critical thinking has interpretations that are often debated because critical thinking involves cognition, competence and some dispositions. Both cognitive and competence are two skills that require a high level of intellectually disciplined skills in conceptualising, analysing, synthesizing and evaluating information gathered from or generated by, observation, experience, reflection, reasoning, or communication (Padget, 2012). Critical thinking abilities, from another perspective, include (1) classroom

interactions, including enquiry and debate techniques, (2) the use of thinking language, and (3) story-based approaches are effective mediators in evoking critical thinking skills (O'Reilly et al., 2022). While Fodor and Barta are of the view that critical thinking skills do not only refer to cognitive skills but must be a measurable instrument to assess someone having critical thinking skills (Barta et al., 2022).

The three perspectives discussed above each place a different focus on procedures, interactions in the learning process, and the usage of instruments. These three points of view were subsequently transformed into five skills: analytical, synthesis, problem solving, concluding, and assessing. This dimension also emphasises its significance in Bloom's taxonomy, which begins with hierarchical and revolutionary thinking and progresses to decision-making. (ÇİFTÇİ et al., 2023).

Competencies in critical thinking are typically associated with the ability to analyze complex issues, interpret various problems from various perspectives, evaluate processes based on criteria, draw and make conclusions based on what is available, and read the relationships between information. In the most fundamental sense, student critical thinking investigates analyses, interprets, or synthesizes information and employs creative thinking to develop arguments, fix issues, or reach conclusions. One of the most fundamental aims of education is to generate competent pupils, which requires students to acquire (Raj et al., 2022).

Critical thinking is highly encouraged in college. As a result, metacognition plays a crucial part in improving critical thinking in order to gain more knowledge. Critical thinking depends on well-functioning metacognitive systems, being aware of the processes, behaviors, and emotions at work, and being able to comprehend and fix what has gone poorly. Even when there is evidence of a link between metacognitive and critical thinking processes, few projects strive to clarify which processes determine which processes or whether the two are interdependent (Rivas et al., 2022). Metacognition alludes to acquiring metacognitive skills and information through systematic processes, including translation, peer review, class conferences, and reflection (Li & Yuan, 2022). The metacognitive development method also uses digital narrative (Lavrysh et al., 2023); Using PenzuTM for academic online diaries (Bort-Mir, 2020); reflective the journaling (Alt & Raichel, 2020); a web-based approach (Shen & Liu, 2011).

Mentimeter for Critical thinking

Mentimeter is an instructional media that helps teachers in teaching and students in learning. Media can also be used to deliver educational advertisements that include ideas and learning objectives (Supriyadi, 2020). Learning media is anything designed to assist teachers in teaching more effectively and make it easier for students to learn (Sukmahidayanti, 2015; Wilar, 2022). In other words, learning media is a method of passing on messages in the framework of teaching and learning to impart content to students and produce effective teaching (Omenge & Priscah, 2016). When used with young learners, instructional media may make learning more interactive, creative, and communicative (Petina, 2023).

Following the type of medium utilized, each has its own set of applications. Difference types of learning media have no different effect on student understanding in online learning. However, in offline learning, the type of media influences the level of student understanding (Heo, 2013). In additional events, learning media can help autistic children understand significantly (Sari Puspita et al., 2019). Teachers can employ a variety of media to assist students in learning; the type of media used impacts the learning effect (Aghni, 2018); The media and student literacy are inextricably linked (Laila et al., 2022), and enhance learning outcomes (Meirani & Rossa, 2021).

Depending on the material and its properties, not all media are appropriate for all subjects. Visual media can be utilised to teach insectarium topics in science study.(Rustam et al., 2022). The wordwall application is used by the teacher in mathematics classes (Nadia et al., 2022). According to Ramli (2012), there are at least five forms of learning media: 1) media without two-dimensional projection (only has length and width), such as photos, charts, graphs, posters, base maps, and so on, 2) media with two-dimensional projection (only has length and width), 3) media with two-dimensional projection (only has length and width), 4) media with two 2) Media that does not have three-dimensional projection (having length, width, and thickness/height, such as actual things, models, dolls, and so on). 3) Audio media (listening media) includes radios and tape recorders. 4) Touted media (films, slides, filmstrips, overhead projectors, and so on); and 5) Television (TV) and Video Tape Recorder (VTR). TV is a device for viewing images and hearing sound from a distance (Ibrahim Arsad et al., 2022). Mentimeter has complete component for access menu.

Some earlier studies have been conducted on the continual platform for online training. Technology-enhanced learning and cutting-edge online tools significantly increase students' various learning styles and spark their interest and motivation in online learning. Madiseh et al. (2022) conducted a review of the literature in this regard to investigate how well mental representations are incorporated into teaching and learning. According to the study's findings, incorporating the Mentimeter into educational environments increased student motivation by encouraging active engagement, improving student-centered pedagogy, and providing lightning-fast feedback for anonymized responses from learners (Madiseh et al., 2022).

Maintaining active involvement and critical thinking abilities is a crucial problem that must be addressed. Several researchers discovered that Mentimeter could improve students' critical thinking skills, while Dinata et al. found that Mentimeter can boost student activity. Interviews, questions and answers, and displays were utilized as tactics (Dinata et al., 2020). The information gathered from pupils as well as educators demonstrated the Mentimeter application's widespread capability. This is due to the application's ability to engage a varied audience with various perspectives and roles, providing an equal educational opportunity for all and improving interaction, cooperation, attention, and engagement. Furthermore, a descriptive investigation of the thinking skills of learners and responses to problem-based learning through web-based programs such as the Mentimeter app stated that students had an upbeat view towards learning research, became more passionate about their studies, and their understanding and skills in basic statistical concepts upgraded as a result of using the Mentimeter app (Pichardo et al., 2021).

METHODOLOGY

Ex post facto research is being used. This is due to the fact that there is no treatment or treatment of the object, but rather the learning has been carried out with the goal of determining the amount of its impact on critical thinking skills. The research was conducted on basic education students at Mataram State Islamic University. The overall sample size was 70 participants, divided into two groups: 1A and 1B. The following is the research design:

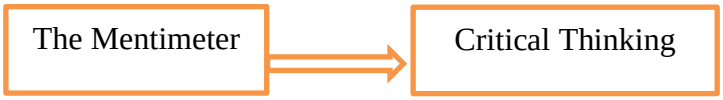

Figure 2: Reseach Design

The data collection technique employs a questionnaire, which undergoes a variety of precondition tests before being utilised as a research instrument, including validity, reliability, normalcy, and homogeneity testing.

a. Validity test

The definition of validity is "the extent to which a measuring instrument can be used to measure what it wishes to measure" (Siregar, 2014). A valid instrument is one that appropriately reflects data from the variables tested, with test results based on the r_table value at a significance level of 5%. in accordance with the test criteria If $r_{count} > r_{tabel}$ is present, the question item is valid; otherwise, r_countr_tabel is present. The product moment correlation formula can be used for validity testing:

$$r_{xy} = \frac{n\sum xiyi - (\sum xi)(\sum yi)}{\sqrt{\{n\sum xi^2 - (\sum x\,i)^2\}\{n\sum yi^2 - (n\sum yi^2 - (\sum yi)^2\}}}$$

Note:
r_{xy} = The coefficient of correlation between variables X and Y.
N = Number of respondents
$\sum x$ = Total score per item
$\sum y$ = Total score
$\sum xy$ = The sum of the scores per item multiplied by the total score
X = The independent variable is the home learning system
Y= Variabel dependen yaitu hasil belajar

b. Reliability test

The term "reliability" refers to the degree to which the results of a measurement may be believed. To summarise, dependability is a tool for determining the level of confidence or reliability of an instrument questionnaire. If a person's answers to a questionnaire are constant or stable throughout time, the questionnaire is said to be dependable. To find the entire question, apply the Kuder Richardson formula, which is as follows of criteria, reliabilty coefesient (r_{ii}) > 0,6. The data will analysis by SPSS 28.

Note:

$$r = \frac{k}{k-1}\left(1 - \frac{Si2}{St2}\right)$$

k = many questions
$\sum S_i^2$ = the amount of variance in the scores for each item
S_t = total variance

c. Normality test

The normality test is a test that is used to determine whether or not the distribution of data in a group of data or variables is regularly distributed. The normality test determines whether confounding or residual variables in the model has a normal distribution. This study's normality test utilized the one-sample Kolmogorov-Smirnov test. Using the SPSS program for Windows version 28. The one-sample Kolmogorov-Smirnov test evaluates whether data has a normal, Poisson, uniform, or exponential distribution. Kolmogorov-Smirnov was utilized with the vast number of samples reviewed by researchers in this normality test, with the significance level determined in this normality test being.

d. Homogenity tes

The homogeneity test was used to determine whether or not the data group came from a homogeneous population. The report card and post-test score data were subjected to a homogeneity test. The Levene test SPSS 22.0 for Windows programme was used to perform the homogeneity test. The following is the hypothesis proposed to measure data homogeneity. Test parameters for determining homogeneity In this study, H0 is approved if the Asymp value is positive. Sig. (2-tailed) alpha level > 5%

e. Hypotesis test

The goal of simple regression analysis is to determine the impact of one variable on other variables. Because there is just one independent variable and one dependent variable in the analysis, it is referred to as a simple regression equation. The SPSS 28 tool facilitates hypothesis testing by employing a basic linear regression test to identify the influence of independent and dependent variables.

RESULT AND DISCUSSION

Questionnaires were provided to 75 pupils, with 36 from class A and 39 from class B. First semester students or fresh students starting the basic education study programme were chosen as the criteria. Women comprised up to 80% of the sample.

Table 1: Test of Homogenity

Quesioner

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	17.308	1	17.308	.173	.679
Within Groups	7299.359	73	99.991		
Total	7316.667	74			

Source: Data analysis with SPSS 28

According to the table above, the significance value of the homogeneity test is more than the criteria value. The significance value in the table is 0.679, which is greater than 0.05, indicating that the data is homogeneous.

Table 2: One-Sample Kolmogorov-Smirnov Test

		x	y
N		36	39
Normal Parameters	Mean	80.83	79.87
	Std. Deviation	9.063	10.790
Most Extreme Differences	Absolute	.205	.125
	Positive	.156	.111
	Negative	-.205	-.125
Test Statistic		.205	.125
Asymp. Sig. (2-tailed)		.001[c]	.130[c]

Source: Data analysis with SPSS 28

The Kolmogorov-Smirnov test with a probability level (sig) of 0.05 is used to determine the normality in the present study's data. The Kolmogorov-Smirnov test criteria

are a probability value (sig) greater than 0.05, indicating that the data is normally distributed; if these conditions are met, the research can proceed.

The validity test is used to verify whether an instrument item is suitable for use. The instrument item is declared valid if the calculation results reveal that the calculated r is greater than the r table. All of the 20 questions assessed for validity had a calculated r value > r table, indicating that they were all valid and appropriate for usage. Cronbach Alpha was found to be 0.793 in reliability testing.

Table 3: reliabilty test

Reliability Statistics	
Cronbach's Alpha	N of Items
.793	20

Source: Data analysis with SPSS 28

Reliability test results obtained a Cronbach'c Alpha value of 0.793, meaning that it can be said that all 20 items from the questionnaire statements were declared reliable because the Cronbach'c Alpha value of 0.793 was greater than 0.60, so it was included in the High category.

Tabel 4. Simple Linear Regression Test

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	212.412	1	212.412	7.654	.010[b]
	Residual	832.557	75	27.752		
	Total	1044.969	76			

a. Dependent Variable: hasil belajar IPS

b. Predictors: (Constant), pelaksanaan pembelajaran tatap muka di era ew normal

Based on the results of the Simple Linear Regression test, it is known that the calculated F value = 7.654 with a significance level of 0.010 < 0.05, so in other words, there is an influence of Mentimeter on improving students' critical thinking skills.

Mentimeter and student critical thinking

The employment of Mentimeter in social studies learning can increase the critical thinking skills of first semester students majoring in basic education at Mataram State Islamic University, according to this study. The existence of learning media, particularly Mentimeter, in learning is a joy in and of itself for students, because learning has previously relied on the Zoom and Google Meet or What's Up group applications, albeit with limited use, thus Mentimeter has become an attraction for students in attending lectures. The use of Mentimeter as a learning medium promotes student involvement in the delivery of lecture material.

The use of technology in learning shows competence in organizing the learning itself (İlic, 2021). Learning technology can use audiovisual media or other types of media (Fyfield et al., 2022; Mikhaleva, 2016). However, in general three types of learning media are generally used by teachers, consisting of (1) books, (2) pictures, and (3) videos. Each media is used in many ways according to the needs of teaching and learning activities (Aisyah & Haryudin, 2020; An, 2020). However, not all educators can implement learning media using various sources, because students themselves are divided into various types of learning. Regardless of how vital learning media are, there are restrictions to employing them, such as media beliefs and instructor aversion to learning media (Omenge & Priscah, 2016; Puyada et al., 2018; Sukmahidayanti, 2015)

Not all students have the capability to convey their arguments. There are types of students who cannot work alone, but participate in group work (Novitarum et al., 2019), Similarly, some students choose to study in a hybrid or flipped classroom setting (Aini, 2021); prefer to use What's up (Salsabila & Muslim, 2022); Student learning styles can range from visual to auditory to kinesthetic, and institutional features might influence student learning styles. In either the first or third year, the majority of students' learning styles are unimodal. Visual is the most prevalent unimodal learning style, followed by auditory and kinesthetic. Visual kinesthetic learning is the most bimodal (Akbar, 2021; Hasanudin & Fitrianigsih, 2019; Jeanete Ophilia Papilaya, 2016; Papilaya & Huliselan, 2016; Prihaswati & Purnomo, 2021; Rahman & ., 2019; Saleh et al., 2022; Sekar Prihanti, 2017; Wahyuni, 2017). These various styles of learning necessitate teachers' ability to safeguard and give opportunities for all, rather than monopolising only one or the other.

Aside from employing Mentimeter, there are numerous ways to increase pupils' critical thinking skills. According to a review of the research, strengthening critical thinking abilities can be accomplished through a theme approach in which STEM learning is inquiry-based. (Onsee & Nuangchalerm, 2019; Yaki, 2022). The next phase is to provide social reality content for students., this VR content production project provides instructors with extensive consequences and assistance for replicating a hands-on technology-oriented instructional design in order to strengthen 21st-century core competencies (Wu et al., 2023).

CONCLUSION

Mentimeter was effective in enhancing critical thinking skills. The hypothesis test results show that F value = 7.654 with a significance level of 0.010 0.05. Mentimeter, as a learning device, gives opportunity for all types of learners, including auditory, visual, and kinesthetic learners. The Mentimeter program's varied features allow lecturers and teachers to use them in a variety of ways. Another type of achievement is that student participation and motivation have improved. The attempt to facilitate this is to maximise participant engagement in completing each task assigned.

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