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Need Analysis of Critical Thinking Skills Acquisition through Adaptive Learning Model: Indonesian Perspective on Freedom of Learning Curriculum

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ABSTRACT

This study aims to identify the needs of teachers in schools implementing the Freedom of Learning curriculum, focusing on the foundational principles of critical thinking and adaptive learning. Using a combination of qualitative and quantitative research methods, the study employed a Likert-scale questionnaire and semi-structured interviews to evaluate teachers' needs for fostering students' critical thinking through adaptive learning. The participants included 123 junior high school teachers (teaching phase D, ages 13-15). The data were analyzed using coding and key concept techniques. The findings indicate that teachers require significant support in critical thinking skills such as interpretation, analysis, evaluation, reasoning, and self-reflection. Additionally, they need resources for adaptive learning that address student behavior, knowledge, preferences, goal selection, and content delivery, emphasizing these principles as highly necessary for effective teaching.

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1. INTRODUCTION

Over the past decade, critical thinking (CT) has become widely recognized as an essential skill for addressing the challenges of the 21st century. Countries like China, Iran, Singapore, and Hong Kong have integrated critical thinking into their educational reforms. In Indonesia, critical thinking has been emphasized in various policies, reflecting its importance in education. The government also replaced the National Exam (Ujian Nasional/UN) with the Minimum Competence Assessment (Asesmen Kompetensi Minimum/AKM), which mirrors the PISA model. Indonesia ranked among the lowest in PISA, highlighting the need for improvement. Like PISA, the new national assessment requires students to use

higher-order thinking skills, and teachers are now expected to integrate critical thinking into their classroom instruction.

Critical thinking is understood as the practical application of cognitive skills. The most commonly accepted approach to teaching these skills is based on Bloom's taxonomy of educational objectives, which has been widely adopted, including in Indonesia. Bloom's taxonomy addresses the overemphasis on memorization in many educational systems by establishing a hierarchy of thinking skills. These range from lower-order skills like understanding and remembering to higher-order skills such as applying, analyzing, evaluating, and creating. For teachers to successfully implement critical thinking in their lessons, they must break down these abstract concepts and apply them within the context of their subject area. However, many educators view this responsibility as implicit and find it challenging to incorporate critical thinking into their teaching methods.

According to Davies & Barnett (2015), critical thinking may be broken down into three distinct categories: critical thinking as reasoning and the ability to reason critically, critical thinking as (reflexive) judgment, and critical thinking as a variety of temperaments and attitudes. According to Halonen & Santrock (1999), these can be organized into two primary categories, which are cognitive (reasoning, reasoning, and reflective judgment) and propensity (disposition, skills, and attitudes). Notably, the Delphi definition does not reference the action phenomena. In theory, it is conceivable to meet the standards in the description while doing nothing. A lack of good debate skills cannot be dismissed so readily. They contribute to developing a solid foundation necessary for making knowledgeable decisions. The reason for this is that decisions are made based on judgments that are drawn through talks. For this type of decision-making, it is necessary to have the ability to comprehend and interpret, as well as dispute and refute, the recommendations and arguments of others. The art of persuasion is what most people mean when they refer to "critical thinking" in this context. Critical thinking, in this sense, is a natural talent; moreover, the information that is currently available suggests that it needs to be taught more effectively in universities (Davies & Barnett, 2015).

The term "critical thinking skill" (CTS) refers to an individual's ability to manage their thinking and apply specific criteria and expectations for evaluating it (Elder & Paul, 2008). This concept is widely accepted and cited. Over time, researchers have developed various CTS models, with rubrics used to assess students' skills. The first model, by Huba & Freed (2000), includes recognizing the issue, understanding key facts, gathering relevant information, identifying core values, and generating solutions while weighing their pros and cons. The second model, by Elder & Paul (2008), focuses on setting goals, framing problems as questions, defining issues, drawing conclusions, and understanding consequences. This model assesses students' writing and reading comprehension. The third model, by Browne (2009), emphasizes interpreting material, evaluating evidence, analyzing assumptions, explaining key features, and building propositions using scaffolding to develop CTS. However, these models provide qualitative rubrics for assessment, lacking a practical scale for measuring CTS. In our review, we identified Honey's model, highlighted by Yaiche (2021), as a fourth option. This model offers indicators such as analytical skills, inference, evaluation, inductive reasoning, and deductive reasoning, and includes an adaptive CTS scale, making it the most suitable for precise measurement (Lukman, Asha, Warsah, Morganna, & Adhrianti, 2022).

Thinking always occurs in contexts with direct or indirect social influences and interactions, and different opportunities and restrictions influence individual thinking in different circumstances (Moseley et al., 2005). Thinking always occurs in contexts with direct or indirect social influences and interactions. Thinking is the mental process of considering alternative courses of action and deliberating on what course of action to pursue in a given circumstance. The same cannot be said for critical thinking, which is distinct from thinking. The term "critical thinking" (CT) should not be confused with "good thinking" but rather understood as an all-pervasive and self-correcting human phenomenon (Facione, 1989). Critical thinking has been an important movement in the American educational system for many years. In 1987, the American Philosophical Association formed a panel of experts to analyze the present status of education and assessment carefully. This evaluation was part of the American Educational Research

Association's (AERA) Critical Thinking Initiative. Interpreting, analyzing, evaluating, a deliberate, self-regulating judgment that leads to conclusions, as well as evidence-based, conceptual, methodological, prescriptive, and evidence-based thinking and definition, are some ways we describe critical thinking. However, another way it comes with a justification for thinking about context. Critical thinking (CT) is a crucial research tool, a liberating force in education, and a valuable resource in the lives of individuals and communities. The study, despite its simple observations, which are probably unavoidable when a panel of experts seeks agreement on something very complicated, provides a helpful review of what is meant by the phrase "critical thinking" (Moseley et al., 2005). Despite its crude remarks, the report provides a useful overview of what is meant by the term "critical thinking." It is abundantly obvious that there is a concern over establishing rigorous and reasonable standards of judgment and the necessity to offer strong foundations for beliefs and behaviors as essential concepts. Critical thinking can be summed up more quickly by the definition that was provided by Ennis (2013). Critical thinking can be defined as thinking that is rational, thoughtful, and focused on deciding what to believe and what to do. In the years following the establishment of the Advanced Subsidiary (AS) Critical Thinking Level in 1999, the value of critical thinking has steadily increased in the United Kingdom.

Learning models that promote critical thinking can help individuals enhance their critical thinking skills. Several approaches can be used, but inquiry-based learning, project-based learning, and effort-based learning are particularly noteworthy. Research by Anggraeni et al. (2023) found that models often used to teach basic thinking skills are comprehensive yet time-consuming. Problem-based learning (PBL) is one effective method for fostering critical thinking. PBL emphasizes student engagement with real-world problems, requiring them to think critically and solve problems independently (Ahmad et al., 2020; Amin et al., 2020; Foo et al., 2021). According to Hashim and Samsudin (2020), blended learning also enhances students' ability to apply classroom knowledge to real-life situations. PBL focuses on presenting problems that challenge students to improve their thinking and critical reasoning (Amin et al., 2020), helping them develop higher-order thinking skills (HOTS) like analysis, evaluation, and creation (Anderson et al., 2001; Bulut Ates & Aktamis, 2024). This model encourages students to engage with complex, real-world problems, fostering innovation and collaboration (Anggraeni et al., 2023; Hidajat, 2023). Additionally, PBL is supported by scientific principles that students explore while solving relevant problems, further enhancing their learning experience (Birgili, 2015; Priyaadharshini & Vinayaga Sundaram, 2018; Chis et al., 2018).

According to Oxman & Wong (2014) adaptive learning is a technique of education in which the information being learned can alter or adapt in response to the actions taken by the user. Personalizing a learning experience to enhance a user's performance or capacity for new information acquisition is the mission of an adaptive learning system. The system can fulfill its job by supplying users with learning resources and determining their requirements. The adaptive system, as described by Brusilovsky & Maybury (2002) provides the following model description:

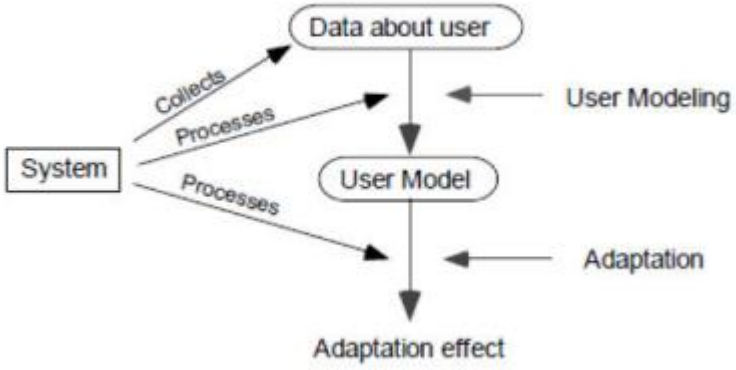

Figure 1. Adaptive Learning System Model 1907

The adaptive system model operates in three key steps. First, it gathers data about the user, starting with their profile, which includes their current knowledge level. This information is stored in the user model, and as the user progresses, the model is updated and developed. Second, the user model is constructed from the collected data, providing a detailed understanding of the user. Finally, the adaptation model uses this user information to guide the adaptation process, tailoring the system to better meet the user's needs.

During COVID-19, Indonesia's educational infrastructure faced challenges and required development to avoid falling behind (Kementerian Pendidikan Kebudayaan Riset dan Teknologi, 2022). The Independent Curriculum Policy, known as the Merdeka Curriculum, was introduced as a solution to help the education system catch up. This curriculum aims to develop students' potential and existing skills by providing relevant and participatory learning experiences. One example of such interactive learning is project-based work, which encourages students to engage with and find solutions to environmental issues. By fostering these interactive experiences, students become more invested in their learning and problem-solving abilities.

The Independent Curriculum offers several key benefits. First, it is less complicated yet more in-depth. The Merdeka Curriculum focuses on essential subject matter, presenting information in a straightforward but thorough way. This approach helps students concentrate better and show more interest in learning by simplifying the content while ensuring deeper understanding.

Second, it promotes more independence in learning. The curriculum allows teachers to tailor their instruction to meet the needs and goals of their students. This flexible approach, endorsed by Indonesia's Ministry of Education and Culture, enables teachers to create more effective learning processes by adapting to the specific requirements of their students, resulting in a more personalized and impactful educational experience.

Lastly, the curriculum is more relevant and participatory. By incorporating engaging and contextually relevant activities, students can enhance their skills and take a more active role in their education. Interactive learning and project-based activities help students engage with real-world issues, fostering greater involvement and encouraging them to develop solutions to challenges in their environment.

To resolve school issues brought on by the Covid-19 pandemic, the Independent Learning Campus Merdeka (MBKM) implementation through the pioneer teaching campus program is being implemented in elementary schools. The activity empowers school supplies and leads students within the context of the teaching and learning process (Khoirurrijal et al., 2022). There are intracurricular activities and building the Pancasila and extracurricular profiles to implement the Merdeka Curriculum. The Independent Curriculum will be implemented by allocating time for up to one year and will be supplemented by the weekly delivery of study hours.

In Indonesia, the current curriculum is frequently perceived as strict and content-focused. There are few opportunities to truly comprehend the subject matter and consider what you have learned. The curriculum's content is also viewed as excessively theoretical, making it challenging for instructors to apply it practically and operationally in learning resources and class activities. The curriculum category is one of the adjustments made as part of the Freedom to Learn policy. The Free Learning Policy will shift pedagogy away from a standardized method and towards a diverse approach that is more all-encompassing, allowing teachers and students to explore a growing body of knowledge. Students are learning leaders in the sense that they are the ones who give teaching and learning activities purpose, allowing for learning to be tailored to each student's level of ability and supported by a variety of technologies that offer a personalized approach to each student's learning progress, without undervaluing the value of socialization and group work in fostering social solidarity and soft skills (Centre for Curriculum and Learning of Stan) The curriculum created by the Freedom to Learn Policy will be characterized as flexible, competency-based, centered on character development and soft skills, and adapting to the needs of the business/industrial environment by emphasizing the significance of student learning.

According to Okoth (2016) and Poedjiastutie, Akhyar, Hidayati, & Nurul Gasmi (2018), the curriculum should allow schools to modify learning objectives to meet the requirements of the environments in which children are educated. This is the expectation. Nevertheless, Bill C-13 must allow schools to adapt learning patterns to various purposes and outcomes. This is because the government has provided adaptive teachers at schools with a comprehensive syllabus package that has been finished. According to Ornstein and Hunkins in Poedjiastutie et al. (2018) teachers object to implementing changes in approaches, methods, and ways of assessing students because instructors do not feel as though they own the curriculum. This is one of the reasons why teachers object to implementing changes in approaches, methodologies, and ways of evaluating students. The curriculum for 2013 needs to provide more flexibility that would allow teachers to develop their creative and innovative abilities. This is due to the fact that the curriculum needs teachers to set up extremely complicated administration for the classroom's supplies. According to Djaelani, Pratikto, & Setiawan (2019), a centralized syllabus inhibits the creativity of teachers working in vocational schools, making it more difficult for them to select learning strategies that are more innovative, significant, and applicable to the real world, in the meanwhile, Alvarez (2010) did research on the learning loss that occurred as a result of the Katrina disaster.

The results of this study demonstrated the need for policy-making for the curriculum to be able to adjust and be flexible by changing both the content of learning and the amount of time spent studying. In the meantime, utilizing a curriculum that is more adaptable so that it may be adapted to the current circumstances of pupils will assist in making up lost ground. As a result of learning loss and learning gaps caused by the pandemic, teaching systems that will change due to the introduction of online learning and adaptations to current situation developments and needs, the curriculum has to be simplified and improved. According to Kementerian Pendidikan Kebudayaan Riset dan Teknologi (2022) one method that is helpful in raising student-learning results is the utilization of a more adaptable curriculum that is improved and adapted to current situations and requirements. This study intends to acquire the underlying concepts of curriculum acquisition inside the learning process, including critical thinking and adaptive learning, to meet teachers' demands at proposed schools that use the freedom of learning curriculum. It exposes the main factors as the need analysis of the considerations to implement particular learning model in term adaptive ones that fits in the ongoing curriculum achieving the critical thinking skill as the novelty in this study. By being able to identify these characteristics, it contributes to the easiness and successfulness of the teachers to complete the learning goals.

2. METHODS

This study utilised both qualitative and quantitative research methods. This approach was chosen because it allowed researchers to get information from a wide range of participants, including some

who were previously unknown. They were selected from a scheduled seminar on critical thinking within a curriculum focused on freedom of learning. Before the seminar, 123 participants were instructed to complete a questionnaire that was shared using a Google form. Interview data from potential teachers was utilised to elucidate their expectations regarding the incorporation of critical thinking and adaptive learning. Recruiting responders from diverse origins and places in West Java, Indonesia was facilitated by the online mode.

2.1. Participant

The participants in this study were male and female junior high school students from Bandung, West Java Province, who had implemented the Freedom of Learning curriculum in their schools and had open seats ranging from the end of phase D (class VII-IX, ages 13- 15). The samples in this study contain the features of teachers who have taught lessons at junior high schools and conducted the instructional process by referring to critical thinking and adaptive learning concepts within the learning goals.

Table 1. Demographic information of respondent

Variable	Respondent
Gender	
Male	66
Female	57
Age	
55 - 60	8
50 – 54	12
45 – 49	11
40 – 44	16
35 – 39	15
30 – 34	33
25 – 29	20
< 25	2

2.2. Technique and means of data collection

The quantitative responses from the teachers were studied in three main sections to determine which critical thinking and adaptive learning skills were most important. Beyond the structured questionnaire, the qualitative responses (views and opinions on adaptive learning) were used to identify newer skill areas. Interview data from prospective teachers were also used to clarify their expectations for including critical thinking and adaptive learning as a reflection of the flexibility principle of freedom of learning curriculum in the teaching process. The questionnaire should enable us to gather the most comprehensive and precise data in a coherent sequence. This is done to ensure dependable findings from our planned observations. An effectively crafted questionnaire should align with the research purpose and goals while reducing the number of unanswered questions. Prior to drafting the questionnaire, the researcher must determine the questionnaire content. Each inquiry should aim to test one or more hypotheses or research questions outlined in the research plan. Interviews involve gathering information through the process of questioning.

Data can be gathered through listening to persons, documenting their comments, filming them, or using a mix of these methods. Structured interviews have predetermined questions and a set order. The supplementary intervention involves providing further clarification if necessary and prompting respondents to elaborate if their answers are unclear (probing). Ennis (2013) stated that the needs of critical thinking level described as the instrument's headline are divided into some domains covering; interpretation, analysis, assessment, inferences, evaluation, explanation, self-reflection, inductive reasoning, and deductive reason. While in the domains aspects within the needs level of adaptive learning include; Student's behavior, student's knowledge, student's achievement, student's

preferences, adaptive information resources, adaptive navigational structure, adaptive trail generation, adaptive contents selection, and adaptive goal selection.

Table 2. Categorizing the needs level in the Likert scale

No	Score	Levels of needs
1	0-1.50	Not Needed
2	1.51-2.50	Less Needed
3	2.51-3.50	Fairly Needed
4	3.51-4.50	Needed
5	4.51-5.0	Highly Needed

2.3 Data analysis

This study used a Likert scale with five points, ranging from "Highly Needed" to "Not Needed," as shown in Table 1 (where "Highly Needed" is equal to 5, "Needed" is equal to 4, "Fairly Needed" is equal to 3, "Less Needed" is equal to 2, and "Not Needed" is equal to 1). Microsoft Excel was used to perform the analysis, and the results showed that the responder data had a weighted average score. The halfway point between the two scales was chosen as the dividing line between them (for example, if four indicates "needed" and five indicates "highly needed," then the halfway point between these two scales is 4.5). Coding and key concepts, which were produced from the words in the data and interpreted in major categories or themes, were used to analyze the interview data (Corbin & Strauss, 2014). Prior to explaining the application of the coding tool in two separate investigations, it is essential to define the important words. The primary terms are code, concept, category, and theme. The stages progress linearly, with saturation in each level signalling the start of the following step. The researchers have the option to revisit and implement modifications if they are considered essential. It demonstrates the sequence in which these terms appear. The initial element in this sequence is code. Codes are assigned to data extracts based on the information they represent. Concepts are interpretive terms that categorise codes with comparable principles. Categories are more elevated and abstract than the concepts they represent. Comparing and contrasting notions leads to the creation of categories. Categories serve as the fundamental framework for generating themes, which represent the culmination of the coding process. Themes represent the most abstract level of categorization.

3. FINDINGS AND DISCUSSION

These goals combine cognitive abilities (thoughts), social-emotional intelligence (feelings), willingness to learn, attitude, and action (disposition or affective) to make changes where flexibility in learning becomes an essential factor in supporting learning objectives and has a relationship with critical thinking skills and adaptive learning for students. The sub-elements and stages of adaptive learning might potentially promote learning objectives, such as critical thinking, which is significant in its adaptability. The adaptive learning approach in the autonomous curriculum was used to analyze students' critical thinking skill needs. The results are below.

3.1 Learning Flexibility

The research Flexibility is linked to instructors' and students' control over learning. This flexible principle follows Government Regulation 57 of 2021 on National Education Standards. The Ministry of Education and Culture sets the basic curriculum framework and structure, but educational entities develop the curriculum. Education units and educators can change, add content, and match the curriculum to participants' qualities with a flexible curriculum: students, local culture and wisdom, and the education unit's purpose and objective. Flexibility is needed to ensure that student's education is relevant to environmental dynamics, current challenges, and learning needs.

Implementing a curriculum requires flexibility. Curriculum implementation will not be imposed and will apply equally to all schools in Indonesia due to its variety. Academic units' preparation to apply the curriculum varies; each needs support and various preparation times. Thus, implementation is a learning stage. The government creates implementation phases that schools can use to implement the curriculum in stages according to their capacity. The results of teachers' needs at proposed schools employing the freedom of learning curriculum to acquire the core concepts of its curriculum acquisition, namely critical thinking by adaptive learning, are shown below.

3.2 Critical thinking needs level

Table 3. Level of the Needs of Critical Thinking

Domains	Functions of Critical Thinking	Weighted Average	Standard Deviation	Level of Need
Interpretation	Information categorization. Decoding written content's factual, conceptual, and subtextual sensitivity. Clarifying provisions, facts, and information message content.	4.52	0.69	Highly needed
Analysis	Conceptual analysis. Identifying claims. Argument analysis. Identification, grouping, comparing, and contrasting facts.	4.57	0.70	Highly needed
Assessment	Statements and assumptions. Argument evaluation.	4.52	0.69	Highly needed
Inferences	Drawing conclusions.	4.59	0.71	Highly needed
Evaluation	Ability to evaluate information.	4.75	1.18	Highly needed
Explanation	Results shown. Procedure justification.	4.42	0.91	Needed

	Argument presentation			
Self-reflection	Self-evaluation, self-correction	4.57	0.69	Highly needed
Inductive reasoning	Ability to generalize from specific areas.	4.28	0.89	Needed
Deductive reasoning	Thinking from general to specialized topics.	4.36	0.79	Needed

The research showed that teachers considered practically all domains and their critical thinking functions essential. Evaluation is the most crucial domain for this competence in critical thinking. The teachers categorized the degree into nine domains: interpretation, analysis, assessment, inferences, evaluation, explanation, self-reflection, inductive, and deductive reasoning. Out of these nine critical thinking domains, evaluation, which emphasizes the ability to consider the value or essence of information (M= 4.75), and inferences, which involves the ability to absorb unstated information and draw a set of conclusions from a bundle of information, cast doubt on the evidence, suggest alternatives, and draw conclusions (M= 4.59), were the most important (see Table 2). The average instructor needs analysis of critical thinking domains in the instructional process within the freedom of learning curriculum is highly needed.

3.3 Adaptive learning needs level

Table 4. Level of the Needs of Adaptive Learning

Domains	Functions of Adaptive Learning	Weighted Average	Standard Deviation	Level of Need
Student's behavior	information about student behavior, such as the state of motivation, learning style, and so on	4.58	0.65	Highly needed
Student's knowledge,	information on student knowledge in understanding a learning material	4.52	0.71	Highly needed
Student's achievement	information on student achievement results in the learning process.	4.58	0.65	Highly needed
Student's preferences	information on a structure concept about student preferences in learning.	4.67	0.56	Highly needed
Adaptive information resources	learning material information based on material that is	3.69	1.21	Needed

Adaptive navigational structure	relevant to the topic being studied adapting the learning navigation structure as additional information to students for the following learning material	4.28	0.87	Needed
Adaptive trail generation	Give an example of a topic being studied so that students more easily understand the topic	4.27	0.78	Needed
Adaptive Contents selection	provides a choice of learning content that can be adapted to student behavior (students behavior), student knowledge (students knowledge), student achievement (students achievement), and student preferences (students preferences)	3.44	1.14	Needed
Adaptive goal selection	provide a choice of learning objectives that can be adapted to the behavior of students (students' behavior).	3.10	1.36	Needed

'Adaptive learning' was the second needs level of this study, and it also consisted of 9 domains. The 'very needed' group contained the following domains: student behavior, student knowledge, student accomplishment, and student preferences. In contrast, adaptive information resources, adaptive navigational structures, adaptive trail generation, adaptive content selection, and adaptive goal selection were the domains that needed to be captured at the "needed" level. Students' preferences were determined to be the highest for adaptive learning's most crucial domains, where there is information about a specific structural concept regarding majors' learning preferences (M= 4.67). While student behavior involving information about the role of the student, such as motivational state, learning styles, and other related topics, was similarly in the second highest category (M= 4.58). Information about master's student performance in the course of instruction scored at the same level of need (M=4.58), which aligns with student achievement. All those adaptive learning domains are frequently essential for teachers to use during the teaching process to achieve the learning objectives as established, especially in the context of freedom of learning curricula.

Discussion

Plate (2012) highlights a key weakness in education systems: curriculums often fail to adapt to the evolving needs of society and the environment. To stay relevant, curriculums must be regularly updated to align with advances in science, technology, and market demands. In the wake of learning loss due to COVID-19, the curriculum requires improvement to reflect post-pandemic learning methods and systems. The Free Learning Policy introduced by the Indonesian government emphasizes a flexible, competency-based curriculum that focuses on character development, soft skills, and addressing global needs (Kementerian Pendidikan Kebudayaan Riset dan Teknologi, 2022).

As a response to the pandemic-induced learning gaps and the rise of online learning, the curriculum must adapt to new educational needs by simplifying and refining its approach. According to the Kementerian Pendidikan Kebudayaan Riset dan Teknologi (2022), a more adaptable curriculum is essential for improving student outcomes in the current environment. Critical thinking, often used interchangeably with analytical and problem-solving thinking, is central to "deep thinking" in both pedagogical and psychological literature (Giraldo-Garcia, Roy, & Alotebi, 2015). Critical thinking encompasses cognitive and behavioral processes such as reflection, inference, and self-formation, which are key to developing emotional intelligence and cognitive stability (Atabaki, Keshtiaray, & Yarmohammadian, 2015; Padmanabha, 2018).

Critical thinking is crucial for socio-cognitive activities such as emotional self-regulation, adaptation, and communication, especially in educational contexts (Padmanabha, 2018). Through various diagnostic tools and conceptual studies, key components of critical thinking—like interpretation, analysis, evaluation, and self-regulation—have been identified as essential 21st-century skills (Ohio Department of Education, 2006). In this study, data showed evidence of higher-order critical thinking, such as questioning, critiquing assumptions, and reflection, indicating that students' critical thinking progressed beyond task comprehension. This shows that critical thinking applied at different stages of learning contributed effectively to achieving the desired outcomes.

This study has a few potential repercussions. As implications, first, the result of the need analysis on the critical thinking and adaptive learning within the teaching-learning process applied in the freedom of learning to be continuously done because it has a promising and positive effect on students' CTSs across educational phase with the outputs of "highly needed" Second, the revelation of its need analysis of both domains needs to be espoused by other external elements in order to assist teachers in effectively collaborating in order to achieve the learning goals. Some examples of support are from educational leaders, administrative administration, and the curricular system. These kinds of external factors are crucial because not all educators successfully design their collaborative teaching frameworks regarding critical thinking and adaptive learning. This is because many challenges associated with pedagogical knowledge, pedagogical experiences, and time availability are all related to the flexibility principle in the curriculum. Through this way, it contributes much for the teachers to use the results of this study as the guideline or grand map for their consideration before ending up for a decision of any subjects in a way of critical thinking by means of adaptive learning applied in the freedom of learning curriculum as the novelty further.

4. CONCLUSION

The adaptive learning model and the flexibility principle on the freedom of learning curriculum positively correlate with students' critical thinking achievement. It was revealed by referring to the questionnaires' spread to the respondents or the junior high school teachers showing the significant results of the need analysis of "highly needed" from almost the domains and their functions. It means that teachers feel and see them as essential factors in the instructional process in the context of freedom of learning implementation and achieved goals. It is highly recommended that teachers' at schools applying the new curriculum to use the results of this study as the considerations matter for further decisions of any decisions towards learning model implementation in the instructional process to reach

the learning outcomes well. For further research, it is essential to teach skills and attitudes that promote critical thinking in the school curriculum, both openly and implicitly, starting at the earliest opportunity. We require further examples promptly in various educational settings. A critical thinking curriculum implemented at all school levels offered a consistent and established pedagogical foundation, enhancing students' skills for instructors to further enhance in this study. Implementing critical thinking as a top skill at all educational levels, together with teachers possessing strong and consistent theoretical knowledge, was crucial for the success of this classroom curriculum.

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REFERENCES

Ahmad, K., Nurkhin, A., Muhsin, M., & Pramusinto, H. (2020). Problem-Based Learning Strategy: Its Impact on Students' Critical and Creative Thinking Skills. *European Journal of Educational Research*, *9*(3), 1141–1150. https://doi.org/10.12973/eu-jer.9.3.1141

Akhdinirwanto, R. W., Agustini, R., & Jatmiko, B. (2020). Problem-Based Learning with Argumentation as a Hypothetical Model to Increase the Critical Thinking Skills for Junior High School Students. *Jurnal Pendidikan IPA Indonesia*, *9*(3), 340–350. https://doi.org/10.15294/jpii.v9i3.19282

Alvarez, D. (2010). "I Had To Teach Hard": Traumatic Conditions and Teachers in Post-Katrina Classrooms. *The High School Journal*, *94*(1), 28–39.

Amin, S., Utaya, S., Bachri, S., Sumarmi, S., & Susilo, S. (2020). Effect of Problem Based Learning on Critical Thinking Skill and Enviromental Attitude. *Journal for the Education of Gifted Young Scientists*, *8*(2), 743–755. https://doi.org/10.17478/jegys.650344

Anggraeni, D. M., Prahani, B. K., Suprapto, N., Shofiyah, N., & Jatmiko, B. (2023). Systematic Review of Problem Based Learning Research in Fostering Critical Thinking Skills. *Thinking Skills and Creativity*, *49*, 101334. https://doi.org/10.1016/j.tsc.2023.101334

Atabaki, A. M. S., Keshtiaray, N., & Yarmohammadian, M. H. (2015). Scrutiny of Critical Thinking Concept. *International Education Studies*, *8*(3). https://doi.org/10.5539/ies.v8n3p93

Birgili, B. (2015). Creative and critical thinking skills in problem-based learning environments. *Journal of Gifted Education and Creativity*, *2*(2), 71. https://doi.org/ 10.18200/jgedc.2015214253

Browne, K. (2009). *The Risk of Harm to Young Children in Institutional Care*. Save the Children.

Brusilovsky, P., & Maybury, M. T. (2002). From adaptive hypermedia to the adaptive web. *Communications of the ACM*, *45*(5), 30–33. https://doi.org/10.1145/506218.506239

Bulut Ates, C., & Aktamis, H. (2024). Investigating the effects of creative educational modules blended with Cognitive Research Trust (CoRT) techniques and Problem Based Learning (PBL) on students' scientific creativity skills and perceptions in science education. *Thinking Skills and Creativity*, *51*(February), Article 101471. https://doi.org/10.1016/j.tsc.2024.101471

Chis, A., Moldovan, A.-N., Murphy, L., Pathak, P., & Muntean, C. (2018). Investigating flipped classroom and problem-based learning in a programming module for computing conversion course. *Educational Technology and Society*, *21*(4), 232–247.

Davies, M., & Barnett, R. (Eds.). (2015). *The Palgrave Handbook of Critical Thinking in Higher Education*. New York: Palgrave Macmillan US. https://doi.org/10.1057/9781137378057

Djaelani, A. R., Pratikto, H. H., & Setiawan, T. (2019). Implementasi Kurikulum 2013 dan Permasalahannya (Studi Kasus Di Smk Ganesa Kabupaten Demak). *Pawiyatan*, *26*(1), 1–9.

Elder, L., & Paul, R. (2008). *Critical Thinking Development: A Stage Theory With Implications for Instruction*. Tomales, CA: Foundation for Critical Thinking.

Ennis, R. H. (2013). *The Nature of Critical Thinking: An Outline of Critical Thinking Dispositions*. University of Illinois.

Facione, P. A. (1989). *Critical Thinking: A Statement of Expert Consensus for Purposes of Educational*

Assessment and Instruction. Retrieved from https://philarchive.org/archive/faccta

Foo, C., Cheung, B., & Chu, K. (2021). A Comparative Study Regarding Distance Learning and the Conventional Face-to-Face Approach Conducted Problem-Based Learning Tutorial During the COVID-19 Pandemic. *BMC Medical Education*, *21*(1), 141. https://doi.org/10.1186/s12909-021-02575-1

Giraldo-Garcia, R., Roy, M., & Alotebi, H. (2015). The Interplay of Technology and Critical Thinking Skills in the 21st Century Blended Classroom. *International Journal of Advanced Research in Education Technology*, *2*(3), 32–35.

Halonen, J. S., & Santrock, J. W. (1999). *Psychology Contexts and Applications* (3rd Editio).

Hidajat, F. A. (2023). A comparison between problem-based conventional learning and creative problem-based learning on self-regulation skills: Experimental study. *Heliyon*, *9*(9), e19512. https://doi.org/10.1016/j.heliyon.2023.e19512

Hidayati, N., Zubaidah, S., & Amnah, S. (2022). The PBL vs. Digital Mind Maps Integrated PBL: Choosing Between the two with a view to Enhance Learners' Critical Thinking. *Participatory Educational Research*, *9*(3), 330–343. https://doi.org/10.17275/per.22.69.9.3

Huba, M. E., & Freed, J. E. (2000). *Learner-Centered Assessment on College Campuses: Shifting the Focus from Teaching to Learning*.

Jackson, A., Yanchar, S., Hansen, K. L., & Hansen, J. (2012). Critical Thinking in Applied Psychology: Toward an Edifying View of Critial Thinking in Applied Psychology. *Issues in Religion and Psychotherapy*, *34*(1), 1–10.

Kementerian Pendidikan Kebudayaan Riset dan Teknologi. (2022). *Pedoman Penerapan Kurikulum dalam Rangka Pemulihan Pembelajaran*.

Khoirurrijal, K., Fadriati, F., Sofia, S., Makrufi, A. D., Gandi, S., Muin, A., … Suprapno, S. (2022). *Pengembangan Kurikulum Merdeka*. Literasi Nusantara Abadi.

Kwangmuang, P., Jarutkamolpong, S., Sangboonraung, W., & Daungtod, S. (2021). The development of learning innovation to enhance higher order thinking skills for students in Thailand junior high schools. *Heliyon*, *7*(6), e07309. https://doi.org/10.1016/j.heliyon.2021.e07309

Lisniandila, N. P. A., Santyasa, I. W., & Suswandi, I. (2019). The Effect of Problem Based Learning Teaching Method on Students' Critical Thinking Skills in Physics Lesson at SMA Negeri 4 Singaraja. *JPP (Jurnal Pendidikan Dan Pembelajaran)*, *25*(1), 16–24.

Li, Y., & Wang, L. (2018). Using iPad-based mobile learning to teach creative engineering within a problem-based learning pedagogy. *Education and Information Technologies*, *23*(1), 555–568. https://doi.org/10.1007/s10639-017-9617-y

Lukman, H., Asha, L., Warsah, I., Morganna, R., & Adhrianti, L. (2022). The Effect of Teacher Collaboration as the Embodiment of Teacher Leadership on Educational Management Students' Critical Thinking Skills. *European Journal of Educational Research*, *11*(3), 1315–1326. https://doi.org/10.12973/eu-jer.11.3.1315

Moseley, D., Baumfield, V., Elliott, J., Higgins, S., Miller, J., Newton, D. P., & Gregson, M. (2005). *Frameworks for Thinking*. Cambridge University Press. https://doi.org/10.1017/CBO9780511489914

Nargundkar, S., Samaddar, S., & Mukhopadhyay, S. (2014). A Guided Problem-Based Learning (PBL) Approach: Impact on Critical Thinking. *Decision Sciences Journal of Innovative Education*, *12*(2), 91–108. https://doi.org/10.1111/dsji.12030

Oderinu, O. H., Adegbulugbe, I. C., Orenuga, O. O., & Butali, A. (2020). Comparison of students' perception of problem-based learning and traditional teaching method in a Nigerian dental school. *European Journal of Dental Education*, *24*(2), 207–212. https://doi.org/10.1111/eje.12486

Ohio Department of Education. (2006). *Framework for 21st-century learning. Partnership for 21st-century skills (P21): Core content integration*.

Okoth, T. A. (2016). Challenges of Implementing a Top-down Curriculum Innovation in English Language Teaching: Perspectives of Form III English Language Teachers in Kenya. *Journal of Education and Practice*, *7*(3), 169–177.

Oxman, S., & Wong, W. (2014). *White Paper: Adaptive Learning Systems*. Integrated Education Solutions.

Padmanabha, P. (2018). Critical Thinking: Conceptual Framework. *Journal on Educational Psychology*, *11*(4), 45–53.

Plate, R. (2012). The Evolution of Curriculum Development in the Context of Increasing Social and Environmental Complexity. *Creative Education*, *03*(08), 1311–1319. https://doi.org/10.4236/ce.2012.38192

Poedjiastutie, D., Akhyar, F., Hidayati, D., & Nurul Gasmi, F. (2018). Does Curriculum Help Students to Develop Their English Competence? A Case in Indonesia. *Arab World English Journal*, *9*(2), 175–185. https://doi.org/10.24093/awej/vol9no2.12

Priyaadharshini, M., & Vinayaga Sundaram, B. (2018). Evaluation of higher-order thinking skills using learning style in an undergraduate engineering in flipped classroom. *Computer Applications in Engineering Education, 26*(6), 2237–2254. https://doi.org/10.1002/cae.22035

Santos, S. C.dos (2017). PBL-SEE: An authentic assessment model for PBL-based software engineering education. *IEEE Transactions on Education, 60*(2), 120–126. https://doi.org/10.1109/TE.2016.2604227

Suryanti, N., & Nurhuda, N. (2021). The Effect of Problem-Based Learning with an Analytical Rubric on the Development of Students' Critical Thinking Skills. *International Journal of Instruction*, *14*(2), 665–684. https://doi.org/10.29333/iji.2021.14237a

Tangkudung, I., Dako, R. D. R., & Dako, A. Y. (2019). Evaluasi website menggunakan Metode ISO/IEC 25010. In S. Mamase, S. Al-Islamiyah, A. Yasin, I. Staddal, Hariadi, & Mustofa (Eds.), *Prosiding Seminar Nasional Teknologi dan Humaniora (SemanTECH)* (pp. 87–107). Gorontalo: Politeknik Gorontalo.

Wahyu, Y., Suastra, I. W., Sadia, I. W., & Suarni, N. K. (2020). The Effectiveness of Mobile Augmented Reality Assisted STEM-Based Learning on Scientific Literacy and Students' Achievement. *International Journal of Instruction*, *13*(3), 343–356. https://doi.org/10.29333/iji.2020.13324a

Wan Husin, W. N. F., Mohamad Arsad, N., Othman, O., Halim, L., Rasul, M. S., Osman, K., & Iksan, Z. (2016). Fostering students' 21st century skills through project oriented problem based learning (POPBL) in integrated STEM education program. *Asia-Pacific Forum on Science Learning and Teaching, 17*(1), 1–19. https://doi. org/10.1109/TE.2008.919699

Yaiche, W. (2021). Boosting EFL Learners Critical Thinking through Guided Discovery: a Classroom-Oriented Research on First-Year Master Students. *Arab World English Journal*, *12*(1), 71–89. https://doi.org/10.24093/awej/vol12no1.6

Yanchar, S. C., Gibbons, A. S., Gabbitas, B. W., & Matthews, M. T. (2017). *Critical Thinking in the Field of Educational Technology: Approaches, Projects, and Challenges*. https://doi.org/10.1007/978-3-319-45001-8_8