Readiness of Melawi Junior High Schools to Develop Graduate Profiles Through Coding and Ai

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ABSTRACT
Education plays a vital role in shaping Indonesia's future. In the digital era, integrating coding and artificial intelligence (AI) into learning is crucial to equip students with relevant competencies. Junior high schools are expected to develop graduate profiles capable of meeting digital challenges; however, their readiness to implement coding and AI learning effectively requires further investigation. This study aimed to describe the readiness of junior high schools in Melawi Regency in developing graduate profile dimensions through coding and AI learning using a quantitative descriptive method. The population consisted of 40 principals. Data were collected via a Google Forms questionnaire with a 1–4 Likert scale, covering competent teacher availability, learning facilities, curriculum implementation, students' readiness, and local government policy support. Data were analyzed using the Smart Education Readiness Index (SERI) Assessment Matrix. Results showed that competent teacher availability and capacity-building programs remain insufficient, with average scores of 1.65 and 1.63. Computer facilities, internet access, and supporting software were limited (1.83–2.35). Curriculum integration and coding/AI guideline implementation were suboptimal (2.45 and 2.58), though teacher and student support was relatively high (3.13). Students' readiness and interest were good (>2.85), yet advanced skill development progressed gradually. While local government support and school strategies showed progress, acceleration and consistency are still needed. In conclusion, school readiness is at an early stage, highlighting the need to strengthen teacher capacity, improve facilities, optimize curriculum, and establish sustainable policies to develop graduates who are adaptive and competent in the digital era.

Keywords: school readiness; coding; artificial intelligence; graduate profile dimensions; junior high school

INTRODUCTION

Education is the foundation of Indonesia's future. In the current digital era, Artificial Intelligence (AI) offers tremendous potential to revolutionize the way we learn and teach. For students at the Junior High School (SMP) level, the integration of AI-driven innovation in the learning process can create a more personalized, interactive, and effective educational experience. The subject of Coding and Artificial Intelligence (KKA) not only introduces students to AI, but also demonstrates how AI itself can become a powerful tool for enhancing their learning process.

The implementation of coding and AI has been proven to support learning that is more interactive, personalized, and effective. Students who learn coding and AI

receive rapid feedback, virtual tutoring support, and learning materials tailored to their individual needs. This makes the learning process more engaging and helps students gain a deeper and more critical understanding of concepts rather than relying on memorization.

The current condition of Junior High School students in Melawi Regency in developing graduate profile dimensions based on coding and artificial intelligence (AI) reveals region-specific challenges and opportunities. Based on recent studies and literature, the findings can be outlined as follows:

1. Many Junior High School students in Melawi still face limited access to technological devices and the internet, particularly in remote and rural subdistricts. This limitation hinders the implementation of digital-based learning and the optimal introduction of AI and coding.
2. The 2024 National Digital Literacy Survey shows that students in West Kalimantan, including Melawi, possess digital literacy levels below the national average. They tend to be capable only of operating basic devices (smartphones, WhatsApp) and are not yet familiar with basic programming or simple AI applications.
3. A study by Ardansirodjuddin (2025) concluded that there remains a significant gap between the required mastery of coding and AI in the curriculum and students' actual abilities. The majority of students have not had experience learning coding, and only a small proportion have received training through extracurricular programs or government-supported initiatives

Referring to the current condition of Junior High School students in Melawi Regency, coding and artificial intelligence (AI) education has now become an urgent necessity within educational institutions, as schools must prepare students to face the challenges of the digital world and future technological advancements. Through coding and AI, students are expected to develop logical, creative, analytical, and collaborative thinking skills that are highly essential across various modern professional fields. In addition, AI provides personalization and interactivity in the learning process, enabling students to learn at their own pace and style while receiving immediate feedback for improvement.

However, the development of coding and AI within educational institutions faces several weaknesses, including a strong reliance on adequate technological infrastructure, the availability of competent teachers, and the need for continuous training and curriculum updates. In schools located in areas with limited infrastructure and human resource capacity, the implementation of such programs may struggle to develop optimally.

If educational institutions do not adopt coding and AI learning, the consequences may include students falling further behind in digital literacy, workforce competitiveness, and future technological innovation capabilities.

Educational disparities between regions will widen, and graduates will be less prepared to meet the demands of industry and the rapidly evolving digital society.

Therefore, the purpose of this study is to describe the readiness of Junior High Schools (SMP) in Melawi Regency in developing graduate profile dimensions through learning in coding and artificial intelligence, assessed through the aspects of the Availability of Competent KKA Teachers, Learning Facilities and Infrastructure, Implementation of the KKA Curriculum, Student Readiness and Understanding, and Support from Local Government Policies.

Theoretically, the readiness of educational institutions in developing graduate profile dimensions through coding and artificial intelligence (AI) learning is strongly influenced by national policies such as the *Merdeka Curriculum*, which encourages the integration of new skills into primary and secondary education curricula. Literature reviews indicate that school readiness must be evaluated based on at least three key components: digital infrastructure, the competence of human resources (teachers and educational personnel), and the integration of a digitally oriented curriculum.

trengthening the capacity of educational institutions, such as through training based on Technological Pedagogical Content Knowledge (TPACK), is a critical requirement to enable teachers to translate coding and AI material into learning practices that align with students' characteristics. Educational institutions are also required to provide affordable and adequate infrastructure, ensure stable internet connectivity, and secure the availability of devices and software to support the learning process. Institutional readiness is not solely a technical matter, but also involves fostering ethical values, creativity, independence, and collaborative skills through technology-based learning experiences.

Several studies emphasize that the greatest challenge faced by educational institutions is the varying levels of readiness among schools, particularly in regions with limited facilities and human resources. Therefore, policy operationalization, cross-sector partnerships, and continuous monitoring and evaluation are essential to ensure equal access and support for all schools. Educational institutions capable of building a digital ecosystem, providing continuous teacher training, and cultivating innovation skills through coding and AI are well positioned to shape graduate profiles that are prepared to meet global demands and the dynamic needs of future industries.

METHOD

This study employed a quantitative descriptive method to describe the readiness of Junior High Schools (SMP) in Melawi Regency in developing graduate profile dimensions through learning in coding and artificial intelligence. Data were collected by distributing a Google Form link to school principals as the primary data collection instrument. This method focuses on numerical data that can be analyzed

through statistical calculations to obtain more objective and measurable results (Sugiyono, 2010).

The population in this study consisted of 40 Junior High School principals in Melawi Regency. The sampling technique used was saturated sampling, whereby all members of the population were included as research respondents. The research instrument was developed independently with reference to existing instruments in the form of questionnaires containing items related to the Availability of Competent KKA Teachers, Learning Facilities and Infrastructure, Implementation of the KKA Curriculum, Student Readiness and Understanding, and Support from Local Government Policies.

Data analysis was carried out using the Smart Education Readiness Index (SERI) Assessment Matrix as the analytical framework, along with an evaluation matrix consisting of three main components: process, technology, and organization. The analysis was conducted to obtain the average percentage of each instrument item in order to address the research objectives and questions, with the final outcome being the mapping of educational institution readiness levels based on established criteria.

RESULTS

The Smart Education Readiness Index (SERI) Assessment Matrix was used as the foundational analytical framework, consisting of three main blocks, five pillars, and fifteen dimensions. The identification results provide information on several areas requiring special attention to enhance the readiness of Junior High Schools (SMP) in Melawi Regency in optimally developing graduate profile dimensions through learning in coding and artificial intelligence. Analysis of these dimensions enables educational institutions to focus more effectively on the most crucial aspects of the educational transformation process.

After identifying these dimensions, educational institutions can design more targeted and impactful strategies, such as strengthening teacher capacity and roles, improving infrastructure, and aligning the curriculum to ensure meaningful learning. Such focus makes the transformation process more effective in improving the quality of learning, allowing students to gain educational experiences that are more contextual, engaging, and in-depth, aligned with contemporary needs and future educational demands. Thus, educational institutions can better face technological challenges and achieve the intended educational goals.

The categories and interpretation of the average score for each questionnaire item based on a 1–4 scale are commonly used in educational research employing a 4-point Likert scale to facilitate result interpretation. According to studies and guidelines from the Indonesia University of Education (Universitas Pendidikan Indonesia, UPI), the criteria for interpreting scores on a 4-point Likert scale are as follows:

- 1 = 0% to 25% (Very Unready)
- 2 = 26% to 50% (Unready)
- 3 = 51% to 75% (Ready)
- 4 = 76% to 100% (Very Ready)

Table 1 Block Process – Pillar of Availability of Competent KKA Teachers

No.	Dimension	Respondent Response	Total (%)	Mean
I	Currently at the school, parents/guardians have teachers who have competence in coding and artificial intelligence (KKA)	Yes, sufficiently available	1 (2.5%)	1,65
		Available but the number is limited	24 (60%)	
		Not available at all	15 (37,5%)	
		Don't know / no answer	0 (%)	
II	The school has provided training for improving teacher competence in KKA	Yes, routinely	1 (2,5%)	1,63
		Rare/limited	23 (57,5%)	
		Not at all	16 (40%)	
		Don't know / no answer	0 (%)	

The analysis results, based on responses from school principals as respondents in Table 1, Block Process – Pillar of Availability of Competent KKA Teachers, yielded an average score of 1.65 (equivalent to 41.25%), falling into the "Unready" category. This indicates that the majority of educational institutions still face limitations in the availability of teachers competent in coding and artificial intelligence. Furthermore, for teacher competency improvement training in KKA, the average score of 1.63 (equivalent to 40.75%) also falls into the "Unready" category. Regular training for enhancing KKA teacher competencies is still conducted infrequently or only to a limited extent in most schools. Thus, regarding the pillar of availability of competent KKA teachers, Junior High Schools in Melawi Regency are generally not adequately prepared to develop graduate profiles through coding and artificial intelligence learning, particularly in terms of competent teacher availability and teacher competency improvement training. Serious attention is required to improve these two aspects so that the readiness of educational institutions in implementing KKA can be enhanced, thereby supporting the achievement of the intended graduate profile dimensions.

Table 2 Technology – Pillar of Learning Facilities and Infrastructure for KKA

No.	Dimension	Respondent Response	Total (%)	Mean
I	Availability of computer devices supporting KKA learning in schools	Very adequate	2 (5%)	2,30
		Adequate	11 (27,5%)	
		Inadequate	24 (60%)	
		Not available	3 (7,5%)	
II	Quality and stability of internet access in schools	Very good and stable	2 (5%)	2,35
		Quite stable	13 (32,5%)	
		Not stable	22 (55%)	

		No adequate internet access	3 (7,5%)	
III	Schools have software supporting KKA learning	Available, complete, and latest	0 (%)	1,83
		Available and complete	1 (2,5%)	
		Available but limited	31 (77,5%)	
		Not available at all	8 (20%)	

Based on the data in Table 2, Technology – Pillar of Learning Facilities and Infrastructure for KKA, obtained from responses of school principals, the results for each dimension are as follows:

1. Computer availability for KKA learning: 60% of schools rated the availability of computers as "inadequate," followed by 27.5% who considered it "moderately adequate." Only 5% rated it as "very adequate," and 7.5% considered it completely inadequate. With a mean score of 2.30, this condition indicates that computer availability is still quite limited and not yet optimal to support KKA learning. This aligns with common challenges in many Indonesian schools, where technological infrastructure limitations impact the effectiveness of technology-based learning.
2. Internet access: The majority of schools (55%) assessed internet access as "unstable," with a mean score of 2.35, indicating that internet stability remains a significant issue. Meanwhile, 32.5% considered it "moderately stable," and only 5% rated it as "very good and stable." Insufficient internet access hinders the use of KKA learning technology, especially when many learning activities require smooth connectivity.
3. Supportive learning software: The majority of schools (77.5%) reported that supportive software for KKA learning is "available but limited," while only 2.5% considered the software complete and fully available, and 20% reported having no such software at all. A mean score of 1.83 indicates low software availability, which has not yet reached an adequate standard to optimally support KKA learning. The availability of complete and up-to-date software is crucial to promoting interactive learning and technological mastery in schools.

These results indicate that the availability of technological facilities and infrastructure supporting KKA learning in schools, including those in Melawi Regency, still shows significant limitations in hardware (computers), internet access, and software. To improve the quality of KKA learning, strategic efforts and investment are needed in the provision of devices, enhancement of internet access, and development and provision of comprehensive, up-to-date learning software. Creative approaches, such as device rotation, utilization of online compilers, and management of internet access, can also serve as temporary solutions under current limitations.

Table 3 Organisation – Pillar of KKA Curriculum Implementation

No.	Dimension	Respondent Response	Total (%)	Mean
I	To what extent has the curriculum in your school adopted Coding and Artificial Intelligence learning integrated with graduate profile development	Already integrated and well applied	0 (%)	2.45
		Partially applied	19 (47,5%)	
		Not yet integrated	20 (50%)	
		Don't know	1 (2,5%)	
II	Schools have standard guidelines or learning modules that support coding and artificial intelligence teaching	Available and consistently used	0 (%)	2.58
		Available but not optimally used	23 (57,5%)	
		Not available at all	17 (42,5%)	
		Don’t know	0 (%)	
III	Teachers' and students' attitudes towards KKA learning	Very positive and supportive	8 (20%)	3.13
		Quite positive	29 (72,5%)	
		Less positive	3 (7,5%)	
		Not supportive	0 (%)	

Based on the data in Table 3, Organisation – Pillar of KKA Curriculum Implementation, the analysis results for each dimension, derived from responses of school principals, are as follows:

1. Integration of the KKA Curriculum with Graduate Profile Dimensions: 50% of schools indicated that the KKA curriculum has not yet been integrated, while 47.5% reported that partial integration has been implemented, and no school stated that full integration had been achieved. The average score of 2.45 indicates that curriculum integration falls within the "Unready" to "Partially Ready" category. This suggests that although efforts have been made, the implementation of KKA learning integration into the curriculum is still suboptimal and requires acceleration.
2. Availability and Utilization of Guidelines/Modules: 57.5% of schools possess guidelines or modules but have not utilized them optimally, and 42.5% have none at all. The average score of 2.58 reflects a similar condition, indicating that learning guidelines have not fully supported the effective implementation of KKA in schools.
3. Teachers’ and Students’ Responses to KKA Learning: Responses were largely positive, with 72.5% moderately positive and 20% very positive in supporting KKA learning. The average score of 3.13 demonstrates strong support from both

teachers and students, which serves as a crucial asset in developing KKA learning.

In summary, the implementation of the KKA curriculum in schools remains at an early stage, with curriculum integration and the utilization of learning guidelines still not fully optimized. However, strong support from teachers and students presents a valuable opportunity for accelerating and improving the integrated implementation of coding and artificial intelligence learning. Strategic steps are needed, such as enhancing curriculum dissemination, providing teacher training, and developing practical guidelines to make KKA integration more effective and sustainable. These findings are consistent with government policies and recommended approaches for implementing adaptive, needs-based KKA learning in Indonesian schools.

Table 4. Organisation – Pillar of Student Readiness and Understanding

No.	Dimension	Respondent Response	Total (%)	Mean
I	Student Readiness in Participating in KKA Learning (Coding and Artificial Intelligence)	Very ready and enthusiastic	2 (5%)	2.93
		Moderately ready	33 (82,5%)	
		Less ready	5 (12,5%)	
		Not ready at all	0 (%)	
II	Student Interest in Coding and Artificial Intelligence Learning	Very high and enthusiastic	6 (15%)	3.08
		Moderately high but needs more encouragement	31 (77,5%)	
		Less interested	3 (7,5%)	
		Not interested at all	0 (%)	
III	Students are able to develop graduate profile dimensions such as creativity, collaboration, and critical reasoning through KKA learning activities	Already well developed	0 (%)	2.85
		Beginning to develop gradually	34 (85%)	
		Less developed	6 (15%)	
		Not developed	0 (%)	

Based on the data in Table 4, Organisation – Pillar of Student Readiness and Understanding, the analysis derived from responses of school principals is as follows:

1. Student Readiness for KKA Learning: The majority of students (82.5%) were reported as moderately ready and enthusiastic, while 5% were very ready. The average score of 2.93 indicates that students fall into the category of moderately to very ready to participate in coding and artificial intelligence (KKA) learning.

This is a positive indication that students possess initial motivation and readiness that support the success of the learning process.

2. Student Interest in KKA Learning: Most students (77.5%) demonstrated moderately high interest but still require additional encouragement, with 15% showing very high and enthusiastic interest. The average score of 3.08 indicates that student interest in KKA learning is high, representing a strong asset for the further development of learning programs.
3. Development of Creativity, Collaboration, and Critical Thinking: Approximately 85% of students have begun to show gradual development in creativity, collaboration, and critical reasoning through KKA learning, with an average score of 2.85, which falls into the "beginning to develop" category. This suggests that although KKA learning has started to support the development of these essential skills, further efforts are needed to optimize their growth.

These results indicate that students in schools generally demonstrate good readiness and interest in KKA learning and are beginning to show positive development in skills that are part of the expected graduate profile, such as creativity and critical reasoning. To maximize learning outcomes, continuous support from schools and teachers is required in the form of innovative teaching methods, adequate facilities, and consistent motivation, so that students can optimally develop all dimensions of the graduate profile. This analysis aligns with KKA learning approaches based on experiential learning, problem-solving, and the development of 21st-century competencies, as recommended by current educational policies.

Table 5. Organisation – Pillar of Local Government Policy Support

No.	Dimension	Respondent Response	Total (%)	Mean
I	Does your school receive policy or program support from the local government regarding KKA learning	Receives full and continuous support	8 (20%)	2.95
		Receives limited and non-routine support	20 (60%)	
		Does not receive any support	6 (15%)	
		Don't know / No answer	2 (5%)	
II	The most needed support to accelerate the development of KKA competency in Junior High Schools (SMP)	Teacher training and mentorship	18 (45%)	1,85
		Improvement of facilities and infrastructure	20 (50%)	
		Curriculum development and mentorship	1 (2,5%)	
		Government policy and funding	1 (2,5%)	
III	Strategic steps taken by the school to strengthen graduate profile dimensions through KKA	Periodic increase in teacher capacity	16 (40%)	2.83
		Curriculum development and innovation	9 (22,5%)	

	learning	Provision and maintenance of technology infrastructure	7 (17,5%)	
		No significant strategic steps yet	8 (20%)	
IV	According to you as the school principal, which stage has your educational unit currently entered in developing graduate profile dimensions through KKA learning?	Not ready stage	9 (22,5%)	1,85
		Ready stage	29 (72,5%)	
		Proficient stage	1 (2,5%)	
		Advanced stage	1 (2,5%)	

Based on the responses of school principals as respondents in Table 5, Organisation – Pillar of Support from Local Government Policies, the results are as follows:

1. Support from Local Government Policies: 20% of schools reported receiving full and continuous support, 60% received limited and irregular support, and 15% received no support at all. The mean score of 2.95 indicates a relatively moderate level of support, ranging between limited and continuous. This suggests that while local government support exists, it is neither evenly distributed nor consistently provided across all schools.
2. Most Needed Support: The support most required by schools includes improvement of facilities and infrastructure (50%) and teacher training and mentoring (45%) as primary measures to accelerate the development of KKA competencies. This underscores the importance of adequate facilities and enhancing teacher capacity as key priorities.
3. Strategic Actions Taken: The most frequently implemented strategic actions are periodic teacher capacity building (40%) and curriculum development and innovation (22.5%). With a mean score of 2.83, this indicates that efforts are fairly intensive but have not yet been evenly applied or optimized across all schools.
4. Stage of Graduate Profile Development: The majority of schools (72.5%) have reached the "Ready" stage in developing KKA graduate profiles, while 22.5% remain at the "Not Ready" stage. The mean score of 1.85 indicates that most schools are still in the early to intermediate phases of graduate profile development.

In summary, although local government policy support for KKA learning exists, it is mostly limited and irregular. Schools require more concrete support in the form of teacher training and improved facilities to accelerate KKA competency development. Strategic efforts have been made, particularly in teacher capacity building and curriculum development, but further strengthening is needed to enable all schools to advance to the next stage of KKA graduate profile development. More synchronized and structured policy strategies and implementation are necessary to

ensure the readiness and sustainability of the KKA program in Junior High Schools in Melawi Regency, in line with national standards and the future needs of educational technology.

DISCUSSION

Based on the compilation of questionnaire data from 40 junior high school principals in Melawi Regency as respondents, presented in tables and analyzed, the discussion is as follows:

1. Table 1, Block Process – Pillar of Availability of Competent KKA Teachers: The average score was 1.65 (equivalent to 41.25%), falling into the "Unready" category. This indicates that the majority of schools still have limited availability of teachers competent in coding and artificial intelligence. KKA teacher training also had a low average score of 1.63 (40.75%), indicating that regular training is still infrequent and limited.
2. Table 2, Technology – Pillar of KKA Learning Facilities and Infrastructure:
   a. 60% of school principals assessed the availability of computers for KKA as "inadequate," with an average score of 2.30, indicating a "Quite Limited" category.
   b. 55% of principals reported internet access as "unstable," with a score of 2.35, highlighting a critical connectivity issue.
   c. 77.5% of principals reported that KKA learning support software is "available but limited," with a mean score of 1.83, indicating low and suboptimal software availability.
3. Table 3, Organisation – Pillar of KKA Curriculum Implementation:
   a. Integration of the KKA curriculum into graduate profiles is largely suboptimal, with a score of 2.45, falling in the "Unready to Partially Ready" category.
   b. Learning guidelines or modules are also not yet fully utilized, with a score of 2.58.
   c. However, teachers' and students' responses were quite positive and supportive (score 3.13), indicating a strong social capital.
4. Table 4, Organisation – Pillar of Student Readiness and Understanding:
   a. Students were generally moderately to very ready to participate in KKA learning (score 2.93).
   b. Student interest was high (score 3.06) but still required additional encouragement.
   c. Development of students' creativity, collaboration, and critical reasoning was gradually progressing (score 2.85).
   5. Table 5, Organisation – Pillar of Local Government Policy Support:
      a. Local government policy support was still limited and irregular (score 2.95).

b. The main support needed is improvement of facilities/infrastructure and teacher training.
c. Strategic actions taken by schools have focused on teacher capacity building and curriculum development (score 2.83).
d. The majority of schools are at the "Ready" stage in developing KKA graduate profiles (score 1.85).

Overall, the analysis indicates that the implementation of Coding and Artificial Intelligence (KKA) learning in junior high schools in Melawi Regency is still at an early to intermediate stage. Challenges remain in terms of teacher competency, training, facilities and infrastructure, and policy support, which need to be strengthened. However, student readiness and social support from teachers and students are quite positive, serving as valuable assets for accelerating KKA implementation. Efforts to enhance teacher capacity, provide adequate facilities, develop practical curriculum guidelines, and ensure more sustainable local government policies are key to supporting the development of graduate profiles that are adaptive to technological needs and the future in Melawi Regency.

A 2025 national literature review from the P4I Journal analyzed school readiness for implementing coding and AI learning models based on digital infrastructure, teacher competencies, and curriculum integration. The study found that limited devices and insufficient teacher training were the greatest challenges, while student motivation and regional policy support were crucial for program sustainability.

Other studies revealed that integrating coding and AI strengthens both technical and soft skills of students, but similar obstacles remain: infrastructure availability and teacher readiness are still uneven, particularly in remote areas. Recommendations from these studies include intensive teacher training, age-appropriate learning materials, and supportive policies and technology access. Research at SMP IT Al-Ghazali Palangka Raya also applied school principals' management readiness analysis as part of the organizational process in KKA implementation.

Overall, these studies generally recommend:

1. Sustainable policy support from local governments through educational funding and training programs.
2. Intensified teacher professional development to enhance digital and technopedagogical competencies, along with improved coding- and AI-based curricula and practical, systematic learning modules.
3. Enhanced access to technology and digital infrastructure to ensure more effective and equitable learning across all schools.
4. Innovative project- and problem-solving-based learning methods to support student motivation and readiness.

These studies demonstrate that the challenges and potentials faced by schools in Melawi are consistent with national trends, suggesting that the implementation of

improvement strategies can refer to recommendations from literature reviews and case studies in various regions of Indonesia.

CONCLUSION

The analysis of data from the three main pillars—process, technology, and organization—leads to the conclusion that the readiness of junior high schools in Melawi Regency to develop graduate profile dimensions through coding and artificial intelligence (KKA) learning remains at an early to intermediate stage. The availability of competent teachers and teacher capacity-building training is still very limited, and facilities and infrastructure, such as computers, internet access, and supporting software, face significant constraints. Integration of the KKA curriculum with graduate profile development is not yet optimal, and learning guidelines and modules are not fully utilized effectively. However, student interest and readiness are relatively good, and support from teachers and students provides positive social capital for advancing this learning. Local government policy support also needs to be strengthened and expanded to ensure consistency and sustainability in the implementation of KKA programs.

Recommendations include:

1. Local Government Support: The local government, in collaboration with the Melawi Regency Education and Culture Office, should enhance comprehensive and sustainable policy support, including funding and programs for teacher training, as well as provision of adequate technological facilities and infrastructure.
2. Teacher Capacity Building: Schools, particularly at the junior high school level in Melawi Regency, are expected to intensify teacher training and mentoring in KKA to significantly and sustainably improve teacher competencies.
3. Curriculum Improvement and Development: Systematic integration of KKA learning into the curriculum, along with the application of practical learning guidelines and modules, should be prioritized to ensure effective learning processes.
4. Technology and Infrastructure Access: Schools need to provide adequate technology access and digital infrastructure to enable effective KKA learning, allowing students to optimally develop 21st-century skills such as creativity, collaboration, and critical reasoning.
5. Student Motivation and Engagement: Innovative learning methods based on projects, hands-on experiences, and problem-solving should be employed to enhance students' motivation, interest, and readiness to learn.

Through these measures, the implementation of Coding and Artificial Intelligence learning in junior high schools in Melawi Regency is expected to become more optimal, supporting the development of graduate profiles that are excellent and adaptive to future challenges in the digital era and Industry 4.0.

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