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## Enhancing Problem-Solving Learning Models: A Review from the Lens of Independent Learning in the Post-Pandemic Era

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### Abstract

This research aims to explore the optimization of the problem-solving learning model within the context of independent learning in the post-pandemic era. Utilizing a systematic literature review method and the PRISMA model, the study identifies 25 pertinent articles concerning the implementation of the problem-solving learning model in independent learning. The analysis indicates that applying this model positively impacts students' critical thinking abilities, enhances creativity, and reinforces communication and collaboration skills. From an independent learning standpoint, the problem-solving learning model grants students the autonomy to cultivate creative thinking patterns and fosters heightened engagement in the learning process. The study also highlights adapting the model to online learning, with teachers as facilitators. In conclusion, these findings underscore the effectiveness of the problem-solving learning model in independent learning, especially in the post-pandemic era. They also offer valuable insights for educators and policymakers to develop adaptive learning strategies suited to the current educational environment.

## A. Introduction

In the context of character formation and the potential of outstanding future generations, education plays a crucial role. The enhancement and development of latent potential within individuals serve as the primary foundation for creating a high-quality generation [1]. As individuals pursue higher education, the knowledge and insights gained become increasingly extensive. Education is not only a means of learning but also a benchmark for the progress of a nation [2]. The government, as the forefront in advancing education, must take concrete actions. One of the steps taken is to continuously refine the curriculum. Therefore, the curriculum can be adapted to the ever-changing demands of the times, making it relevant and competitive [3]. The main goal of this initiative is to ensure that education remains a cornerstone of a nation's progress, providing skills in line with the needs of the times, and maintaining its quality.

As part of the effort to improve the quality of education, the Ministry of Education and Culture of the Republic of Indonesia (Kemendikbud RI) has designed a new policy known as 'Merdeka Belajar' (Freedom to Learn) [4]. Through this policy, it is hoped that there will be a liberation of creativity and innovation in learning, providing students with the freedom to explore their potential more optimally. With 'Merdeka Belajar,' the aim is for the next generation of the nation to become independent, critical individuals ready to face future challenges [5]. The 'Merdeka Belajar' policy is an initiative of the Ministry of Education and Culture of the Republic of Indonesia (Kemendikbud RI) under the leadership of Nadiem Anwar Makarim. The underlying concept of this policy is the understanding of the essence of freedom in thinking. This means that every school, teacher, and student is given the freedom to innovate in the teaching and learning process.

Merdeka Belajar is identified by its distinctive features that emphasize creativity, a problem-solving learning orientation, and an approach to learning based on the needs of the people in the global work context [6]. In addition, this policy also implements a comprehensive evaluation system, ensuring that assessments cover important aspects and provide a holistic picture of students' achievements and progress. Through this approach, it is hoped that education can become more adaptive, responsive, and capable of producing a generation ready to face the complexities of the modern world.

With the implementation of the Merdeka Belajar policy, it is expected that students will be more actively involved in every stage of the teaching and learning process [7]. The goal is to train and produce educational outcomes that can think critically, creatively, collaboratively, innovatively, and participatively [8]. Learning is expected to create an atmosphere as comfortable as possible so that students can enjoy the learning process without feeling bored, as if they are participating in activities outside the classroom [9]. The role of the teacher in this context becomes more dynamic, serving as a guide to students to access knowledge from various sources. Teachers also become facilitators of more intense discussions, enabling students to actively engage in the exchange of ideas and understanding of the material. Through this approach, it is hoped that a generation will be formed that not only has extensive knowledge but also the skills and attitudes needed to face the demands of a constantly changing society and job market.

Post-Covid-19, the implementation of the Merdeka Belajar concept in the education system becomes crucial to face new challenges [10]. In the context of distance learning, Merdeka Belajar can be realized through online platforms, giving students the freedom to explore learning materials independently. Flexibility in time and place is key, allowing students to schedule their learning according to individual needs. Teachers can facilitate online discussions and design tasks that encourage creativity and innovation. Holistic evaluation, involving various assessment methods, also supports this approach.

In this process, Merdeka Belajar not only becomes a learning concept but also emphasizes the development of soft skills such as independence, communication, and collaboration [11]. The primary focus is on enhancing creativity and innovation, where students are given the freedom to choose topics or learning methods that align with their interests and learning styles. Strengthening partnerships with parents is also a crucial aspect, involving them in supporting and understanding the educational process of their children at home. Thus, the post-Covid-19 implementation of Merdeka Belajar is expected to create an adaptive, inclusive, and relevant educational environment in response to the demands of the times.

The implementation of the "Merdeka Belajar" concept post-Covid-19 is closely related to various learning models that provide more significant room for student involvement and creativity. For example, the cooperative learning model can be integrated with Merdeka Belajar by giving students the freedom to choose their learning partners or groups. In this context, students can collaborate in completing tasks or projects, stimulating joint problem-solving, while the teacher acts as a facilitator. Additionally, Merdeka Belajar can also be associated with project-based learning models. Students are given the freedom to choose projects that align with their interests and skills, creating deeper engagement. Teachers remain guides providing direction and resources, but students have the freedom to determine their approach to completing projects, fostering problem-solving skills, creativity, and collaboration.

In the context of the inquiry-based learning model, the Merdeka Belajar concept gives students the freedom to explore topics according to their interests. Students can guide their own learning, formulate questions, and seek answers with the guidance of the teacher. This approach creates a profound learning experience, develops critical thinking skills, and strengthens students' independence. One of the learning models that can enable students to think critically, practice communication, and gather information from various sources is the problem-solving learning model.

In the context of Merdeka Belajar, students have the freedom to choose topics or learning projects that stimulate critical thinking and problem-solving. The teacher, as a facilitator, provides guidance and supports the learning process without restricting students to a single approach. Students are given space to explore various solutions, creating an environment that encourages creativity and innovation.

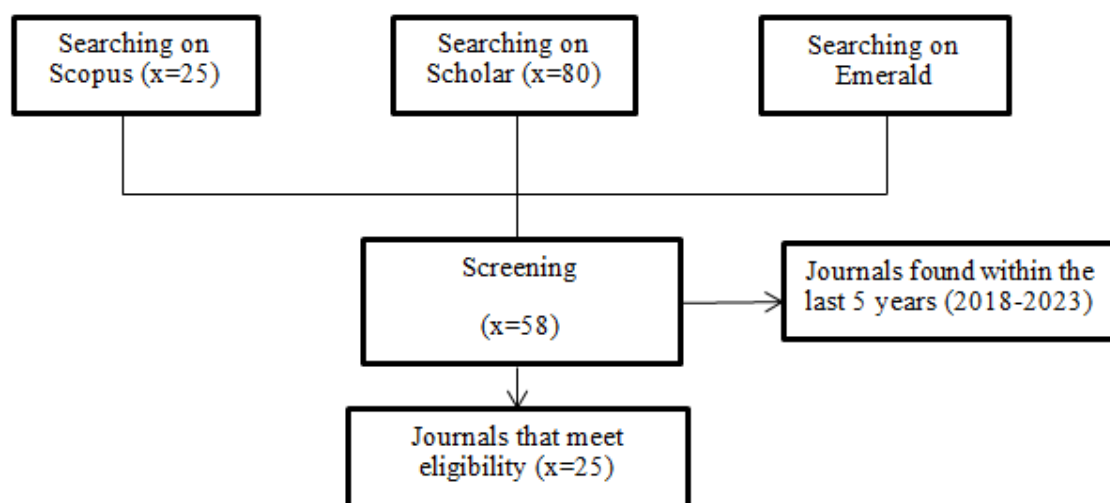
The implementation of the Problem-Solving Learning Model through Merdeka Belajar also includes an evaluation aspect focused on the understanding of concepts and the ability of students to face learning challenges [12]. The

evaluation system can be designed to include projects or tasks that require problem-solving, providing a holistic overview of students' abilities. By integrating the Problem-Solving Learning Model into the concept of Merdeka Belajar, the learning approach becomes more adaptive, allowing students to develop critical and creative thinking skills more profoundly. Students are empowered to become independent and creative problem solvers, aligning with the educational goal of prioritizing the full potential development of learners. Therefore, this research aims to explore how the implementation of the problem-solving learning model aligns with the perspective of Merdeka Belajar in the post-Covid-19 era.

## B. Research Method

The type of research described adopts the systematic literature review method using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analysis) model to evaluate systematic reviews or meta-analyses. The data collection method involves reviewing journals and articles from credible sources such as national journals, international journals, Scopus, Google Scholar, and Emerald. The authors successfully gathered 115 journals from various sources, including 25 journals from Scopus, 80 journals from Google Scholar, and 10 journals from Emerald. The review process continued with screening the titles and abstracts of each journal article. The screening results showed that out of the 115 journals, 58 articles were included, and 57 journals were excluded. After this stage, the authors filtered articles that met the eligibility criteria and finally obtained 25 journals relevant to the research.

The Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) is used as a comprehensive and structured guide in conducting the literature review [13]. PRISMA consists of five stages, namely defining eligibility criteria, defining information sources, literature selection, data collection, and data item selection [14]. The entire research process is systematically detailed, reflecting a structured and comprehensive methodological approach to producing valid and reliable research results.



**Figure 1.** PRISMA diagram

From a number of articles that have been obtained, there are certain criteria, namely journals published within the last 5 years (2018-2023), with the rationale

that those published during this period are still highly relevant as references. Out of the 58 journal articles that have been screened, there will be several journal articles that meet the eligibility criteria, with a total of 25 journal articles. These articles cover the topic of learning models, especially from the perspective of independent learning. In searching for journal articles from various sources, keywords have been limited, particularly focusing on the problem-solving learning model within the scope of students in schools.

### **C. Results**

From the results of the research using the systematic literature review method with the PRISMA model, a total of 25 articles were found, comprising 10 international articles and 15 national articles. These articles have high relevance to the implementation of the problem-solving learning model from the perspective of Merdeka Belajar in the post-Covid-19 pandemic era.

The success of a learning process serves as evidence that the goals of an educational institution have been achieved, positively influencing the quality of students [15]. This is related to research conclusions stating that the use of teaching methods has a positive impact on academic achievement in schools, indicating efforts to improve the quality of the learning process in schools. An educational institution with professional educators will be more effective if it can manage the learning process and adapt the application of teaching models that enhance the quality of student learning achievements. This emphasizes the importance of the role of teachers and educational management in creating a learning environment that supports the development of students' potential.

Research results present information that in an effort to improve the quality of Social Science (IPS) learning, the problem-solving IDEAL method according to Brandford and Stein is used. The learning stages are adjusted with guidelines to actively engage students during the learning process, encouraging them to develop their thinking skills. Students are guided to understand the steps in the problem-solving process, covering critical thinking aspects. Active participation of students in the learning process is considered a key success factor that needs to be maximized. Research on the Indonesian education system highlights that student autonomy is now a demand that needs to be encouraged in the current curriculum implementation. However, challenges remain as student autonomy still faces obstacles, especially in the context of the dominant role of teachers in the teaching-learning process. Therefore, it is important to explore the perceptions of teachers and students regarding learning autonomy through this study, as a step towards improving the quality of students.

In the context of research findings, it is concluded that education is considered a lifelong process widely accepted. Schools are regarded as institutions established with the aim of providing quality education, delivering more complex and abstract knowledge and ideas, and developing basic literacy and numeracy skills to students. Essentially, every country has established an education system and educational institutions to ensure quality, social integration, continuity, and stability. This is done to preserve the social and cultural heritage of society, emphasizing the crucial role of education in maintaining the sustainability and stability of the social and cultural aspects of a community.

## **1. Problem Identification in Problem-Solving Learning to Trigger Critical Thinking**

Critical thinking is the ability to think rationally and systematically with the aim of understanding the relationships between ideas or facts [16]. The problem-solving learning model is closely related to critical thinking patterns as it can train how to think and reason in drawing conclusions through exploration, experimentation, and demonstrating similarities, differences, consistency, and inconsistency [17]. Research findings indicate that problem-solving is a skill of problem identification. Students using the problem-solving learning model can positively influence critical thinking abilities. Through the application of problems solving, learning is expected to become more meaningful, engaging, and stimulate student creativity.

The concept of problem-solving skills includes cognitive processes in problem-solving using time-consuming solution search methods. Therefore, students' thinking patterns can be trained, enabling them to think critically in finding solutions to problems. Merdeka Belajar, as a government program, aims to create a joyful learning atmosphere with the essence of freedom of thought. This policy is expected to provide the best benefits for the quality of student learning. According to [18], Merdeka Belajar is a new policy initiative from the Ministry of Education and Culture of Indonesia designed by Minister of Education and Culture Nadiem Anwar Makarim. This policy is based on the results of the PISA 2019 assessment, which showed limitations in the literacy and numeracy skills of Indonesian students. Nadiem took steps as a solution to improve these limited abilities, involving literacy, numeracy, and character surveys.

Based on research presented by [19], it is explained that the connection with the Merdeka Belajar policy is a process that guides towards specific goals. Although the learning achievement standards are clearly outlined in the 2013 Curriculum, the procedures for achieving these standards are tasks assigned to teachers. Teachers are expected to adapt interaction patterns according to the conditions of their respective classrooms. In this process, teachers are required to improvise to create more effective, engaging, and enjoyable learning.

In the context of the freedom given to teachers, they can determine learning strategies that are suitable for the abilities and situations in the classroom. This approach aims to avoid the use of less effective learning strategies that may potentially affect the learning outcomes of students. The new concept in learning, Merdeka Belajar, allows students to actively seek and explore material information from various sources. This is expected to stimulate critical thinking patterns in students, shaping them into individuals who are more independent in the learning process.

## **2. Critical Thinking and Its Impact on Learning**

Critical thinking is the skillful ability in someone's thought process, effective in developing, researching, and applying choices that align with the desired target [17]. This aligns with research results affirming that critical thinking is a mental activity conducted using scientific methods. Critical thinking forms the basis for problem-solving, involving analysis, argumentation, evaluation, decision-making, drawing conclusions, and building insights into every issue [20]. In the application of learning models, its benefits are not only felt by students but also by teachers as

the driving force in creating a better classroom culture. Research conclusions about the 21st century emphasize that the advancement of knowledge fields requires everyone to become high-quality Human Resources (HR). Quality HR must be able to process, use, and develop critical thinking. Critical thinking involves mental operations such as deduction, induction, classification, evaluation, and reasoning. Critical thinking skills are crucial to ensure a learning-teaching process full of ideas that can stimulate students' abilities to improve.

The specific implementation of the problem-solving model plays a crucial role in the 21st-century context, where individuals are considered to have critical thinking skills if they can provide reflective, productive, and evaluative opinions on an event. This indicates that this learning model has a significant impact in creating a learning process that aligns with the demands of 21st-century education.

### **3. Effectiveness of Problem-Solving Learning Model**

The effectiveness of the problem-solving learning model is evident from the improvement in students' critical thinking skills [21]. Research on the relationship between the problem-solving learning model and 21st-century competencies shows that both are categorized as good. When students find solutions to problems, good communication skills facilitate them in conveying ideas. Effective communication helps students in finding solutions to these problems. 21st-century learning design focused on products and problem-solving emphasizes the importance of collaboration among students in creating systematic innovations and easy problem-solving. Problem-solving trains students to be independent in learning, including problem-solving, identification, analysis, and evaluation.

In training critical thinking skills, students can be given problems in groups to encourage discussion and questions to the teacher. Research shows that the problem-solving learning model significantly influences critical thinking skills, with a high percentage of 77%. Furthermore, a comparison between the problem-solving learning model and conventional learning models shows that the application of the problem-solving model has a positive impact on students' mathematical communication skills.

Research results on the implementation of the problem-solving learning model at SMK Negeri 7 Batam state that the ninth-grade class has a success rate of 82.06, classified as good. The implementation of this model allows students to access information, analyze situations, and identify problems to achieve the desired solution. Students are trained to think critically, foster creativity, and find solutions to problems. The evaluation of students' critical thinking skills is conducted through steps such as defining problems, tracing problems, planning solutions, implementing plans, checking solutions, and evaluating and communicating solutions. Learning innovations in the Merdeka Belajar era involve the application of HOTS-oriented learning and Problem Solving, the four pillars of education, Self Regulated Learning (SRL), online learning, and authentic assessment. Lecturers or teachers play the role of facilitators, motivators, inspirators, and role models in the learning process.

### **D. Discussion**

From the analyzed research results, it can be concluded that quality education is the kind of education that enhances students' quality by providing them with the freedom to develop creative thinking patterns. An effective learning

process is one that uses methods suitable for the conditions at hand. The use of appropriate methods can be a determinant of success in learning, reflected in the improvement of students' abilities and understanding of a subject, ultimately producing high-quality outcomes.

### **1. The Influence of Implementing Problem Solving Learning Model on Learning Outcomes**

According to Anies Baswedan (Minister of Education and Culture of Indonesia for the period 2014-2016) in his speech at Jakarta Expo 2017, he presented three main projections for 21st-century education: character formation, competence development, and literacy improvement. In the 21st century, rapid technological development significantly impacts the world of education. Critical thinking skills play a crucial role in the four competencies that students must possess in the 21st century, known as the 4Cs: critical thinking and problem-solving skills, creativity, communication skills, and the ability to collaborate.

The implementation of the problem-solving learning model is highly suitable for supporting and developing these 21st-century competencies [23]. This method is not just an approach in the teaching-learning process; it also motivates students, enhancing their critical thinking abilities towards various issues. Research findings emphasize the positive relationship between the problem-solving learning model and 21st-century competencies. This means that when students successfully find solutions to problems, good communication skills facilitate their ability to express these solutions effectively. Effective communication is essential in helping students find solutions to various problems they encounter.

Teachers are encouraged to choose appropriate teaching techniques and guide students in understanding learning strategies to enhance independent learning. The problem-solving learning model brings about significant changes in student learning outcomes. By applying this model, students gain broader and more accurate information to apply. Problem-solving is based on its strengths, emphasizing the development of problem-solving skills by involving students' experiences in daily life. This allows students to relate learning to their real-world context, enhancing understanding and developing practical skills applicable in various situations.

Through the problem-solving learning model, students are actively engaged in solving tasks or challenges that require critical and creative thinking. Their critical thinking abilities are sharpened through the processes of analysis, evaluation, and decision-making. Moreover, the model encourages students to communicate effectively, collaborate with their peers, and develop teamwork skills in problem-solving. The importance of implementing problem-solving in learning lies in its focus on developing 21st-century skills, such as creativity, communication, and collaboration. In a constantly changing world, students need to be trained to become independent learners who can adapt quickly to changes and effectively solve problems. The problem-solving learning model provides a foundation for students to develop these skills, creating a relevant and meaningful learning environment.



## **2. Analyzing Situations and Identifying Problems Based on the Problem-Solving Learning Model**

The learning model is a pattern or guideline used to plan and implement learning in the classroom. It includes curriculum development, materials, learning objectives, learning steps, and classroom and learning environment management [24]. One effective learning model for improving critical thinking skills is the problem-solving learning model [25]. The implementation of the problem-solving learning model aims to enhance students' critical thinking skills, including formulating problems, analyzing, deducing, inducting, evaluating, and decision-making.

The analysis of everyday situations is the initial step in implementing the problem-solving learning model. The main characteristic of implementing this model is that students are not merely listening, taking notes, and memorizing lesson materials. Instead, they are actively thinking, communicating, seeking, and processing data to draw conclusions. The learning process focuses on problem-solving, empowering students to address challenges with a scientific thinking approach. Problem-solving involves analyzing situations, identifying problems, understanding problems, planning solutions, implementing plans, reviewing, and discussing to determine appropriate and effective solutions. This process is conducted with the goal that the final results provide suitable and effective solutions.

## **3. Effectiveness of the Problem-Solving Learning Model in the Perspective of Independent Learning in the Post-Pandemic Era**

The effectiveness of the Problem-Solving Learning Model in the perspective of Independent Learning in the Post-Pandemic Era is crucial for creating a responsive, dynamic learning environment tailored to the needs of each student [26]. This model not only provides students with the freedom to manage their own learning but also helps develop essential critical thinking skills to face 21st-century challenges.

In the context of Independent Learning, where student autonomy and freedom are the main focus, the problem-solving learning model provides a framework that supports these goals. Students are encouraged to actively seek solutions, identify problems, and participate in the learning process. This aligns with the spirit of Independent Learning, emphasizing the importance of students becoming agents of their own learning. This model also has the ability to adapt to the flexibility of learning, allowing each student to explore and delve into the material at their own pace and learning style. Moreover, with a focus on practical problem-solving, learning becomes more meaningful and relevant for students.

The importance of developing critical thinking skills in the current era, especially after the pandemic that has changed the educational landscape, makes the problem-solving learning model increasingly relevant. Students not only learn to master the material but also to develop analytical, synthetic, and evaluative skills essential for daily life. By integrating various aspects of learning, this model creates opportunities for students to connect knowledge from various subjects, reflecting the holistic approach of Independent Learning. Thus, the problem-solving learning model becomes an effective tool in achieving the goals of

Independent Learning: creating a generation with independence, creativity, and critical thinking skills to face the future's challenges.

The effectiveness of this learning model can be seen in students' ability to sharpen critical thinking skills. With these skills, students tend to be more active and able to provide more directed answers to questions posed by teachers. The technical implementation of the problem-solving learning model in the context of independent learning can be done online, where teachers provide learning guidance as in offline learning, but this time without face-to-face interaction.

In online learning, teachers still organize teaching materials, including problems that require solving. Teachers then present these questions or problems to students. Next, students are asked to collect relevant data or information to solve the problem. The next process involves determining solution options to address the problem. With this approach, the problem-solving learning model can be implemented effectively in online learning, making students remain active, involved, and skilled in solving problems. This creates a dynamic learning environment, stimulates creativity, and gives students the freedom to manage their learning process according to the spirit of independent learning.

## **E. Conclusion**

The research findings indicate that the problem-solving learning model is effective in the perspective of independent learning in the post-pandemic era. In the context of online learning, this model remains capable of honing students' critical thinking skills. The students' activity and ability to answer questions and solve problems are maintained, even without direct face-to-face interaction with the teacher. The technical implementation of the problem-solving learning model in online learning requires guidance from the teacher, who prepares materials containing problems to be solved. The teacher poses questions or presents problems to students, who are then directed to collect data or information needed to solve the problem. The subsequent process involves determining solution options as a step in the resolution.

The research results also highlight that the effectiveness of this learning model lies in the students' honed critical thinking skills. Overall, this approach creates a dynamic learning environment, stimulates creativity, and gives students the freedom to manage their own learning, in line with the spirit of independent learning.

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