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Research Article

Student's Self-Regulated Learning Level in Vocational School: Implications for Improving Critical Thinking Skills.

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ABSTRACT

Learning independence helps students determine learning goals, find learning strategies, monitor the learning process, and evaluate their learning progress independently. Weak learning independence causes students to have difficulty managing emotions, lose focus, and find it challenging to engage in learning. This article aims to map the the self regulated learning skills of students from vocational high schools in East Kotawaringin Regency and its implications for increasing learning independence and critical thinking skills. This study used a survey method conducted in four vocational schools in East Kotawaringin Regency. The study sample comprised 262 numbers taken using the Slovin technique at an error rate of 5%—data collection techniques using e-questionnaires with Likert scales, field observations, and interviews. The data collected were analyzed using descriptive analysis techniques. The study concluded that the self regulated learning ability of vocational high school students in East Kotawaringin Regency falls within the sufficient category, based on indicators such as metacognitive skills, motivation, and learning methods, as well as in terms of gender and areas of expertise. This suggests a need to optimize students' self regulated learning abilities through student centered learning approaches, problem based learning strategies, and digital based learning resources. The use of these strategies is also expected to contribute to the improvement of students' critical thinking skills.

Keywords: Self Regulated Learning, Critical Thingking, Vocational School, Student Self Regulated Learning

I. INTRODUCTION

21st-century life requires critical thinking skills to solve increasingly complex problems [1], [2], [3]. Critical thinking will facilitate learning in generating solutions and creative ideas in solving problems faced with action that are systematic, effective efficient, and reflective [4], [5]. In addition, the ability to think critically makes a person able to make wise decisions in everyday life [5]. Critical thinking is a key standard for achieving competency in education in Indonesia. The country's educational regulations mandate that every student must possess the ability to think and act creatively, productively, critically, independently, collaboratively, and communicatively. Therefore, students need to be trained to possess 4C skills, one of which is critical thinking [6]. Vocational School as formal education institutions needs to provide learning services that support the mastery of critical thinking and problem solving skills using the application of adequate learning methods and the use of learning facilities [7], [8], [9]. Ability of critical thinking skills Support the development of students' technical competencies. Practical learning is a form of implementation of affective and cognitive aspects and applications that is aggregated in estimator activities to form certain technical competencies [10] . It is these technical skills that are very prominent in solving a particular field of work and mastering them requires training in the form of learning and training [11], [12].

Mastery of competencies in learning activities in vocational schools has a major impact on the readiness of students to enter the business world and the industrial world [13]. However, the level of competence of students, especially in the field of automotive engineering in recent years, has decreased, especially in the field of electricity and

confectionery measuring instruments as well as the application of occupational safety and health [14], [15], [16]. The low practical competence of students in schools is certainly caused by internal factors of the students themselves and external factors which include learning planning, implementation, evaluation, and infrastructure supporting practical learning [17]. Critical thinking skills are strongly linked to the learning process across the cognitive, psychomotor, and affective domains. [18], [19]. Moreover, Learning without knowing basic concepts or critical thinking skills will be challenging to apply. In the end, it will only accustom a child to recognize theories without understanding the fundamental basis of the knowledge he has. It will eventually make it difficult to apply that knowledge in various situations [20]. However, support for learning, learning activities, and the quality of learning presented at school has yet to support the development of students' thinking skills [21]. This condition causes low critical thinking skills on all indicators [22], [23]. Other research findings show as 58.34% of students of Vehicle Engineering have a lower critical thinking skills; with even 5.56% categorized as remarkably lacking [22].

The low competence of teachers in facilitating the development of critical thinking, along with limited resources for enhancing these skills, a teacher centered approach to learning methodologies, and factors such as student culture and environment, student motivation, learning independence, self regulation, metacognition, and reading or communication skills, all serve as constraints on the development of critical thinking skills in vocational schools [24], [18]. This leads to learning in schools that still rely on low level thinking and are not oriented towards improving critical thinking skills [25]. Critical thinking is one of the higher order skills that, in the process, involves metacognition and self regulation as a form of cognitive activity to plan, monitor, and evaluate what they do [26]. So that the decisions taken can be accounted for conceptually, contextually, and methodologically [27].

Metacognition is a consciously controlled thought process [28]. This process is carried out in depth and meaningfully through monitoring and regulating cognitive abilities adaptively in evaluating ideas and performance and choosing strategies for solving a problem [29], [30]. Metacognition has an influence on enhancing development critical thinking and increasing an individual's awareness of his or her thought processes. Critical thinking relies heavily on efficient metacognitive mechanisms. With awareness of processes, actions, and emotions, thus enabling the identification and improvement of learning processes that lead to the progress of the learning process [31], [32]. Metacognition is a critical factor in learners' decisions regarding the techniques and learning strategies used that are believed to affect learning processes and outcomes. When students apply these metacommunication strategies, they have tried to develop the ability to learn independently [33].

Learning independence will help students determine specific goals, use more learning strategies, monitor the learning process themselves, and more systematically evaluate the progress of the students themselves. However, each student in vocational schools has its own uniqueness, comes from various socioeconomic backgrounds, and hete rogeneous environments make the support and ability of independent learning between students diverse [34], [35], [36]. Therefore, each student has a different learning strategy for monitoring the learning patterns they will apply. In addition, biological factors, cognitive development, contextual, and individual differences in carrying out regulations that still require support from teachers, parents, and other learning components also affect the ability to learn independently and self regulation of students [37], [38].

Self regulated rearing is the effort of learners consciously and independently to organize the most effective learning activities through monitoring, motivation, finding learning resources, and motivating themselves gathered to make decisions [39]. Implementation of self regulated learning starts from determining learning goals, supervision, regulation, and control of cognition, motivation, and behavior [40]. Various factors influence the capacity for self regulated learning, including motivation, behavior and metacognition [41]. Metacognition is the ability of students to plan, determine goals, and organize, self observation which aims to identify needs and determine how to learn through the process of planning, monitoring, and escorting the learning process to get effective results [42], [43]. Motivation has a role in encouraging learning both from within and outside students. Through internal processes that occur, learners will bring out the mental ability to direct and behave independently in achieving goals [44], [45]. The motivational components that influence self regulated learning encompass expectations and beliefs regarding one's capability to complete a task, the values associated with the task, self awareness of its significance, and emotional responses to the assigned work. Additionally, behavior impacts self regulated learning, as it pertains to students' ability to manage their learning environment, prepare for the learning process, strategize, evaluate, and enhance their learning [46].

Reflecting on the daily activities of students during learning both in class X and class XI, data were obtained that the level of independence and self regulation ability in learning could have been much higher. However, many learners need help to engage meaningfully in metacognitive processes [28]. This is shown by the low ability of students to manage emotions, not focused on learning, low management of learning time, delays in doing assignments, anxiety in assessment activities, low involvement in learning, and low use of smartphones to access learning resources independently [47], [48], [49]. This condition was observed at the research site, where students were seen busy on social media during lessons, sleeping, or doing activities that were not relevant to the learning theme. Based on information from subject teachers, homeroom teachers, and BK teachers, awareness of being responsible for school regulations and obligations as students in learning still needs to be improved. This can be observed from discipline in following school rules involvement in learning, to responsibility in completing assignments both independently and in groups. Based on these findings, there are still several students who do not have skills in self regulation effectively, which may hurt their academic achievement in the school environment. The ability to self regulate is one of the individual factors that affect a person's performance. With self regulation, individuals can better control their behavior and carry out planning, development, and implementation processes to achieve specific goals [50].

Advanced cognitive abilities (HOTS), including critical thinking skills critical thinking, have become an indispensable component in the education system in vocational schools. Critical thinking is influenced by metacognitive awareness and self regulation [51]. Meanwhile, self regulation also significantly predicted awareness of metacognitive abilities. Metacognitive awareness has a role as a partial medium between self regulation and critical thinking. Thus, fostering self regulation and metacognitive awareness is essential for enhancing learners' critical thinking abilities [52]. Vocational education institutions need to know the level of metacognitive ability and learning independence to develop efforts to strengthen creative thinking skills, independent learning skills, and self efficacy skills. Self efficacy contributes significantly to the independence of learners' learning. The higher the student's self efficacy, the student's learning independence is high, and vice versa. If the student's self efficacy is low, then the student's learning independence is low [52], [52]. Based on these issues, this article will map the self regulated learning abilities of vocational middle school students in East Kotawaringin Regency according to level of metacognition, motivation, and learning behavior based on gender and skill programs. It aims to provide one of the foundations for the development of independent learning skills and critical thinking skills for vocational school students.

II. METHODE

The study involved 262 eleventh grade students from four vocational schools offering automotive engineering, computer network engineering and plantation agribusiness programs in East Kotawaringin Regency. The sample size was determined using the Slovin formula with a 5% margin of error.

Data collection was conducted through an e questionnaire using a Likert scale, field observations, and interviews. The research instrument was structured around three key indicators of self regulated learning (SRL): metacognition, motivation, and behavior. The questionnaire framework is presented in Table I. Instrument validity was ensured through expert judgment, while its reliability was tested using Cronbach's Alpha, yielding a high reliability score of 0.995. Descriptive analysis was employed to determine the level of self regulated learning, with the criteria detailed in Table II.

Table I. Question Grid

Aspects	Dimension	Indicator
Metakognitif	Plan	Develop goals, schedules, targets, and learning strategies
	Monitoring	Check assignments, summarize material, and note essential things
	Self evaluation	Conduct a self evaluation
Motivation	Hope	Self confidence
	Value	Awareness, learning without prompting

	Affective	Interest and Reaction to tasks
Behaviour	Selection	Find information and help
	Organize	Organize, condition, time and place of study
	Handling	Controlling focus

Table II. SRL Capability Categorization is based on Respondent Achievement Level

Classification	Point Range
Excellent	90% -100%
Good	80% - 89%
Enough	65% - 79%
Less	55% - 65%
Less Than Once	0% - 54%

III. RESULTS & DISCUSSION

The study's findings provided data on the learning levels of vocational school students in East Kotawaringin Regency. This data indicates that the majority of students in the area fall into the sufficient category regarding their level of independence. Specifically, the achievement in metacognition ability indicators is at 74%, while motivation and learning behavior indicators both stand at 67%. The level of self regulated learning) among vocational school students in East Kotawaringin Regency is illustrated in Figure 1.

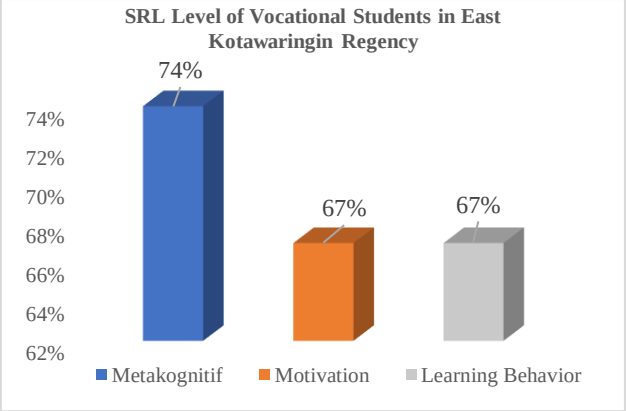

Figure 1. SRL Level of Vocational Students in East Kotawaringin Regency

The data analysis results indicate that both male and female students have a self regulated learning level categorized as sufficient. For male students, the achievement levels for self regulated learning are 74% in metacognitive ability indicators, 68% in motivation indicators, and 68% in behavior indicators. In contrast, female students achieved 73% in metacognitive indicators, 66% in motivation indicators, and 66% in behavioral indicators. Figures 2 and 3 illustrate the levels of self regulated learning among male and female students, respectively. Figure 2 visualizes the self regulated learning levels for vocational school students in East Kotawaringin Regency based on gender.

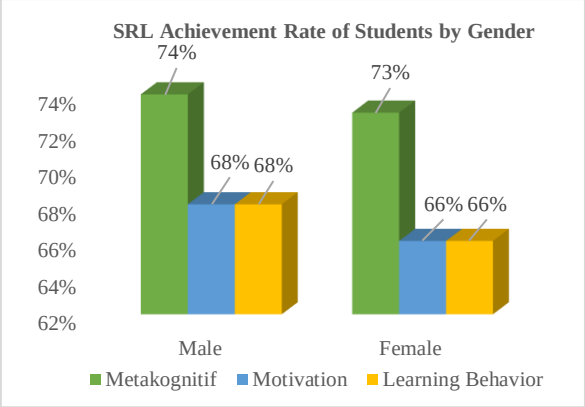

Figure 2. SRL Achievement Rate of Students by Gender

According to the expertise programs, the level of self regulated learning among vocational school students in automotive engineering, computer network and communication engineering, and agribusiness plantation crop programs is categorized as sufficient. In the automotive engineering program, the self regulated learning (SRL) achievement rates are 75% for metacognitive indicators, 68% for motivation indicators, and 69% for behavioral indicators. For the computer network and communication engineering program, the SRL achievement rates are 73% for metacognitive indicators, 66% for motivation indicators, and 66% for behavioral indicators. In the agribusiness plantation crop program, the SRL achievement rates are 74% for metacognitive indicators, 68% for motivation indicators, and 67% for behavioral indicators. Figure 3 illustrates the self regulated learning (SRL) levels for vocational school students in Kotawaringin Timur district across each expertise program.

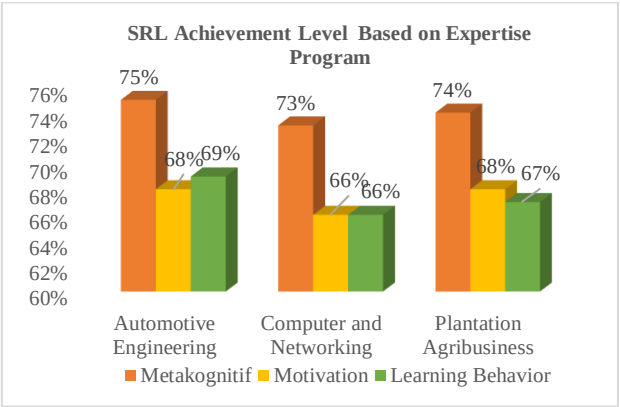

Figure 3. SRL Achievement Level of Students Based on Expertise Program SRL

This article investigates the self regulated learning abilities of Vocational Middle School students in East Kotawaringin Regency, focusing on metacognition, motivation, and learning behavior in relation to gender and skill programs. The study's findings demonstrate that the self regulated learning levels across all indicators fall within the sufficient achievement category. This conclusion is supported by the data analysis conducted with respect to both gender and expertise programs. These results suggest that the principles of independent learning in vocational education have not yet been fully implemented, particularly in enhancing students' metacognitive abilities, motivation, and learning behaviors in Vocational Middle Schools. Based on the observations made, the teaching modules developed by the referring teachers have referred to the teaching module development guidelines set by the Ministry of Education and Culture. Both are related to learning outcomes, approaches, and learning methods used. However, the teaching module cannot be realized optimally because it is bumped with the availability and condition of learning facilities, school activities, and the condition of students who need more time to be ready to carry out project based learning and collaboration.

The teaching module is a preparatory document that includes objectives, steps, learning media, and assessments based on the Learning Objectives Flow. Teaching modules help educators carry out According to the expertise programs, the level of self regulated learning among vocational school students in automotive engineering, computer network and communication engineering, and agribusiness plantation crop programs is categorized as sufficient. In

the automotive engineering program, the self regulated learning (SRL) achievement rates are 75% for metacognitive indicators, 68% for motivation indicators, and 69% for behavioral indicators. For the computer network and communication engineering program, the SRL achievement rates are 73% for metacognitive indicators, 66% for motivation indicators, and 66% for behavioral indicators. In the agribusiness plantation crop program, the SRL achievement rates are 74% for metacognitive indicators, 68% for motivation indicators, and 67% for behavioral indicators. Figure 3 illustrates the SRL levels for vocational school students in Kotawaringin Timur district across each expertise program. learning, organize the learning process by learning outcomes, and support the achievement of competence in a subject [52], [53]. Therefore, teaching modules must be arranged and studied in such a way that learning objectives can be achieved. Therefore, teaching modules need to be well designed and applied to achieve learning objectives. The implementation of the Independent Curriculum requires school principals and teachers to adapt and relearn. In lesson planning, teachers still often rely on teaching modules from the central level [54], [55], [56]. Learning planning that is carried out is not based on the conditions of student participants; collaborative based learning cases will produce learning that tends to inhibit the ability of students to develop independent learning skills [57].

Problem solving based learning is one strategy to develop students' independent learning skills [58]. Of course, this learning strategy requires certain learning facilities, according to the scientific context, at the vocational Middle School level based on improving the technical ability of students. Practical facilities are the main element in learning to support the achievement of competencies and train students' independent learning abilities [59]. The results of interviews in this study found that the number of learning facilities available at vocational schools was different from the number of students. The challenges faced by vocational schools was the need for more learning facilities [56]. At the program level, there are only so many training objects used in learning with conditions that are not suitable for use . This condition requires students to use the object training interchangeably.

The development of independent learning skills is strongly influenced by the metacontent ability, motivation, and behavior of students in learning [60]. This is possible because the ability of metacognition has a role as a determinant of learning strategies and techniques to solve cognitive problems and solve daily activities to solve complex problems [33]. Metacognition is seen as the ability to self regulate, plan, monitor, and evaluate learning processes and outcomes so that the learning process can run effectively [33], [61]. This metapartnership ability of learners involves components of higher level thinking, self regulation, and focus on learning [62]. The data analysis results indicate that the achievement level of metacognitive abilities among vocational school students falls within the category of moderate, ranging from 73% to 75%. This finding is further supported by the vocational schools' education report card, which reveals that the quality of learning and students' skills in critical reasoning, reflective planning, emotional management, and self control are among the lowest in the rankings [63].

Cognitive abilities, academic achievement, readiness to learn, learning motivation, culture, careful strategic planning, mastery of concepts, and execution of learning process evaluations significantly impacts the metacognitive abilities of students [64], [65], [66]. The results of the interviews revealed that students still require support from teachers to help them identify the learning strategies they should use. In addition, students need to be reminded of their responsibilities as students, both in the academic sphere and the scope of life at school. This shows that the ability of students to plan learning strategies needs to get support from outside students. Therefore, providing motivation and encouragement to students is still needed to improve independent learning skills.

The research findings regarding students' metacognitive levels, categorized as sufficient, indicate that there is no significant difference between the metacognitive abilities of male and female students. Previous studies on the relationship between gender and metacognitive ability have suggested that biological factors associated with gender do not significantly impact metacognitive abilities [66], [67]. These findings suggest that both men and women have equal levels of metacognitive awareness in managing their learning [68], [69]. This is due to the growing metacognitive awareness among middle school students about how much they will learn and how to use effectively what they have learned [68].

Metacognitive abilities are essential in promoting the improvement of critical thinking skills. This makes a person aware of his thought process to improve it for the acquisition of better knowledge. Critical thinking relies on well functioning metacognitive system, being aware of behaviors, processes, and emotions. to provide opportunities for students to evaluate and improve [51], [32]. Critical thinking is a self assessment that aims and organizes oneself to produce interpretation, analysis, evaluation, and inference based on evidence, conceptual, methodological, or

contextual [27]. Three mental processes drive critical thinking, including the metacognitive component, the performance component, and the knowledge acquisition strategy [26].

Critical thinking requires reasoning and decision making to effectively solve problems and achieve goals; however, it demands a certain level of awareness and self regulation. In this context, metacognition is crucial as it facilitates the direction, organization, and execution of the skills and actions necessary for effective learning [32]. The ability of metacognition is considered the ability to teach how to learn and how to learn. These metacognitive abilities make learners more autonomous in learning, Enhancing awareness of cognitive processes and self regulation, enabling individuals to manage their learning and apply it to various areas of life. By its nature, metacognition abilities can be divided into two components: declarative, which refers to knowledge about the learner himself and his task, and procedural, which is in the form of metacognitive control or learning controlled by the learner [51].

Metacognition refers to high level mental processes for planning, monitoring, and evaluating what they do. The performance component refers to the actual strategy used, while the knowledge acquisition strategy refers to the way individuals relate old material to new material. To enhance students' critical thinking skills, it is effective to engage them in learning activities that incorporate problem based learning strategies, role playing, simulations, researchoriented environments, and diverse problem contexts [70], [71]. In the educational process, the teacher serves as a facilitator and role model, guiding students' cognitive and metacognitive activities. The teacher progressively encourages students to engage in enhancing their competencies while gradually reducing support to promote greater autonomy in their learning process. Furthermore, students are advised to start analyzing their own thinking, which aligns with the principles of self regulated learning associated with metacognitive abilities. [72].

Motivation is one of the variables that affect the level of independent learning ability of students. Motivation has an essential role in determining learners' involvement in independent learning. Intrinsic motivation is closely related to metacognitive activity. Meanwhile, extrinsic motivation can support the development of independent learning abilities [73]. The results found that the level of motivation, learning awareness, and interest in learning of vocational schools students in East Kotawaringin Regency was in the category of quite 66% to 68% achievement. Motivation can serve as a precursor, and mediator to bind the process of self learning. As a precursor, motivation drives individuals to start SRL. As a mediator, motivation influences the process and self learning strategies applied [74]. Therefore, the learning carried out must be able to facilitate students to increase motivation to find, organize, and implement learning in their way.

Self efficacy, defined as an individual's belief in their capacity to plan and execute the necessary actions to achieve specific goals, is recognized as a vital factor influencing academic achievement and student participation in the learning process [75], [76]. Students with higher levels of self efficacy are more likely to establish challenging learning goals, sustain their motivation, and demonstrate perseverance when confronted with obstacles [77], [78]. The results of this study show that the self efficacy of Vocational school students is at an adequate level, showing that students in vocational schoolS in East Kotawaringin Regency have enough confidence in their ability to overcome challenges and achieve learning objectives. An adequate level of self efficacy tends to strengthen students' courage in taking intellectual risks and facing challenges constructively, mainly through active involvement in the learning and problem solving process [79]. In this context, it is essential for learning facilitators to create a supportive learning environment, where students feel comfortable to express their opinions and participate actively. The implementation of digital learning tools designed to increase student engagement and provide timely feedback can help students feel more confident in their ability to learn independently and think critically [80], [81].

Research findings regarding the level of self regulated learning indicate that the achievement levels of student learning behavior indicators fall within the range of 66% to 69%, categorizing them as sufficient. This condition indicates that students still need further development in improving their essentialaility to manage learning independently at an optimal level. Information selection is one of the critical element of Self Regulated Learning. Students with learning behavior in sufficient categories can identify and analyze the relevance of information to their learning goals. However, it still has limitations in determining the credibility and accuracy of information and analyzing information critically and deeply. Good literacy and information selection skills are essential to support the mastery of independent learning skills [81], [82]. On this basis, students must be facilitated in developing information literacy skills so that effectiveness in implementing learning independence can increase.

Self regulation of learners in learning at the level of self regulated learning still requires assistance from external resources such as teachers, peers, or technology that is relevant to the development of independent learning abilities. The interview results found that vocational schools students in East Kotawaringin tend to rely on direction from teachers or specific guidance if they experience difficulties and need to be more proactive in finding and utilizing various available resources optimally. To overcome this, students need to be facilitated to find various sources of help independently. This aims to strengthen self learning behavior through the use of digital learning platforms that can facilitate access to information and learning assistance systems more effectively [83], [83], [84].

Based on the findings of this study, aspects of learning behavior, which include the ability to manage time and conditioning the learning environment, need to be optimized, especially in structuring physical and digital environments to maximize focus and concentration. It aims to increase effectiveness in finding, processing, and managing learning patterns and learning outcomes [85], [86]. vocational schools students are a generation of digital natives who have unique characteristics in the context of independent learning. Digital natives are more responsive to technology involved learning and tend to seek information independently via the Internet [87], [88]. However, they are also more vulnerable to digital distractions that can hinder the learning process. The main challenge of the digital native generation in learning is the management of digital distractions around them, including social media, games, and other entertainment applications [89], [91]. Digital natives often have difficulty managing time because they tend to multitask with their digital devices. While multitasking is often considered a skill, it can reduce the efficiency and quality of learning [92], [93], [91]. Therefore the use of interactive and personalized digital learning platforms can help students develop better Self self regulated learning skills [94], [95], [84]. Technology can also provide real time feedback that helps students assess and reorganize their learning strategies.

IV. CONCLUSION

Self regulated learning provides opportunities for students to organize, implement, and evaluate learning and how to learn independently. The research findings indicate that the self regulated learning abilities of vocational school students in Central Kalimantan, assessed through indicators of metacognitive ability, motivation, and learning methods, fall within the sufficient category, regardless of gender or expertise programs. Consequently, it is essential to enhance students' self regulated learning capabilities by optimizing vocational education management in East Kotawaringin Regency. This can be accomplished by applying student centered learning methods, problem solving strategies, and digital learning resources. Furthermore, incorporating various learning strategies is expected to aid in the growth of students' critical thinking abilities.

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