



TRENDS IN CRITICAL THINKING SKILLS RESEARCH IN INDONESIAN ECONOMICS EDUCATION: A CONTENT ANALYSIS

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ABSTRACT

Effective development of critical thinking skills requires a comprehensive educational approach that fosters a stimulating learning environment, encourages active participation, and provides opportunities for students to analyse, evaluate, and synthesise information. This research is intended to gather information about studies related to critical thinking skills in Indonesia, including the number of publications per year, types of research, research subjects, topics, treatments, data collection instruments, and data analysis methods. By analyzing several Indonesian economic education journals published between 2019 and 2024. Content analysis was used as the research design in this study in which as many as 32 articles were analyzed. The results of the analysis show that the number of publications has increased in the last two years, the type of research most often used is quantitative research, the most common research subject chosen is X Grade SHS students, the topic chosen is mostly economics in general, the treatment most often implemented is problem-based learning (PBL), the data collection instrument most often used is a test sheet, and the data analysis method most often used is N-gain. Based on the results of the study, several recommendations for further research are proposed. Firstly, it is necessary to conduct more diverse research, not just quantitative, to obtain more valid results. Second, the selection of research subjects needs to be more diverse according to their characteristics. Third, researchers should provide clear information about the reasons for choosing the type of research, subjects, topics, treatments, instruments, and their validity. Finally, researchers should choose tests that are appropriate to the hypothesis and research design.

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1. INTRODUCTION

Education is important for the health, well-being and progress of society (Sahlberg & Goldfeld, 2023). Education is an important concern for many countries, yet many students do not receive a proper education (Grewal et al., 2022). The abundance of educational research is transforming teaching, learning, and decision-making processes, raising both expectations and concerns (Jarke & Breiter, 2019). Education is considered ineffective and a waste of time by some, they argue that education does not teach useful skills, it only provides a signal or sign about one's qualifications (Keep et al., 2019). Complex skills and competences are believed by some to be better taught than basic knowledge, to prepare students for an uncertain future (Sahlberg & Goldfeld, 2023). Education is and always has been undergoing changes and developments that focus on the learning needs of individual students and begin to pay attention to the importance of informal learning experiences including hobbies, extracurricular activities, or daily life experiences (Sahlberg & Goldfeld, 2023).

Critical thinking skills are important in education and the world of work. Critical thinking skills include the ability to analyse, evaluate, and synthesise information for decision making and problem solving (Raj et al., 2022). The concept of critical thinking has evolved through the contributions of many researchers, with some defining analytical, evaluation, and argumentative cognitive functions (Dąbrowski, 2021). According to Facione (2015), critical thinking refers to the process of thinking well; in other words, it is the opposite of illogical and irrational thinking.

In education, critical thinking skills are essential for academic success and professional development, being able to utilise a wide range of language skills and easily adapt to real-life situations (Vu & Nguyen, 2020). Facione (2015) reported that a study involving over 1,100 college students found a significant positive correlation between scores on a college-level critical thinking skills test and overall GPA. Furthermore, empirical evidence indicates that critical thinking skills are teachable, suggesting that improvements in these skills may contribute to higher academic performance. This proposition is reinforced by the significant association between critical thinking and critical reading comprehension, whereby enhancements in one skill are typically accompanied by gains in the other. Consequently, it is plausible that students who strengthen both their critical reading and critical thinking abilities are more likely to achieve better academic outcomes.

In the labor market, employers regard critical thinking and problem-solving skills as highly essential competencies for newly hired employees (Halpern & Dunn, 2023). Halpern & Dunn (2023) explain that a survey of 501 business executives and 500 hiring managers indicated that the top priority for student learning is the ability to communicate effectively, both orally and in writing, followed closely by critical thinking and analytical reasoning skills. These results underscore the intrinsic link between clear communication and coherent thinking, as the former is unlikely without the latter. Furthermore, four of the five most desired learning outcomes among employers applying knowledge in real-world contexts, analyzing and solving problems, connecting choices to actions, and demonstrating innovation and creativity fall within the broader domain of critical thinking. Across sectors, policymakers, expert panels, professionals, and students consistently regard critical thinking as a central goal of education. Workers with critical thinking skills are able to avoid mistakes, self-regulate, and have social responsibility (Penkauskienė et al., 2019).

Some countries consider that critical thinking in students is essential, but it is still not well developed (Wang & Wu, 2023). A systematic review found mixed results regarding Chinese students' critical thinking skills compared to other countries, highlighting the need for more robust studies (Fan & See, 2022). International studies reveal that in general, tertiary students experience improvements in critical thinking skills, although not as great as expected and varying by country (Van Damme et al., 2023). Interestingly, a cross-cultural analysis of high schools from South Korea, Turkey, and the United States identified similar profiles of critical thinking skills, suggesting that developing critical thinking skills can be intervened in various educational contexts (Demir et al., 2023).

Critical thinking skills among Indonesian students are generally low (Nuryadi et al., 2024; Minan et al., 2021; Maharani et al., 2019). A study of junior high school students found that only 20.90% demonstrated high critical thinking skills in natural science (Minan et al., 2021). The same thing was found by Indah et al. (2024) that students majoring in English literature showed a weak correlation between critical thinking skills and engagement in blended learning systems. Various factors lead to weak critical thinking skills, including traditional teaching methods that emphasise formula-based problem solving (Nuryadi et al., 2024) and students' difficulties in analysing problems and answers systematically (Maharani et al., 2019). Traditional formula-based problem-solving methods common often emphasize procedural steps over conceptual understanding, limiting opportunities for students to question assumptions or explore alternative solutions.

Educational institutions must accommodate basic critical thinking skills in students, so that students can analyse, evaluate and synthesise information effectively (Raj et al., 2022). The ability to think analytically is fundamentally related to how individuals research and critically analyze information and data. Analytical, evaluative, and synthetic thinking skills form the cornerstone of effective learning and daily decision-making. Therefore, preparing students to acquire and effectively use these critical thinking skills is a primary goal for many higher education professionals. Moreover, these skills are highly sought after by employers who recruit new university graduates, as they indicate a graduate's capability to navigate complex problems and adapt to dynamic work environments (Phurikultong & Kantathanawat, 2022). Research has found that curriculum design influences the development of students' critical thinking. A study of Pakistani students found that curriculum and critical thinking skills have a strong relationship, including extracurricular activities, career counselling, and school facilities also play an important role (Ahtesham Elahi & H. Sharif, 2020). Bećirović et al. (2019) found that grade level and nationality had an impact on the critical thinking development of Bosnian-Herzegovinian and Turkish secondary school students, necessitating curriculum revision to foster critical thinking. Studies on K-6 education emphasise the importance of teacher knowledge, school commitment and alignment between pedagogical, technological and

environmental factors in creating a curriculum that supports critical thinking (Falloon, 2023). In addition, as students' eagerness to learn, innovation skills and technological literacy increase due to the implementation of the 21st century curriculum, students' creative thinking ability also increases (Dilekçi & Karatay, 2023). The design of critical thinking lessons and teaching practicum can better prepare student-teachers for the complexities of real-world teaching (Lithoxoidou & Georgiadou, 2023).

The learning model is something that must be considered to improve critical thinking skills. Meta-analyses and systematic reviews by Sharma et al. (2022); Wale & Bishaw (2020) show that Project-based Learning (PjBL) and Inquiry-based Learning (IBL) are very effective in developing critical thinking skills. These methods are better than traditional learning techniques, especially in improving analysis and evaluation skills (Sharma et al., 2022). Lestari et al. (2024) found Project-based Learning (PjBL) was proven to improve independent learning and critical thinking skills in primary school students. Adekantari et al. (2020) also found the Instagram-assisted PjBL model improved critical thinking skills in sociology subjects. The POE2WE model (prediction, observation, explanations, elaboration, writing, and evaluation) has a positive impact on argument writing skills, with varying effectiveness based on students' critical thinking levels (Haryanti et al., 2024). In addition, an inquiry-based learning model incorporating ILWDS (Local Wisdom Dilemmas Stories) showed improvement in critical thinking and scientific writing skills of secondary school students (Yuliarti et al., 2023). Other methods including case studies, cooperative learning, and team-based learning are also effective for improving critical thinking skills (Musharyanti et al., 2021). According to Surin & Damrongpanit (2024) to maximise the development of critical thinking skills, education is advised to incorporate problem exploration, collaborative analysis, and a variety of media adapted to the learning context.

In Indonesia, various approaches have been explored to improve critical thinking skills among students and prospective teachers. Research shows ONMIPA (National Mathematics and Natural Sciences Olympiad) has the potential to develop students' critical thinking skills (Wahidin & Romli, 2020). In higher education, inquiry learning has been shown to be effective in improving the critical thinking skills of STEM (Science, Technology, Engineering and Mathematics) teacher candidates (Prayogi et al., 2024). A gendered approach to critical thinking has been observed, with male and female students demonstrating different problem-solving strategies despite equal mathematical ability (Pathuddin et al., 2024). In addition, inquiry learning integrated with ethnoscience showed effective results in fostering the critical thinking skills of prospective science teachers, better than traditional teaching methods (Verawati et al., 2022).

This research is intended to gather information about studies related to critical thinking skills in Indonesia. Although previous international studies have explored critical thinking broadly, there remains a lack of comprehensive content analyses focusing on recent trends in Indonesia, especially within the economic education field. By analyzing several Indonesian economic education journals published between 2019 and 2024, this research seeks to answer the following questions: (1) How has the number of studies on critical thinking changed over the years? (2) What research designs are used to investigate critical thinking skills in Indonesia and how have they evolved over the years? (3) What topics are most frequently used to investigate students' critical thinking skills? (4) What types of treatments do researchers apply to develop students' critical thinking skills? (5) What instruments are used by researchers to measure critical thinking skills? (6) What data analysis techniques are used by researchers to analyse critical thinking skills? (7) How is the series of studies that have been conducted by researchers investigating critical thinking skills described?

In contrast to several studies on critical thinking skills, this research focuses on a broader scope by analysing all economic education articles published from 2019 to 2024 accredited by the Science and Technology Index (SINTA). Specifically, it refers to articles that focus on critical thinking skills. In addition, this study used various criteria for its content analysis.

2. METHOD

Research Design

This research is a qualitative analysis. This research uses content analysis which focuses on findings from various studies that have been published in scientific journals in Indonesia registered in the science and technology index (SINTA) database. Content analysis was chosen because this method allows researchers to see trends in various forms of communication, including journal articles (McKibben et al., 2020). Furthermore, content analysis is particularly well-suited for this research because the study aims to identify thematic trends, patterns, and the frequency of specific topics within Indonesian economic education journals. Content analysis allows a detailed and systematic examination of the textual data in journal articles to uncover how critical thinking skills research is framed and developed over time. Thus, researchers identify research trends related to critical thinking in the scope of economic education in Indonesia and determine future research needs based on areas that have not been covered by previous research.

Data Collection Method and Search Strategy

Data were collected from the results of content analysis of articles from economic education journals that examine critical thinking. Articles were taken from economic education journals registered in the Science and Technology Index (SINTA) with a minimum journal rating of Sinta 4. SINTA (<https://sinta.kemdikbud.go.id/journals>) is a platform for measuring the development of science and technology designed and developed by the Ministry of Education, Culture, Research and Technology of the Republic of Indonesia. There are 21 economic education journals indexed from SINTA 1 to SINTA 4 in the SINTA database. Of the 21 economic education journals, only 13 journals contain

articles that examine critical thinking from 2019 to 2024, which will be used in this study. The articles analysed in this study were published online before September 2024. Of the hundreds of articles collected, there were 32 articles that examined critical thinking.

The researcher used the keywords “*Pendidikan Ekonomi*” and “Economic Education” in the journal search field, then used the keyword “critical thinking” in the search field for article titles, abstracts, and keywords in the selected journals. First, we searched for journals in SINTA with the keywords *pendidikan ekonomi* and economic education accredited by SINTA 1 to 4. Journals accredited from SINTA 1 to SINTA 4 were selected because they represent reputable and high-quality publications in Indonesia, ensuring the reliability and academic rigor of the articles included in this study. Lower-ranked journals (SINTA 5 and below) were excluded to maintain the standard of research quality and relevance. Next, sort out the articles listed in the selected journals, using the keywords critical thinking and critical thinking (see Figure 1).

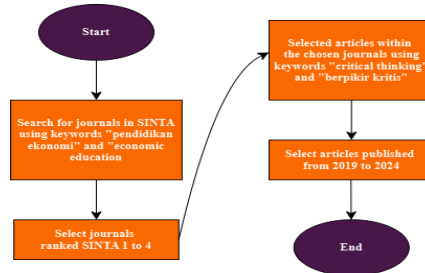


Fig. 1 – Flowchart on paper selection protocol

Data Collection Instrument

This study used a content analysis guideline to examine several aspects of existing research (Table 1). Seven main categories were identified for analysis: (1) the number of publications per year, (2) types of research, (3) research subjects, (4) topics, (5) treatments, (6) data collection instruments, and (7) data analysis methods. However, three categories (1) number of publications, (4) topics, and (5) treatments were not defined initially. This was due to the lack of previous studies to reference and the potential for overly broad categories. The remaining categories were defined before data collection. These categories, related to types of research (general and quantitative), research subjects, data collection instruments, and data analysis methods, were adapted from previous work by Fauzi and Pradipta (2018) and Susetyarini and Fauzi (2020).

Table 1 – Aspects and Categories used for Content Analysis in the Study

Aspects	Categories	
Types of research (2a)	A.1-R and D A.2-CAR	A.3-Qualitative Research A.4-Quantitative Research
Types of quantitative research (2b)	B.1-Observation Studies (OS) B.2-Correlational Research (RS) B.3-Survey Research (SR) B.4-Pre-Experimental Designs (PED)	B.5-True Experimental Designs (TED) B.6-Quasi-Experimental Designs (QED) B.7-Ex Post Facto Designs (EPFD)
Research subject	C.1-VII Grade JHS students C.2-VIII Grade JHS students C.3-IX Grade JHS students C.4-X Grade SHS students C.5-XI Grade SHS students C.6-XII Grade SHS students	C.7-Undergraduate students C.8-Postgraduate students C.9-JHS teacher C.10-SHS teacher C.11-lecturer
Data collection instruments	D.1-questionnaire sheet D.2-observation sheet D.3-test sheet	D.4-interview sheet D.5-unidentified
Data analysis methods	E.1-mean E.2-percentage E.3-N-gain E.4-t-test E.5-ANOVA	E.6-ANCOVA E.7-Correlation E.8-Unidentified E.9-Others

Data Analysis

Each article was assigned to a specific category based on its alignment with the specified criteria. Categorisation was determined by the information provided by the authors through the abstract, methodology and discussion sections. The data collected was then visualised in the form of diagrams.

3. RESULTS AND DISCUSSION

Number of Publications

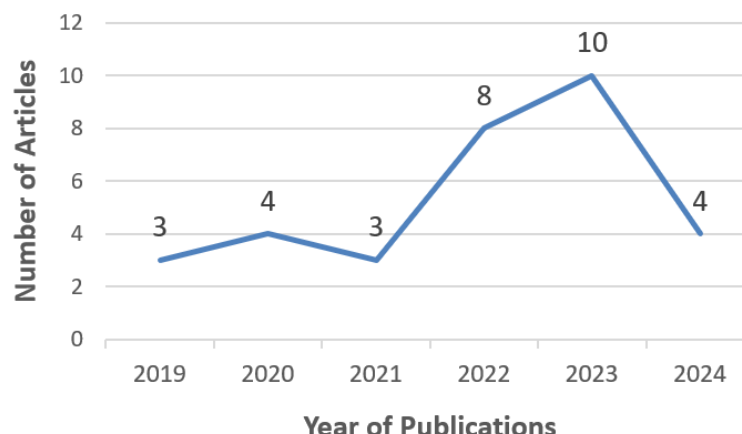


Fig. 2 – Trends in the Increase in the Number of Economic Education Journal Articles Examining Critical Thinking in Indonesia

The trend in the number of publications from 2019 to 2024 of articles from economic education journals that examine critical thinking has increased, except for 2021 and 2024 (Figure 2). The year 2024 experienced a decrease, because this research was conducted in September 2024, not covering 2024 completely, so it is possible that there will be publications of new articles that examine critical thinking during the remaining months. The year 2022 became the year with the most increase in research compared to other years.

These findings are consistent with those of Dong et al. (2023); Misbah et al. (2022); Susetyarini & Fauzi (2020); Wicaksono et al. (2024); Putri et al. (2024), all of which found a significant upward trend over the past two decades. The increasing trend in the number of publications examining critical thinking indicates a significant increase in the number of researchers interested in investigating critical thinking more deeply. However, these results contrast with those of Balkist & Juandi (2022), who observed a fluctuating publication trend. Such differences may be attributed to variations in database coverage, the time span of analysis, and the number of articles reviewed. Studies spanning more than five years and analyzing over 35 articles tend to reveal an upward trend (Dong et al., 2023; Misbah et al., 2022; Susetyarini & Fauzi, 2020; Wicaksono et al., 2024; Putri et al., 2024), whereas studies with narrower coverage often yield less stable patterns (Balkist & Juandi, 2022).

Type of Research

Type and designs of research determine the focus of the research. Quantitative research is the type of research most often used by researchers in economic education journals to examine critical thinking (Figure 3). The amount of quantitative research is higher than other types of research because quantitative research is able to analyse large data sets and provide statistical insights (Dani & Elaine, 2023). The increased availability of data in higher education creates opportunities for quantitative comparative research, although there are methodological challenges in developing conceptual and operationalisation frameworks (Seeber, 2020).

Based on Figure 4, QED (Quasi-experimental Designs) is the most frequently used type of quantitative research to study critical thinking skills, far exceeding other types of quantitative research. Compared to other experimental designs, TED (True Experimental Designs) and PED (Pre-Experimental Designs) are the least frequently used. Susetyarini & Fauzi (2020); Putri et al. (2024) also found that quasi-experimental designs are the most frequently employed research type in studies on critical thinking.

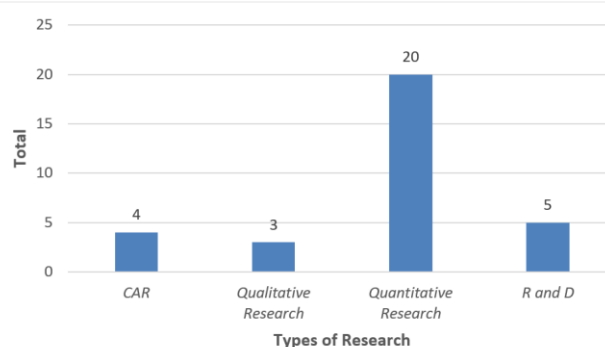


Fig. 3 – Distribution of Researches on Journal of Economic Education Articles that Examine Critical Thinking in Indonesia

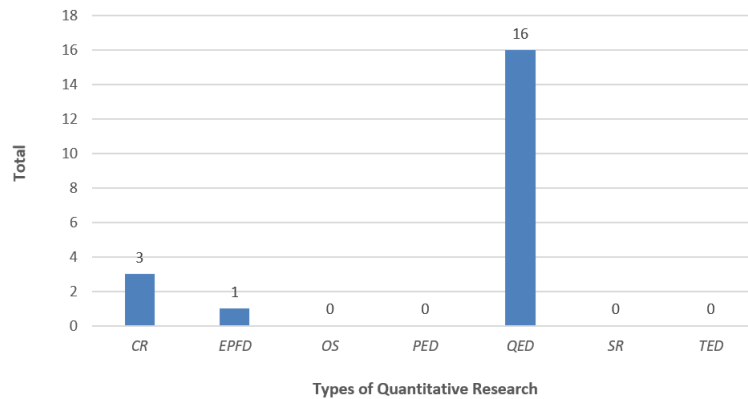


Fig. 4 – Distribution of Quantitative Researches on Journal of Economic Education Articles that Examine Critical Thinking in Indonesia

QED are increasingly popular in research due to their applicability in real-world settings and ability to generalize findings to diverse populations (Gayle et al., 2021). Unlike TED, QED often lack random assignment but can incorporate many elements of experimental design (Muse & Baldwin, 2021). Common quasi-experimental designs include interrupted time series, regression discontinuity, and pre-test/post-test studies (Muse & Baldwin, 2021; Stratton, 2019). While QED generally have lower internal validity than true experiments, they offer advantages in external validity and feasibility (Gayle et al., 2021). Researchers can improve the validity of QED studies by employing strategies such as using control groups and addressing potential confounding variables (Stratton, 2019). Despite limitations, QED remain valuable tools for investigating causal relationships in complex, real-world settings.

In contrast, Balkist & Juandi (2022) found that qualitative research, particularly phenomenology, was the most commonly used approach. This discrepancy is likely influenced by differences in research focus and context. Qualitative studies tend to be adopted when researchers aim to explore students' or teachers' learning experiences and in-depth perceptions, whereas quasi-experimental designs are more often chosen when the research seeks to examine the impact or effectiveness of a particular instructional strategy. Variations in research subjects, fields of study, and data sources may also shape methodological preferences across different studies.

The lack of existence of other research, such as qualitative research, CAR, and R and D is a good opportunity for researchers to provide more varied and contextualised results in education. Quantitative research is the most widely used type of research, with a very large number compared to other types of research, so it is necessary to know the distribution of quantitative research.

Research Subjects

Researchers often employ quasi-experimental designs to investigate the effectiveness of different instructional strategies in fostering critical thinking skills among students. This approach allows for comparisons between various teaching methods to determine which ones are most successful in enhancing students' ability to analyze, evaluate, and synthesize information. To conduct these studies, researchers need to recruit participants to serve as subjects and test their hypotheses.

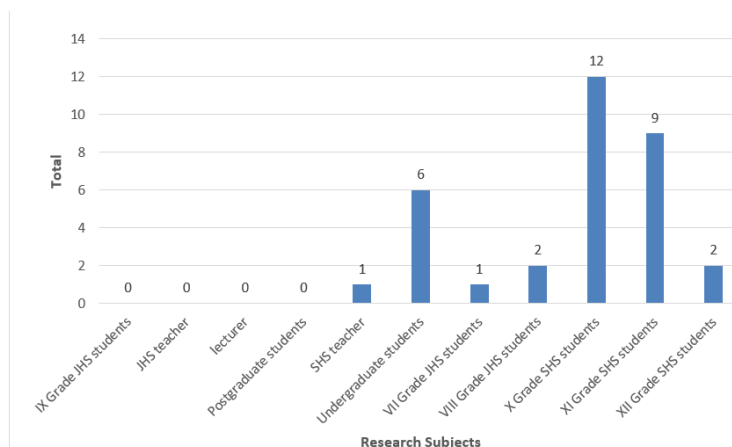


Fig. 5 – Distribution of Research Subjects on Journal of Economic Education Articles that Examine Critical Thinking in Indonesia

Based on Figure 5, the most selected research subjects are high school students, followed by university students and junior high school students. High school students are often the subject of research due to their unique development and challenges faced. High school students show greater psychiatric morbidity compared to junior high school students (Shafi et al., 2019). The focus on this age group is fuelled by the potential long-term impact of educational quality on future student success (Baum & Mcpherson, 2019).

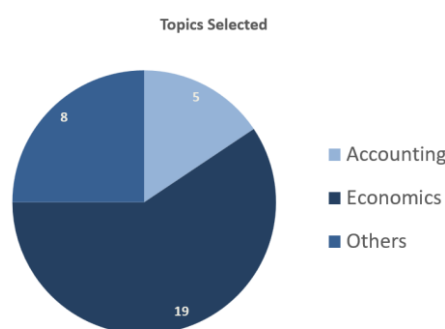
In Indonesia, many researchers choose high school students over others in economics education research because at the high school level, students are specifically exposed to economics. In addition, in grades X and XI students are at a less busy period, so it can be utilised to conduct research on students, in contrast to grade XII who generally have to prepare themselves to enter college.

Figure 5 also shows the trend that the higher the grade level, the less frequently the grade was selected as a research subject. Grade one and two students in junior high school were frequently selected, while grade three students were rarely selected. The same is true at the senior high school level. Grade one and two students in senior high school were frequently selected, in contrast to grade three students who were rarely selected. This phenomenon occurs because most schools are selective in granting permission to researchers to conduct research at the third grade level of junior high school and senior high school due to the tightly scheduled preparation for high school entrance for junior high school, and preparation for college for senior high school.

Similar findings were found by Susetyarini & Fauzi (2020); Putri et al. (2024), who found that senior high school students, particularly those in Grade 10, were the most frequently selected participants in studies on critical thinking. This choice is likely based on the consideration that their cognitive development has reached the formal operational stage, as outlined in Piaget's theory (Oogarah-Pratap et al., 2020), making them better prepared to engage in higher-order thinking tasks. However, this contrasts with the findings of Balkist & Juandi (2022), who found that elementary school students were, in fact, the most commonly used research subjects. Such discrepancies may be explained by differences in research objectives: studies at the elementary level often aim to instill critical thinking skills from an early age as a foundation for future learning, whereas research at the senior high school level typically seeks to measure or further develop these skills at a more advanced stage.

Topic Selected when Conducting Studies

Economics is one of the social science subjects that has a wide range of topics. Some topics are considered easy and some are considered difficult for students. Based on the analysis, some publications are based on only one specific topic, while most of them highlight economics topics in general. As can be seen in Figure 6, several topics were chosen by the researchers to pilot their research. Economics in general was the most frequently used. A total of nineteen studies utilised economic topics in their research. This general economics consists of many chapters according to the curriculum used. Unfortunately, none of the analysed studies elaborated more clearly on the sub-topic sections used from this general economics topic. They also did not elaborate on the research background in relation to the factual conditions between students' critical thinking skills and general economics topics. Another topic chosen was accounting with five articles and other topics included APBN and APBD, business, econometrics, cooperative economics, digital economy, entrepreneurship, national income, and marketing with one article each.

**Fig. 6 – Mostly Topics Selected with on Journal of Economic Education Articles that Examine Critical Thinking in Indonesia**

This pattern can be interpreted through the framework of critical thinking proposed by Siegfried & Colander (2021), which distinguishes between “big-think” and “little-think” critical thinking. *Little-think* refers to learning a set of tools, models, and methods that have proven useful for economists in understanding economic phenomena an “inside-the-box” form of critical thinking that focuses on mastering established analytical frameworks. Todorova et al. (2005) emphasize that economics education should not merely train students to think like economists but also cultivate individuals who are critical, creative, and non-dogmatic. They highlight the risks of “going with the flow” in economics, as exemplified by the mass privatization in Eastern Europe undertaken without critical assessment of

its implications. Critical thinkers in economics are those who combine logic with intuition, observe reality deeply, question underlying assumptions, and seek new explanations for phenomena that remain poorly understood.

Integrating these two perspectives suggests that the selection of research topics in economics should not only emphasize mastery of analytical methods but also encourage intellectual courage to explore innovative ideas and challenge established views. The dominance of general economics and accounting topics indicates that research on critical thinking in the field of economics tends to focus more on mastering conventional economic analytical methods and models (*little-think*) rather than engaging in critical reflection to assess the relevance and limitations of these models (*big-think*). This suggests that the development of critical thinking in economics remains largely oriented toward learning existing analytical tools, rather than pursuing innovative exploration beyond established frameworks.

Treatments

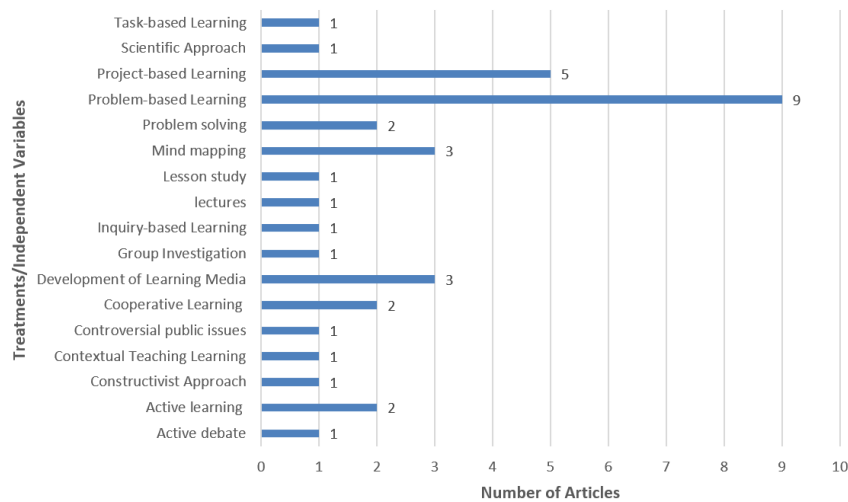


Fig. 7 – Distribution of Treatments/Independent Variables on Journal of Economic Education Articles that Examine Critical Thinking in Indonesia

Treatment aims to identify the significance of specific conditions on the parameters under investigation or test hypotheses. Based on Figure 7, Problem-based Learning (PBL) is the most commonly used to assess critical thinking skills, followed by Project-based Learning (PjBL). There were nine articles using PBL, and five using PjBL. Followed by the use of mind mapping and learning media development as many as three articles. Then, problem solving, cooperative learning, and active learning are two articles. And, the rest, Task-based Learning (TBL), scientific approach, lesson study, lectures, Inquiry-based Learning (IBL), group investigation, controversial public issues, contextual teaching and learning, constructivist approach, and active debate each one article.

The findings of Susetyarini & Fauzi (2020) also revealed that problem-based learning (PBL) was the most frequently employed intervention by researchers in studies on critical thinking. However, this contrasts with the results of Putri et al. (2024), who found that the inquiry approach was the most dominant method. Such differences may stem from variations in research focus; studies employing PBL generally emphasize collaborative problem-solving, whereas those adopting the inquiry approach tend to focus more on developing exploration skills and independent discovery. Furthermore, methodological preferences may also be influenced by differences in educational level, subject-matter characteristics, and teachers' readiness to implement constructivist-based instructional strategies.

Data Collection Instruments

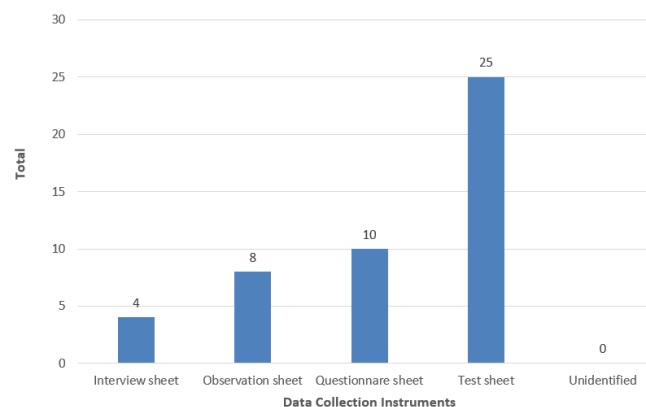


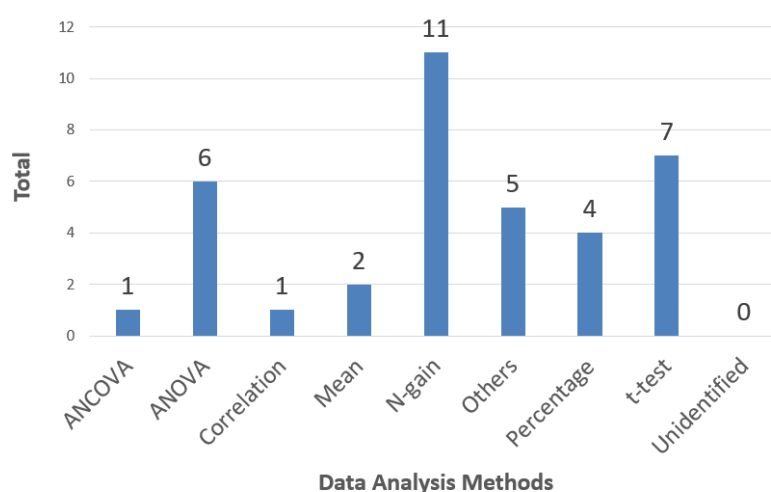
Fig. 8 – Distribution of Instrument Selection for Data Collection on Journal of Economic Education Articles that Examine Critical Thinking in Indonesia

Instruments are needed by researchers to collect data. Students' critical thinking skills can be measured with various instruments. Based on Figure 8, the graph in the figure shows that the most common instrument used to collect data on critical thinking skills is a test. Critical thinking skills can be measured or assessed based on students' answers to questions. Data collection with tests is considered more objective than questionnaires, observations, and interviews. All articles used in this content analysis have included the results of validity and reliability tests related to the suitability of the instruments used. Validity and reliability tests are key points for testing instruments before they are used. Information about validity and reliability is considered important to reassure readers.

These findings are consistent with those of Susetyarini & Fauzi (2020); Putri et al. (2024); Balkist & Juandi (2022), who found that tests were the most frequently used data collection instruments in studies on critical thinking. The predominance of test usage can be understood in light of their ability to measure critical thinking skills in a structured and quantitative manner, thereby facilitating statistical analysis. Moreover, tests are often considered more objective and efficient than other methods, such as observation or interviews, particularly when research involves a large number of participants. This suggests that, despite the availability of various approaches to assessing critical thinking skills, researchers tend to favor methods that yield measurable, replicable results and align with the demands of evidence-based research publication.

Data Analysis Methods

The accuracy of the method selection for data analysis determines the level of validity of the research. Based on Figure 9, the graph in the figure shows that only one article used Analysis of covariance (ANCOVA) as a data analysis method, although the number of Quasi-experimental Design (QED) uses was 16 articles (Figure 4). Figure 9 also shows that N-gain is the most widely used data analysis method by researchers. This finding clarifies that researchers often use N-gain to evaluate the effectiveness of the treatment given. There are two trends shown by the researchers. Firstly, the researchers only took the pre-test and post-test data from each class, then calculated the N-gain score to determine the final result. Secondly, the researchers referred to the pre-test and post-test data before calculating the N-gain of both data. After that, the N-gains of both classes were examined by means of a t-test. The trend of this kind of analysis method will lower the validity level of the research. It can be said that this kind of data analysis method is not accurate.

**Fig. 9 – Distribution of Data Analysis Method on Journal of Economic Education Articles that Examine Critical Thinking in Indonesia**

This result differs from the findings of Susetyarini & Fauzi (2020); Putri et al. (2024), who found that the t-test was the dominant analytical method, as well as from Balkist & Juandi (2022), who found that percentage analysis was more commonly employed. Such differences are likely influenced by the research design and the type of data analyzed; studies employing a pretest–posttest design and focusing on score improvement tend to prefer the N-gain, whereas research comparing groups is more inclined to use the t-test. Meanwhile, percentage analysis is commonly applied in descriptive studies aiming to illustrate the proportion or distribution of critical thinking skill attainment.

Analysis of covariance (ANCOVA) is often recommended for quasi-experimental designs, particularly in pretest-posttest control group studies. ANCOVA can improve precision and statistical power by accounting for baseline differences between groups and reducing within-group variability (Streiner, 2019). It is especially useful when covariates are correlated with the dependent variable, even if groups do not differ on the covariate (Streiner, 2019). In pretest-posttest designs, ANCOVA is considered a suitable method for comparing groups and examining

treatment effects (Nayeri et al., 2024). However, ANCOVA assumes all relevant confounders are measured, while change score approaches can control for unobserved confounders but rely on strong assumptions about their effects (Lüdtke & Robitzsch, 2020). Despite its advantages, ANCOVA cannot fully account for all confounds in quasi-experimental studies, potentially limiting the validity of conclusions (Andrade, 2021). Researchers should use quasi-experimental designs sparingly and only when no other options are available (Andrade, 2021).

ANCOVA is often recommended for QED especially in control group pretest-posttest studies. ANCOVA accounts for baseline differences between groups and reduces within-group variability, thereby increasing the precision and statistical power of the study (Streiner, 2019). It is particularly useful when covariates are correlated with the dependent variable, even if the groups have no covariate differences. ANCOVA is considered suitable for comparing groups and examining treatment effects in pretest-posttest designs (Nayeri et al., 2024). However, despite its advantages, ANCOVA only assumes all relevant confounders are measured, while the change score approach can control for unobserved confounders but relies on strong assumptions about their effects (Lüdtke & Robitzsch, 2020). In summary, the use of ANCOVA is suitable for QED research with pre-test and post-test.

4. CONCLUSION

This study conducts a content analysis of economics education journal publications on critical thinking in education, indexed in SINTA categories 1 to 4, from 2019 to 2024, to provide an overview of research trends in the field of critical thinking. The findings indicate a consistent increase in publications, suggesting that the issue of critical thinking is receiving growing attention among researchers. Specifically, quantitative studies particularly those employing a quasi-experimental design dominate the findings, while other research types such as qualitative studies, classroom action research (CAR), and research and development (R&D) remain limited. The dominance of Grade 10 high school student subjects, general economics topics, the use of problem-based learning as the primary intervention, reliance on tests as the main instrument, and the application of the N-gain analysis technique indicate a relatively homogeneous research pattern.

The findings of this study have important implications for researchers, educators, institutions, and regions/countries. The steady growth in publications on critical thinking shows that the topic is becoming increasingly popular. Therefore, we recommend that researchers maintain their focus on critical thinking in future studies. The analysis of research types reveals that quantitative methods have attracted greater attention from scholars. Future research on critical thinking should place more emphasis on underexplored research types. It is necessary to increase the frequency of studies employing methods other than purely quantitative approaches, or a combination of different methodologies, to investigate and develop critical thinking skills and to produce more valid results. Furthermore, this study reveals that research on critical thinking in economics education in Indonesia tends to exhibit homogeneity in terms of selected topics, subjects, instruments, and analytical techniques. The implication is the need to enhance the diversity of research types, methods, and instruments used so that the investigation and development of critical thinking skills can be approached more comprehensively and yield more robust findings.

This study has several limitations. Only economics education journal publications indexed in SINTA 1 to 4 were included and analyzed, thereby excluding other publications on critical thinking available in different databases, which may result in an incomplete representation of critical thinking research in economics education. In addition, the sample comprised only 32 articles, which provides limited empirical evidence. The publication period examined was also relatively short, spanning only from 2019 to 2024. In future research, it is expected that broader article selection criteria will be employed, such as including Scopus-indexed publications and extending the publication period, in order to conduct a more comprehensive content analysis.

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