# The Role of Principal Leadership Management as a Driving Force in Implementing the Independent Curriculum Using AI

**Sri Yuni[1], Saryanto[2], Rejokirono[3]**

*Department of Education Management, Universitas Sarjanawiyata Tamansiswa, Indonesia*

*Corresponding author Email:* *yunisri1021@gmail.com*

**Abstract**

In the millennial era, characterized by constant change and progress, schools that thrive possess specific qualities and characteristics. Education not only functions as a place to transfer knowledge but also as a place to develop students' skills, character, and critical thinking abilities. In this increasingly complex world, educational institutions must adapt curricula and teaching methods that are relevant and able to meet students' diverse needs. Schools that innovate and provide captivating learning experiences will be better able to attract the attention of students and parents. In addition, educational institutions must realize the importance of building an identity and characteristics that distinguish them from other schools. This includes developing superior programs, adequate facilities, and a positive and supportive learning environment. This study investigates the role of principal leadership in implementing the Merdeka Curriculum while integrating artificial intelligence (AI) in a kindergarten/early childhood education environment. Through a qualitative approach, this study explores the experiences of a principal and staff at TK IT Tunas Mulia. Findings indicate that principals play a critical role in fostering a culture of innovation and adaptation to AI, providing the necessary training and resources for teachers to utilize AI tools effectively, and collaborating with stakeholders to ensure successful implementation. However, the study has identified challenges such as limited teacher proficiency in AI and the need for more comprehensive AI-integrated curriculum materials. While principal leadership plays a critical role, the study concludes that further support and professional development are necessary to fully harness the potential of AI in improving early childhood education.

*Keywords*: *Independent Curriculum, Principal Leadership, Educational Technology.*

## 1. Introduction

According to Article 28 Paragraph 3 of Law of the Republic of Indonesia Number 20 of 2003 concerning the National Education System, kindergarten organizes education to develop children's personalities and self-potential following their developmental stage. In this context, kindergarten plays a vital role in providing primary education that meets the developmental needs of early childhood [1]. Furthermore, the Minister of Education and Culture, Research, and Technology's Regulation No. 8 of 2024 defines early childhood education as a developmental endeavor that targets children from birth to six. Early childhood education facilitates children's growth and physical and spiritual development by providing educational stimulation. It expects children to prepare themselves for further education, ensuring they are physically and mentally prepared. These two regulations emphasize the importance of education for early childhood in building a solid foundation for their future by prioritizing an approach based on the child's developmental stage and focusing on developing individual potential [2].

In the millennial era, characterized by constant change and progress, schools that thrive possess specific qualities and characteristics. Education not only functions as a place to transfer knowledge but also as a place to develop students' skills, character, and critical thinking abilities. In this increasingly complex world, educational institutions must adapt curricula and teaching methods that are relevant and able to meet students' diverse needs. Schools that innovate and provide captivating learning experiences will be better able to attract the attention of students and parents [3]. In addition, educational institutions must realize the importance of building an identity and characteristics that distinguish them from other schools. This includes developing superior programs, adequate facilities, and a positive and supportive learning environment. By creating clear added value, schools can build a positive reputation and increase their appeal in the eyes of the public.

Schools with strong characteristics, whether in academics, arts, sports, or specific skills, will find it easier to attract students with interests and talents per the program.

On the other hand, underqualified educational institutions often struggle to survive and eventually face elimination [4]. Society will abandon them because they lack the competitiveness necessary to thrive in the increasingly competitive education market. In this context, schools need to conduct regular evaluations and improvements to ensure that they remain relevant and can meet the expectations of students and parents. Therefore, it is crucial to develop sustainable education quality so that educational institutions can significantly contribute to producing superior future generations prepared to face global challenges [5].

An educational institution tries to keep up with all societal changes and demands. However, each educational institution has different abilities to adapt to the changes and desires of society. Variations in these abilities affect how educational institutions provide learning services to students. For example, some educational institutions enthusiastically support using technology to enhance the learning experience, while others still have difficulty adapting to technological advances. With the world constantly changing, students must always be ready to adapt to changes that occur every day. In this context, the head of the educational unit becomes very important. All school members expect the principal to motivate them to implement a curriculum that adapts and responds to current needs and developments. By optimizing the independent curriculum policy, the principal can create a more flexible and innovative learning environment [6]. This includes integrating technology into learning and developing teaching methods to attract student interest and answer current educational challenges. As a leader, the principal must be a proactive and visionary driver of change when facing educational challenges. The principal is responsible for the progress of the educational institution he leads. The principal can create a positive educational atmosphere by leading a team of qualified teachers and having superior human resources. Good cooperation between the principal and teachers will produce students who excel in academics, social skills, and character. Thus, efforts to improve an institution's education quality depend not only on the policies implemented but also on inspiring and collaborative leadership in creating a better student future [7].

The principal's leadership style significantly influences the school progress factor and substantially contributes to the development of educational institutions. The principal acts as a manager and a leader who can inspire and motivate all school residents to achieve better educational goals. Therefore, principals and teachers must work together and support each other in creating a conducive and innovative learning environment. However, achieving these goals requires effective leadership from principals and teachers. Particularly in the 21st century, science and technology are advancing swiftly. Principals and teachers must continue to improve their quality, both in terms of knowledge, skills, and attitudes, for the progress of education in the future. This includes mastery of educational technology, innovative teaching methods, and the ability to adapt to changes in the academic environment. Thus, investment in educators' self-development will increase education quality for future generations [8].

Principals who are movers have a crucial role in modern education. They are required to adapt quickly to new and dynamic environments. In the face of various changes, principals who are movers must remain vigilant and understand the characteristics of the human resources (HR) around them, which serve as the primary supporters in achieving their leadership vision and mission. Recognizing and utilizing HR potential is crucial for effective collaboration toward educational goals. In addition, principals who are movers must have a dynamic spirit and be open to change. They must seize opportunities to improve the school's quality [9]. This includes establishing close cooperation with the school committee and various stakeholders, such as the business and industry world, the Regional Leadership Conference, religious organizations, and other community organizations. This cooperation broadens the network and provides additional resources for school development. Through collaboration with various parties, principals who are movers can create innovative programs that support improving the quality of education. For instance, they can involve the business world in student internship programs or organize educational seminars with community organizations to enhance public awareness and participation in education. With an inclusive and collaborative approach, the driving principal can maximize the school's potential and create a better learning environment for students [10].

As a leader, the driving principal is expected to be the locomotive of change in the school where they work. A decisive leadership role greatly determines the school's quality and characteristics. In other words, the success of a school in achieving quality education goals depends significantly on the principal's leadership. Therefore, the driving principle must demonstrate an inspiring and innovative attitude and build a clear vision for the school's future. The driving principal must be a role model for educators, education personnel, and students [11]. The principal's exemplary behavior will establish authority and foster a sense of admiration, respect, and appreciation among all school members and the surrounding community. The attitude of integrity, discipline, and dedication shown by the principal will be a role model for all school members, thus creating a positive and productive learning environment. Being a good role model, the driving principle builds self-confidence in students and motivates teachers and education personnel to give their best in the learning process. All school members will be more committed to supporting the changes and innovations needed to improve the quality of education when they perceive the principal as someone they can trust and respect. This all contributes to creating schools that excel and can compete in an increasingly competitive era of education [12].

A principal's role in education extends beyond school administration, acting as a catalyst for change and introducing innovation into the learning process. One increasingly relevant innovation is the implementation of the Merdeka Curriculum, which emphasizes contextual, appropriate, and personal learning for each student. The Merdeka Curriculum aims to provide a learning experience that aligns with each student's needs, interests, and abilities to develop their potential optimally. This approach aims to equip students with academic knowledge and essential social, emotional, and life skills for their future. In addition, the Merdeka Curriculum also seeks to create an inclusive, supportive, and adaptive learning environment that can accommodate the diversity of students and provide opportunities for each individual to develop holistically. This is very important, especially considering that each student has a different background, experience, and way of learning [13]. By paying attention to this diversity, schools can create a more positive and productive atmosphere where all students feel valued and motivated to participate in learning activities. However, in implementing the Merdeka Curriculum, significant challenges arise regarding proper management and implementation, especially at the kindergarten or early childhood education level. At this level, the principal must overcome various obstacles, such as limited resources, training for teachers, and the need to adjust learning methods appropriate to early childhood characteristics. Therefore, the principal needs to play an active role in providing the support and resources needed to ensure that the implementation of the Merdeka Curriculum can run effectively and provide maximum benefits for all students [14].

TK Islam Terpadu Tunas Mulia is one of the first generations of pioneering schools to implement the Merdeka Curriculum. Pioneering schools have an essential role in supporting the vision of education in Indonesia, namely realizing an advanced, sovereign, independent, and personality-based Indonesia and creating Pancasila. In this context, the school concentrates on academic aspects and emphasizes student character formation through holistic development-oriented activities. The driving school designs activities to enhance students'

overall learning outcomes, including literacy and numeracy competencies, while instilling good character values. To achieve this goal, it is essential to have superior human resources (HR), especially from among the principals and teachers. Principals who have a strong vision and leadership will be able to encourage innovation in teaching and create a conducive learning environment. Likewise, skilled and committed teachers will actively implement the Merdeka Curriculum to give students relevant and valuable learning experiences. The Merdeka Curriculum aims to establish a robust educational foundation for children, fostering knowledge acquisition and the development of attitudes and characters that align with the values of Pancasila. Hopefully, this approach will help students develop into academically intelligent individuals with a social soul and good adaptability to face future challenges.

Initial observation results indicate that implementing the Merdeka Curriculum in one of the first batches of schools is confronted with various challenges. One of the main challenges is the limited competence of teachers in adapting and implementing the curriculum effectively. Many teachers still need training and professional development to understand the basic concepts and principles of the Merdeka Curriculum and implement learning strategies that are appropriate to students' needs [15]. Despite the Merdeka Curriculum's emphasis on differentiated learning, which caters to each student's unique characteristics and needs, its full implementation remains elusive. This is due to the lack of adequate resources, knowledge, or support for teachers to apply different learning methods according to the objectives of the curriculum.

On the other hand, in today's digital era, using information technology in learning is essential [16]. However, observations reveal that the utilization of IT in the learning process remains suboptimal, potentially impeding students' access to diverse learning resources that can enhance their learning quality and equip them to navigate the challenges of an increasingly technological world [17]. Therefore, we need to implement appropriate strategies and interventions to enhance teacher skills, facilitate differentiated learning, and optimize the use of information technology in the Merdeka Curriculum.

In this context, artificial intelligence (AI) technology offers great potential to increase the effectiveness and efficiency of the learning process. The application of AI in early childhood education in schools requires strong and proactive leadership from a driving principle [18]. The principal acts as an administrator and a leader who can encourage the effective use of AI technology to support the implementation of the Merdeka Curriculum. With a deep understanding of the potential of AI, the principal can facilitate training for teachers in utilizing AI-based tools and applications to support more interactive and personalized learning. In addition, the principal also needs to create an environment that promotes innovation and collaboration so that teachers feel motivated to explore the use of technology in everyday learning. Through a visionary and adaptive leadership approach, the driving principle can ensure that the application of AI is not just a trend but becomes an integral part of an educational strategy that focuses on developing student potential holistically [19]. The goal of this study, which relates to the implementation of the independent curriculum in driving schools, is to identify and gather information about the principal's role in the Merdeka Curriculum's implementation to explain and provide an overview of this process. In this complex context, the leadership and management role of the driving school principal becomes crucial. The principal must understand the potential of AI technology, identify the needs of schools and students, and direct the optimal use of AI technology to achieve the desired educational goals [20]. Therefore, further exploration of the driving school principal's leadership and management role in implementing the Merdeka Curriculum through AI in schools is crucial and urgent. Principals and other education stakeholders need to comprehend the principal's vital role in integrating AI technology with the Merdeka Curriculum and how effective leadership can impact the success of implementing AI technology in early childhood education.

## 2. Research Method

This study employs a qualitative approach to investigate how the leadership and management of principals drive the implementation of the Merdeka Curriculum through the use of artificial intelligence (AI) technology. This study focuses on understanding how principals and their management teams implement this new curriculum and integrate technology into the learning process. With a qualitative approach, researchers hope to gain in-depth information about school dynamics, challenges, and strategies implemented to improve learning effectiveness. TK IT Tunas Mulia conducted the study for three months, from June to August 2024. The research subjects comprised 14 respondents, including one principal, three vice principals, five teachers, two school committee members, and three students. We conducted interviews to gather perspectives from various parties involved in the learning process and school management and to obtain comprehensive information about implementing the Merdeka Curriculum with the help of AI. In this context, multiple voices are needed for a holistic analysis. Researchers acted as the main instrument to collect data by going directly to the field. Data collection techniques included participant observation, in-depth interviews, and document analysis. Data reduction, data presentation, and drawing conclusions or verification. While data reduction focuses on filtering and organizing information, data presentation employs matrices and charts to enhance comprehension. Finally, the conclusion involves triangulation to ensure the validity of the data obtained.

## 3. Result And Discussions

### 3.1. Principal as Manager and Leader

The principal acts as a manager and leader in educational management. As a manager, the principal has more responsibility for the technical aspects of classroom management and school operational arrangements. The principal's primary duties are planning learning activities, organizing available resources, directing educators and students, and controlling the learning process to ensure it aligns with set goals. In carrying out his role, the principal needs to ensure that all components in the school, including the curriculum, facilities, and educators, function synergistically to achieve optimal results in education. As a leader, the principal not only focuses on technical aspects but must also be able to provide inspiration and motivation to teaching staff and students. This involves creating a positive school culture, developing a clear vision, and implementing strategies that support innovation in the teaching and learning process. Thus, the principal plays a crucial role in creating a conducive learning environment, supporting student character development, and improving the overall quality of education. Combining practical managerial and leadership skills will impact school progress and student success.

The principal has significant duties and responsibilities in his role as a manager. First, in terms of planning, the principal is responsible for preparing an educational program that includes the curriculum, extracurricular activities, and human resources and infrastructure needs. Organizing is also an essential part of the principal's duties, which include building the school's organizational structure, delegating tasks to staff, and arranging coordination between departments to ensure that all aspects of the school run smoothly. In addition, the principal

must exercise control by evaluating school performance, providing feedback to staff and students, and making necessary improvements to achieve school goals effectively. As a leader, the principal must not only carry out managerial duties but also inspire and motivate all parties in the school. One of his primary responsibilities is establishing a clear and inspiring school vision and mission. All school members can find direction and purpose in a strong vision, while a clear mission guides the necessary steps to realize the vision. In this case, the principal must effectively motivate staff and students to give their best in every educational activity. In addition, the principal must be a role model for all school members by demonstrating the expected attitudes and behaviors.

Effective communication is also vital in leadership, so the principal must build positive relationships with all stakeholders, including teachers, students, parents, and the community. Additionally, in complex situations, the principal must be able to make quick and correct decisions, enabling them to overcome challenges and seize existing opportunities for the school's advancement. By carrying out these two roles in a balanced manner, the principal can create a better educational environment and support optimal student development. The principal is a supervisor and leader who encourages school change and innovation. As a supervisor, the principal must possess the necessary skills to create a learning supervision program and enhance the outcomes of previous supervision. This learning supervision aims to motivate educators and staff to improve and strengthen the atmosphere of learning activities. This entails offering stimulation, coordination, and guidance to ensure the efficient and effective achievement of learning objectives. The primary function of the principal as a supervisor in an educational institution is to develop the competence and skills of teachers and staff. In this context, the principal is responsible for ensuring that teachers receive the support and training needed to improve the quality of their teaching. Through adequate supervision, the principal can help teachers identify strengths and areas that need improvement so that they can design appropriate strategies for their professional development. The principal's duties in the field of supervision have a significant role in improving teacher professionalism adaptively. By doing good supervision, the principal helps teachers enhance their skills and knowledge and creates a better learning environment for students. Therefore, the principal must consistently commit to effectively performing this supervisory role, enabling the school to realize its vision and mission and achieve optimal learning outcomes.

The principal's supervisory function is crucial in improving school education and teaching quality. First, the principal provides guidance to teachers so that they can understand the problems and needs of students well and help them overcome issues that arise. In addition, the principal assists teachers in dealing with difficulties in teaching so that the learning process can run more smoothly. Second, the principal is responsible for guiding new teachers through the orientation process so that they can adapt to the school environment and carry out their duties well. Furthermore, the principal assists teachers in enhancing their teaching abilities by introducing diverse teaching methods that align with the curriculum. This function is expected to enrich students' learning experiences and create a pleasant learning atmosphere.

Furthermore, the principal also plays a role in helping educators understand the use of service tools in the teaching and learning process. In addition, the principal provides moral guidance to staff, fostering high morale in carrying out their duties. In carrying out his duties, the principal must demonstrate an attitude as an effective and democratic leader, creating a safe and accessible environment for teachers to develop their potential and creativity with full responsibility. Thus, as a supervisor and leader, the principal plays a crucial role in driving change and innovation in his school. To carry out his duties as a principal, a leader must have the necessary education and experience. An effective leader can learn from past mistakes or experiences, strive to improve, and provide opportunities for staff and teachers to develop. According to Basit, A principal with a vision, skills, and commitment to quality improvement leads an advanced school. As a learning activity, education encompasses acquiring knowledge, skills, and habits through guidance and direction, guiding individuals toward a better life, and setting educational goals that align with their aspirations. The essence of learning lies in how students interpret each learning process they experience so that the experience aligns with their lives. Thus, the principal must play an active role in creating a learning environment that supports students in exploring, understanding, and applying knowledge in the context of their natural lives.

Careful planning in implementing the teaching and learning process can achieve learning objectives efficiently and effectively. The curriculum serves as the primary reference for learning planning. Therefore, educational units need to form a Curriculum Development Team, which has the critical task of designing a curriculum according to the academic needs of each institution. The team usually consists of the principal, the vice principal in charge of the curriculum, curriculum staff, teachers, and other members assigned by the principal. This team's existence is crucial to effectively implementing every aspect of the curriculum in the learning process. The implementation of Independent Learning initiated a transformation in Indonesian education, improving education quality. Circular Letter (SE) No. 1 of 2020 concerning the Independent Learning Policy emphasizes the importance of flexibility in determining student graduation and accepting new students in the 2020/2021 academic year. This concept allows educational units to adjust learning methods and materials to student characteristics to make learning more relevant and contextual. The Merdeka Curriculum supports a learning process that is more aligned with students' needs and potential. This approach expects teachers to adapt teaching methods and materials more efficiently, enabling students to understand and master the expected competencies. This learning process that focuses on student needs increases interest and motivation to learn and encourages students to participate to actively make their learning experience more meaningful.

Government Regulation No. 57 of 2021, specifically Article 38 Paragraph 2, mandates that school curriculum development adheres to the diversification principle, tailoring it to educational units, regional capabilities, and student characteristics. This underscores each educational unit's unique context and needs, necessitating a curriculum that reflects these differences. It hopes this approach will make the developed curriculum more relevant and effective in meeting students' learning needs. We need to consider educational units' readiness when making curriculum development changes. It is crucial to prevent educational unit managers from feeling overwhelmed or under pressure from new policies related to autonomous learning. This readiness includes various aspects, such as infrastructure, human resources, and understanding of implemented policies. Thus, educational unit managers can implement these changes with more confidence and planning. It hopes that each educational unit can design learning programs that suit the conditions and characteristics of students in their area by adopting the principle of diversification in curriculum development. This will not only improve the quality of learning but also create an environment that supports a more inclusive learning process and is responsive to the needs of each student. Sustainable and targeted changes in curriculum development will support national education goals and improve overall student learning outcomes. The national education system explains that educational units' diversity informs curriculum development. This provides a broad opportunity for schools to design and plan the learning process effectively. Thus, the principal and curriculum development team possess the authority to craft a curriculum that aligns with their school's expertise and specific needs. This development is essential so that the curriculum can be relevant and responsive to the educational context in each educational unit. An educator cannot defer their responsibility to educate students. Young people must be ready for changes caused by science, technology (IPTEK), and globalization. Therefore, it is essential for educators to deeply understand the needs and challenges students face in this ever-changing context. The birth of this curriculum was a response to the need for a more adaptive one. Each school can implement this curriculum according to its expertise, and it includes a

reflection mechanism that enables teachers and principals to evaluate and improve the learning process continuously. Thus, the curriculum emphasizes academic achievement and the development of student character and skills to compete in the global era.

## 3.2. The Role of Principal Leadership Management as a Driving Force in Implementing the Independent Curriculum Using AI

Sudarmono Danim defines the principal as a teacher who takes on additional responsibilities to lead an educational institution. This shows that the principal does not only function as a teacher but also has broader responsibilities in managing and leading a school. Daryanto underscored that the principal, or madrasah, serves as a leader in the educational context and is responsible for guiding and inspiring various stakeholders within the institution. These experts' opinions suggest that the principal serves a dual role. The principal fulfills his role as a teacher and guides and motivates teachers, staff, and students. This task includes resource management, curriculum development, and the creation of a conducive learning environment. Thus, the principal plays a crucial role in ensuring that all elements within the educational institution contribute to achieving the set goals. In carrying out his duties, the principal must establish excellent communication with all related parties and create effective collaboration between staff and students. With the right approach, the principal can build a positive school culture, support teacher professional development, and improve the overall quality of education. This, in turn, will contribute to achieving the desired educational goals in the institution he leads.

The principal is crucial in developing the Merdeka Curriculum, the first generation of driving schools. A primary goal of the principal is to ensure that all students understand the Merdeka Curriculum. This aims to create harmony in implementing the curriculum so that all school members, including teachers, staff, and students, can move in the same direction. In addition, the principal also strives to foster cooperation among school residents and collaborate with external parties, such as parents and the community, to support the implementation of the curriculum (Sudarmanto, 2021). However, despite its implementation, there remain disparities in educators' understanding of this curriculum. One aspect often in the spotlight is learning planning, including determining learning objectives, learning tools and techniques, and creating teaching modules. Lack of clarity in understanding these three elements can hinder the achievement of competencies that students should master. Therefore, the principal needs to ensure that all educators understand and can plan learning effectively. To achieve the expected competencies in learning outcomes, the principal must provide support and training to teachers in understanding and implementing the principles of the Merdeka Curriculum. This approach aims to enhance educators' readiness and proficiency in executing the curriculum, thereby enhancing student learning outcomes. The success of implementing this curriculum is highly dependent on the understanding and active involvement of all parties involved.

Based on the results of observations, several issues arose regarding the understanding and implementation of the curriculum, particularly the strengthening of the Pancasila Student Profile. One of the challenges we encounter is the suboptimal implementation of differentiated learning in the classroom. Each teacher's varied personalities and comprehension contribute to the weakening of the Pancasila Student Profile and the need for differentiated learning. This misalignment of understanding impacts the effectiveness of education and the achievement of curriculum objectives. The problem becomes more evident when the principal performs his supervisory duties to the predetermined schedule. In this role, the principal should be able to function as a coordinator who directs and assists teachers in understanding and implementing the curriculum properly. According to Olivia, a supervisor's primary responsibilities encompass various roles, including coordinator, consultant, group leader, and evaluator (Nadhirin, 2009). Therefore, the principal needs to take strategic steps to improve teachers' understanding of these two concepts so curriculum implementation can run more effectively. To overcome this problem, the principal needs to provide training and assistance to teachers so that they can better understand the concept of strengthening the Pancasila Student Profile and the implementation of differentiated learning. With the proper support, it is hoped that teachers will be better prepared and able to apply approaches based on student characteristics so that the learning process can occur more effectively and with quality.

Interviews with the principal, who develops the Merdeka Curriculum, revealed that school leaders actively participate in various activities to support this program. These efforts aim better to understand the characteristics and development of the curriculum. This school aims to achieve a more advanced and sovereign Indonesian education while also fostering the development of independent and individual students by forming Pancasila students. In collaboration with the curriculum development team, the principal engages in several strategic steps. Firstly, they convene a meeting to assess the vision and mission from the previous academic year, tailoring them to the institution's unique characteristics. This meeting aims to ensure that all parties have the same understanding of the direction and objectives of curriculum development. Second, we hold curriculum coordination and workshop activities to provide training and discuss various aspects of curriculum implementation.

Furthermore, school-level PMO (Program Management Office) activities function to coordinate and evaluate curriculum learning activities. This activity involves interaction between teachers and supervisors, which aims to assess the implementation of the curriculum and provide constructive input. The principal and his team aim to optimize curriculum implementation through this series of activities, thereby achieving more progressive and adaptive educational goals.

Researchers conducted interviews and found that the principal carried out numerous supporting activities to enhance understanding of the Merdeka Curriculum's implementation in schools. These activities include the formation of a curriculum development team for learning evaluation. This aligns with the responsibilities of the principal, who serves as a resource and must possess knowledge and understanding of various teaching-related issues. In addition, the principal also functions as a consultant who can help teachers apply better teaching methods and manage the learning process effectively. Different training and mentoring activities attended by the principal during the school program, such as workshops, in-house training (IHT), and coaching, have contributed significantly to the principal's understanding and skills in implementing the Merdeka curriculum. These activities allow educators to develop learning tools and modules that align with the guidelines. Thus, the principal acts as a leader and an active facilitator in supporting teachers and staff to develop the skills needed in the learning process. The involvement of principals in these programs demonstrates their commitment to creating a learning environment that is adaptive and responsive to students' needs. By equipping teachers with the necessary knowledge and tools, principals contribute significantly to the success of curriculum implementation in schools. This is important to ensure students gain meaningful and up-to-date learning experiences.

Interviews with class teachers revealed that they struggled to understand the implementation of the Pancasila Student Strengthening Profile (P5) and the creation of project modules. The absence of literature or instructions on both topics contributed to this lack of understanding. The researcher realized that this situation reflects that the Merdeka Curriculum device is still in its early stages of implementation, given that this is the first batch of the curriculum being implemented. This situation demonstrates that despite the initiative to introduce the

curriculum, many teachers still struggle to understand and implement its new elements fully. This can also be seen in the many changes and improvements needed to the device related to learning planning and implementation. With the need for better guidance, principals and curriculum development teams need to provide more intensive support to teachers through training, workshops, or adequate resources. The importance of understanding P5 and the creation of project modules affects the quality of learning and the development of student character as the nation's next generation. Therefore, prioritizing efforts to enhance teacher understanding in curriculum implementation is crucial to effectively achieve the expected educational goals. Support from schools and the government in providing sufficient training materials and information sources will significantly assist teachers in carrying out their duties more effectively and efficiently. Based on school problems related to implementing the Merdeka Curriculum, the principal took proactive steps by carrying out his role as a motivator and pioneer of renewal. This attitude reflects his commitment to never being satisfied with the existing situation and to continue encouraging improvements in the learning process. We expect this effort to foster an environment that enables teachers to innovate and enhance their teaching methods. The principal took an exciting step by inviting competent speakers to conduct a training session. This activity aims to provide deeper insight and knowledge regarding implementing the Merdeka curriculum, including important aspects such as the formulation of learning objectives and assessment tools and the creation of teaching modules. By presenting speakers, the principal tries to provide clear guidance to teachers so that they can understand and implement this curriculum effectively. In addition, the principal also holds regular discussions that focus on problems related to curriculum implementation. This discussion is a forum for teachers to share experiences, challenges, and solutions in dealing with various issues that arise in the formulation and creation of teaching modules. Through collaboration and open communication, it is hoped that teachers can support and inspire each other to improve the quality of classroom learning. This is all part of a collective effort to ensure that the desired educational goals can be adequately achieved.

With the various obstacles faced and the multiple efforts made by the principal, it is essential to realize that the success of implementing the curriculum in the current era is highly dependent on technology. Technology can simplify program management for principals, particularly in establishing driving schools that lead the way in progress compared to other educational institutions. The role of the driving principle is crucial in the success of implementing the curriculum, especially when combined with technology, including artificial intelligence (AI) technology. Teachers can use AI technology to analyze learning data, provide real-time feedback, and assist in designing more personalized and adaptive learning experiences for students. Thus, principals can utilize this technology to increase efficiency and effectiveness in managing learning in schools.

Furthermore, technology can enhance communication and collaboration among principals, teachers, students, and parents. Principals can easily share information through digital platforms, hold virtual meetings, and conduct online teacher training. All of this will create a more dynamic and responsive learning environment, which ultimately supports the implementation of the curriculum more optimally. Thus, integrating technology in education is a tool and a key to advancing education in Indonesia and making the driving school an inspiring example for other educational institutions. Principals are critical in leveraging artificial intelligence (AI) technology to support early childhood learning. First, they need to develop a clear vision by defining the school's long-term goals in leveraging AI and formulating a mission that sets out concrete steps to integrate AI into daily learning activities. Next, as change leaders, principals must be role models who demonstrate a spirit of innovation and adaptation to change by actively engaging in the AI learning process. They are also responsible for building a culture of innovation, encouraging teachers and staff to continue learning and developing themselves by utilizing AI technology. In addition, principals function as learning facilitators by organizing training for teachers to improve their competency in using AI and ensuring the availability of adequate hardware, software, and internet access.

On the other hand, collaboration with experts in AI, early childhood education, and technology is essential so that principals can build networks to gain support and input. They must also involve parents by establishing effective communication to encourage participation in their children's AI learning process. Finally, principals must set up success indicators to gauge the effectiveness of utilizing AI to enhance children's learning. They must also regularly conduct evaluations to pinpoint areas that require improvement and implement necessary changes. By carrying out these roles, principals can create a learning environment that is innovative and responsive to students' needs.

Artificial intelligence (AI) can provide many benefits when implementing the Merdeka Curriculum. One of the main benefits is personalized learning, where AI can adjust learning materials to the interests and abilities of each child. This allows each child to learn according to their pace and learning style. Additionally, AI can enhance interactivity in learning, fostering a more captivating and pleasurable learning experience through educational games and simulations that capture children's interest. With data analysis capabilities, AI can analyze learning outcomes to identify children's strengths and weaknesses so that teachers can provide more appropriate and targeted support. AI can also help automate administrative tasks, such as assessments and reporting, allowing teachers to focus more on direct interaction with children and developing the learning process. Examples of AI applications include virtual assistants that can answer children's questions, provide explanations about learning materials, or even tell stories. These virtual assistants can help create a more interactive learning environment. Additionally, by recognizing a child's face and tailoring learning content to their profile, facial recognition software ensures a more relevant and personalized learning experience. With these applications, AI can potentially improve the quality of education and the learning experience.

## 4. Conclusion

A principal plays a very active role in developing the Merdeka Curriculum. A principal is a leader and a manager within his school institution. The duties and responsibilities of the principal as a manager are as follows: Planning involves preparing educational programs, curriculum, and extracurricular activities, as well as addressing human resource needs and infrastructure. Organizing: building a school organizational structure, delegating tasks, and managing coordination between sections; directing: providing instructions and directions to staff and students to work by school goals; controlling: evaluating school performance, providing feedback, and making improvements if necessary. If the principal encounters challenges when implementing the Merdeka Curriculum, they promptly resolve them and seek solutions by engaging in various external trainings, including those related to technology. With strong leadership and a clear vision, the principal can create an innovative learning environment and empower children to achieve their best potential. The principal's efforts in implementing the Merdeka Curriculum have an impact on change or progress in the implementation of the Merdeka Curriculum. This demonstrates that the principal's actions serve as a guide for implementing the Merdeka Curriculum. The role of the driving principle is crucial in ensuring the success of implementing the Merdeka Curriculum using AI. Using AI technology in teaching is essential for implementing the independent learning curriculum as a digital medium, as it enhances the learning experience and makes learning more engaging and enjoyable.

## References

[1] Andriani, W. (2022). The Importance of Curriculum Reform and Its Problems. *ULM Journal*, 5(1), 1-12. https://doi.org/10.35542/Osf.lo/Rkjsg

[2] Depdiknas. (2003). Undang- undang RI No.20 tahun 2003 tentang Sistem Pendidikan Nasional. Diunduh dari https://pusdiklat.perpusnas.go.id

[3] Ideswal, I., Yahya, Y., & Alkadri, H. (2020). Contribution of School Climate and Principal Leadership to Elementary School Teacher Performance. *Jurnal Basicedu, 4*(2), 460–466. Https://Doi.Org/10.31004/Basicedu.V4i2.381

[4] Bousalis, R. (2022). Correlating the Perceptions of Preservice Elementary Teachers and Social Studies in the Elementary Curriculum. *Journal of Education*, *202*(4), 385-396. https://doi.org/10.1177/0022057421998324

[5] Ikhsandi, A., & Ramadan, B. (2021). Principal Leadership in Improving Elementary School Teacher Performance. *Journal Basicedu 5*(3):1312-1320. https://doi:10.31004/basicedu.v5i3.901

[6] Tannady, H., & Budi, I. S. K. (2023). The Influence of Organization Culture, Work Environment and Leadership On Performance of Fulltime Lecturer (Case Study of Private Higher Education Institution which Supported by Corporate). *Journal on Education*, *5*(4), 13020-13025.

[7] Yuni, D, F., Achmady, S., Apramilda, R., Aswadi, D., & Setiowati, R. (2024). Analysis of The Influence of Marketing Attributes Proper Identification, Brand Competitiveness and Digital Communication on Effectiveness of Local Fashion Brand Promotion in Global Market. *JSSIFOTEK*, *6*(2), 101–105. https://doi.org/10.60083/jsisfotek.v6i2.371

[8] Kadarsih, I., Marsidin, S., Sabandi, A., & Febriani, E. A. (2020). The Role and Duties of Principal Leadership in Elementary Schools. *Edukatif: Jurnal Ilmu Pendidikan, 2*(2), 194–201. https://doi.org/10.31004/Edukatif.V2i2.138

[9] Drost, B. R., & Levine, A. C. (2024). The Alternative Narrative: When Digital Learning Worked During the Pandemic. *Journal of Education*, *0*(0). https://doi.org/10.1177/00220574241249454

[10] Köse, Ö., & Kahveci, G. (2022). An Analysis of Relationship Between Schools' DNA Profiles and Organizational Happiness According to the Perception of Teachers. *Journal of Education*, *202*(4), 365-374. https://doi.org/10.1177/0022057421996256

[11] Feliciano, C. J. O., & Dy, M. F. R. (2022). Comparative Analysis of the Knowledge, Attitude, and Practice of First to Third Grade Teachers of Private and Public Schools Toward Free Play. Journal of Education, 202(4), 375-384. https://doi.org/10.1177/0022057421996241

[12] Kantor, S. A., Agama, K., & Jember, K. (2020). Supervision of Madrasah Principals Based on Performance Assessment as an Effort to Improve Teacher Professionalism. JIEMAN, 2(1). https://doi.org/10.35719/Jieman.V2i1.14

[13] Khairul, H. M. T. (2023). Children in the Utopia of Neoliberalism: A Critique of the Independent Curriculum Paradigm in PAUD. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*. https://doi.org/10.31004/obsesi.v7i4.4059

[14] Poniman, P., Sumadi, S., & Hariri, H. (2017). The Influence of Principal Leadership, Teachers' Emotional Intelligence and Spiritual Intelligence on Teacher Professionalism. *Jurnal Manajemen Mutu Pendidikan, 5*(1).

[15] Rahman, H. (2022). *Basic Concepts of Early Childhood Education*. Yogyakarta: Galah.

[16] Capper, K. (2022). Culturally Relevant Pedagogy in the English Curriculum. *Journal of Education*, *202*(4), 397-405. https://doi.org/10.1177/0022057421991856

[17] Sudarmanto. (2021). The Influence of Principal Communication on the Implementation of School Leadership in the School Mover Program. *Jurnal Ilmiah Pro Guru, 7*(4), 462–472. http://Journal2.Um.Ac.Id/Index.Php/Jipg/Article/View/2652

[18] Broza, O., Lifshitz, A., & Atzmon, S. (2022). Exploring a Model to Develop Critical Reflective Thought Among Elementary School Math Preservice Teachers. *Journal of Education*, *202*(4), 406-415. https://doi.org/10.1177/0022057421998336

[19] Yamin, M., & Syahrir, S. (2020). Development of Independent Learning Education (Review of Learning Methods). *Jurnal Ilmiah Mandala Education, 6*(1), 126–136. https://doi.org/10.36312/Jime.V6i1.1121

[20] Askhadullina, N. N., Vishnyakova, I. V., Aminova, G. A.-B., Safargaliev, E. R., & Hamatgaleeva, G. A. (2022). Formation of a Programmatic Management Mechanism for Risk Reduction in Educational Activity. *Journal of Education*, *202*(4), 436-445. https://doi.org/10.1177/0022057421998334