Journal Evaluation in Education (JEE)
Vol. 7, No. 1, January 2026, pp. 150~161
ISSN: 2716-4160, DOI: 10.37251/jee.v7i1.2254

Research Article

Integrating Systematic and Adaptive Curriculum Implementation: A Comparative Model for Inclusive 21st-Century Education

Eva Puspitasari[1,*], Ninik Wijiningsih[1], Rudi Susilana[1], Riche Cynthia Johan[1]
[1] Department of Curriculum Development, Universitas Pendidikan Indonesia, Jawa Barat, Indonesia

Article Info

Article history:

Received Oct 30, 2025
Revised Dec 17, 2025
Accepted Jan 09, 2026
OnlineFirst Jan 26, 2026

Keywords:

Curriculum
Comparison
Development
Evaluation
Implementation
Recommendations

ABSTRACT

Purpose of the study: The purpose of this research is to compare various approaches in curriculum implementation and provide recommendations for further development.

Methodology: Using qualitative method with a descriptive approach of field research. The subjects were secondary school teachers, while the informants were school principals. Subjects and informants were selected using purposive sampling, based on relevance and direct involvement in curriculum implementation. The research instruments included interview guidelines and observation sheets. Data were collected through in-depth interviews and direct observations at the school. The data were analyzed using thematic analysis to identify key themes and patterns from the interviews and observations.

Main Findings: The findings of this study imply that curriculum development in the context of 21st-century education should not rely solely on rigid standardization or full flexibility, but rather on a strategic integration of systematic and adaptive approaches. Practically, schools are encouraged to strengthen curriculum management through structured planning, supervision, and the utilization of digital management systems such as MIS and LMS, while simultaneously providing pedagogical flexibility through differentiated and contextual learning that responds to students' diverse needs and learning styles. For policymakers and school leaders, these results highlight the importance of developing curriculum policies that support both institutional accountability and instructional adaptability, particularly in promoting inclusive education for students with special needs.

Novelty/Originality of this study: The novelty of this research lies in the comparison of two curriculum implementation approaches and the recommendation to integrate both to create a more effective, flexible, and contextual curriculum.

Corresponding Author:
Eva Puspitasari,
Department of Curriculum Development, Universitas Pendidikan Indonesia,
Jl. Dr. Setiabudi No.229, Isola, Kec. Sukasari, Kota Bandung, Jawa Barat, 40154, Indonesia
Email: epsh28@upi.edu

1. INTRODUCTION

The implementation of the curriculum in secondary schools often faces various complex challenges. Some of the main issues encountered include a lack of resources, insufficient teacher training, and misalignment between policy and practice in the field [1]. In addition, there are also issues related to the adaptation of the

curriculum to diverse local contexts, which are often not taken into account in the design of the national curriculum. Social facts show that the implementation of the curriculum is influenced not only by educational factors but also by economic and social conditions. For example, schools in less developed areas often face additional challenges such as poverty and lack of family support, which affect the effectiveness of curriculum implementation [2]. In addition, the COVID-19 pandemic has exacerbated educational inequalities, hindering efforts to implement an effective curriculum [3]. In addition, the curriculum can also support the level of religiosity, which is very beneficial [4], This is certainly a form of the importance of education, which cannot be separated from human life [5].

The success of curriculum implementation greatly depends on adequate support and training for teachers. Studies show that teachers who are involved in curriculum development and receive ongoing training are more capable of implementing the curriculum effectively [6]. In addition, adapting the curriculum to local needs and student characteristics is also important to achieve the desired outcomes [7]. Research on Classroom-Based Assessment (CBA) in Malaysian secondary schools shows that although teachers strive to align their practices with national curriculum policies, there are challenges in implementation due to an exam-focused culture, lack of professional development, and heavy administrative workload. Recommendations include ongoing training to improve assessment literacy and the use of digital tools to reduce administrative tasks [8]. The implementation of the science curriculum in Ethiopian secondary schools was found to be inadequate, with critical issues such as the availability of resources, stakeholder engagement, a conducive school environment, and a supportive external context. Recommendations are provided to improve the implementation of the science curriculum [1]. A study on the implementation of the English curriculum in secondary schools in Medellin, Colombia, shows that government initiatives are ineffective in supporting teachers due to the limited curriculum design and contextual as well as social factors that affect implementation [9].

Several studies indicate that there is a gap between curriculum policies and practices in the field. For example, in Malaysia and Taiwan, teachers face challenges in implementing government-established policies. The lack of adequate training and professional development for teachers is a major barrier to effective curriculum implementation. Research in Malaysia and Colombia emphasizes the importance of continuous training to improve assessment literacy and teaching methodology. Successful curriculum implementation requires active involvement from all stakeholders, including teachers, students, and school leaders. Studies in Ethiopia and Hong Kong show that insufficient stakeholder engagement can hinder implementation success. Research in various countries indicates that the curriculum needs to be adapted to the local context and student needs. For example, in Hong Kong, curriculum adaptation to address pedagogical challenges is very important. Research in Malaysia recommends the use of digital tools to reduce administrative burdens and improve the efficiency of curriculum implementation. Although numerous studies have been conducted, there remains a gap in understanding how various social, economic, and cultural factors influence curriculum implementation in different local contexts. Furthermore, there is a need for further research on effective strategies to overcome the challenges faced in curriculum implementation in secondary schools.

This study aims to compare various approaches to curriculum implementation and provide recommendations for further development. The main focus is to identify factors that influence the success of curriculum implementation and to develop strategies that can be applied to improve implementation effectiveness in various local contexts. Effective curriculum implementation is key to enhancing the quality of education in secondary schools. By understanding and addressing the various challenges faced, as well as adapting the curriculum to local needs, we can ensure that every student receives a quality education. This study will provide valuable insights for the development of better policies and practices in curriculum implementation in secondary schools.

2. RESEARCH METHOD

This study employed a qualitative research design with a descriptive field study approach aimed at exploring curriculum implementation practices in depth. The participants of this study consisted of teachers as the main research subjects and the school principal as the key informant. Participants were selected using purposive sampling, based on their direct involvement and experience in curriculum planning, implementation, and evaluation.Data were collected through in-depth interviews, non-participant observations, and document analysis related to curriculum planning, learning implementation, and assessment practices. The research instruments included semi-structured interview guidelines and observation checklists. These instruments were developed by the researcher and adapted from relevant literature and previous studies on curriculum implementation and instructional practices to ensure content relevance and validity. Data analysis was conducted using thematic analysis, involving data reduction, data display, and conclusion drawing. The analysis process included coding, categorizing, and identifying recurring themes and patterns emerging from the data obtained from interviews, observations, and documents. To enhance the trustworthiness of the findings, data triangulation across sources and techniques was applied.

3. RESULTS AND DISCUSSION

3.1. Curriculum Implementation at School A

Based on the results of the interview with HS, the process of preparing the Lesson Plan (RPP) and syllabus at the school is carried out according to certain standards through internal training (In-House Training/IHT) that involves collaboration among teachers. Lesson planning refers to official documents such as the Graduate Competency Standards (SKL), teaching modules, and supporting books, and is adjusted based on the results of diagnostic assessments. The RPP is then uploaded to the school's Management Information System to be reviewed by the principal as part of quality control efforts. In its implementation, HS utilizes modules and teaching materials to carry out the curriculum. Although there are slight gaps between planning and implementation, the teachers are able to adapt well. The school has adopted a one-tablet-per-student system and a Learning Management System (LMS), although student responses to the technology have been varied. Islamic values have been integrated into the teaching materials, supporting the strengthening of students' character. To implement differentiation, the high school applies project-based methods, discussions, and presentations, as well as using formative, summative, and project-based assessments. The results of these assessments are used for reflection and improvement in the learning process. One of the main challenges faced is the uneven access to technology. Periodic training helps teachers understand the new curriculum. The high school also recommends the Backward Design approach from Understanding by Design (UbD) to create more focused and outcome-oriented learning.

Table 1. Interview Results with HS

Aspects That Are Studied	Findings
Lesson Plan Preparation & Planning	Compiled through In-House Training collectively.
Learning Reference Document	Refer to SKL, modules, textbooks, and other references.
Adjustment to Student Needs	Diagnostic assessment to understand students' interests and abilities.
Evaluation & Revision of the Lesson Plan	Uploaded to the system, reviewed by the principal.
Curriculum Operationalization	Modules and teaching materials are used for daily activities.
The Gap Between Lesson Plan and Implementation	A small gap, only during extraordinary problems.
Use of Technology	Already using one tablet per student and LMS.
Integration of Character Values/Local Wisdom	Islamic values have been integrated into the teaching materials.
Learning Differentiation Strategy	Project-based learning, discussions, and presentations.
Types and Functions of Assessment	A combination of formative, summative, project, and portfolio assessments.
The Influence of Assessment on Methods	Assessment becomes the basis for reflection and method improvement.
Challenges in Curriculum Implementation	Integration of technology and student needs becomes a challenge.
Strategy to Overcome Facilities/Time	Use simple but effective tools to learn.
Training and Mentoring	There is regular training from the school and external parties.
Curriculum Improvement Recommendations	Use the Backward Design (UbD) approach.

Based on the table above, it can be seen that the implementation of the curriculum in secondary schools reflects a systematic, collaborative, and adaptive effort by teachers and the institution. The integration of technology, mapping of student needs, and ongoing assessments are good practices that can be emulated. The main recommendation is to develop a more organized approach to instructional design using the Backward Design framework, as well as to strengthen the internal evaluation system that is responsive to changes in classroom dynamics.

Furthermore, an interview with GP as the Principal explained that School A designs its operational curriculum by forming working groups (pokja) based on the results of internal quality audits, using the school's vision and mission as the primary reference. Supervision and evaluation of learning are conducted through the Education Management Information System. In the curriculum development process, the school involves the committee and obtains approval from the Education Office. To ensure the implementation of the curriculum, the school conducts coaching, academic supervision, as well as monitoring and evaluation (monev). Training and mentoring for teachers are also provided to enhance their competencies. Learning technology has been integrated

through the use of a Learning Management System (LMS). The school supports diverse learning and encourages teachers to optimize various types of assessments. However, there is currently no special system provided for students with special needs or gifted students. The main challenge faced is teachers' competence in information technology, which is addressed through mentoring. Support from the Education Office is provided through the School Operational Assistance (BOS) Performance funds. Curriculum evaluation is conducted based on Key Performance Indicators (KPIs) related to teachers and schools. In the future, the school plans a curriculum that integrates academic aspects, foreign languages, the Qur'an, and leadership character into a single Integrated Curriculum. The results can be seen in more detail in the following table.

Table 2. Results of the Interview with HS

Aspect	Description
Curriculum Design	The working group is formed based on the results of the internal quality audit, with reference to the school's vision and mission.
Learning Supervision & Evaluation	Using the Education Information System to monitor and evaluate teachers' lesson plans.
External Involvement	The school committee is involved, and the curriculum documents are approved by the Education Department.
Curriculum Implementation Strategy	Coaching, academic supervision, as well as monitoring and evaluation (monev) were carried out.
Teacher Training/Assistance	Training and mentoring programs are available to enhance teachers' competencies.
Technology Integration	Has used the LMS in the learning process.
Differentiated Learning & Assessment	Fully supported, teachers are encouraged to optimize assessment for/as learning.
Monitoring of Students with Special Needs/Gifted Students	No specific system available yet.
Main Challenge	Teachers' competency in IT is still limited.
Solutions to Limitations	Assistance for teachers with low competence.
External Support	There is BOS Performance fund assistance from the Department of Education.
Evaluation of Curriculum Success	Through the measurement of KPI at the teacher and school levels.
Development Plan	Curriculum integration with students' interests and talents.
Latest Development Initiative	Development of an Integrated Curriculum (academics, foreign languages, the Qur'an, leadership/preaching).

3.2. Curriculum Implementation at School B

Based on interviews with DF, the teachers at School B develop lesson plans (RPP) by analyzing learning outcomes, specific basic competencies, formulating objectives, arranging goal sequences, and preparing teaching modules. Documents on learning outcomes and institution-specific basic competencies serve as their main reference. Learning is designed according to students' needs through a differentiated approach that considers abilities, interests, and learning styles. Evaluation is conducted through reflection after the learning process to improve the lesson plans. The curriculum is implemented through classroom learning, extracurricular activities, and daily habits. Although there are gaps between the plans and implementation due to technical conditions in the classroom, teachers adjust the implementation without changing the main objectives. Technology, such as educational games, is used as a learning medium. Character values and local wisdom are integrated through objectives, standard operating procedures (SOPs), and assessments. Differentiated learning is implemented to accommodate differences among students. Formative, summative, and project-based assessments are conducted regularly, and the results are used to improve teaching methods. The main challenge is adjusting learning to the learning styles of Generation Z, as well as dealing with limitations in facilities and time, which are addressed by adapting strategies. As a recommendation, teachers suggest the development of independent learning materials tailored to students' needs to enhance curriculum effectiveness.

Table 3. Interview Results with DF

Aspects That Are Studied	Findings
Learning Planning	Compiled through analysis of learning outcomes, DT-specific basic competencies, formulation and sequencing of objectives, as well as preparation of teaching modules.
Document Reference	Referring to the Learning Outcomes and Basic Competencies specific to Daarut Tauhiid.
Adjustment to Student Needs	Carried out through differentiated learning based on students' abilities, interests, and learning styles.
Lesson Plan Evaluation	There is a post-learning reflection mechanism for improving the lesson plan (RPP).
Curriculum Implementation	Carried out through classroom learning, extracurricular activities, and daily habits.
The gap between lesson plans and implementation	There are adjustments in the class due to technical conditions, but it still refers to the teaching module.
Utilization of Media/ Technology	Using IT-based educational games that are relevant to the learning material.
Integration of Character Values/ Local Wisdom	Through SOP, learning objectives, implementation values, and assessment instruments.
Strategies to Overcome Differences in Ability	Using a differentiated learning approach.
Types of Assessment	Formative, summative, and project.
The Impact of Assessment Results on Learning	Used in assessment for learning to improve teaching methods and strategies.
Implementation Challenges	Adjustment of Gen Z learning styles.
Solutions to Limitations of Facilities/Time	Adjusting the learning models, methods, and strategies to the conditions and available resources.
Suggestions for the Effectiveness of Curriculum Implementation	Developing independent teaching materials that are relevant to students' needs.

Based on the interview results, it can be concluded that teachers at School B have a good understanding and systematic approach in designing and implementing the curriculum. They integrate the institution's distinctive characteristics at every stage of learning, from planning to evaluation. Adjusting learning according to students' needs becomes the main approach through differentiation strategies. Learning evaluation is conducted reflectively to improve the quality of the Lesson Plan (RPP), and the use of technology is beginning to be applied contextually. The main challenges lie in adapting learning to the characteristics of Generation Z students and the limitations of facilities, but these are addressed with flexibility in strategies. The suggestions given emphasize the importance of developing independent teaching materials tailored to students' needs as an effort to adapt and enhance the effectiveness of curriculum implementation.

Interviews with the Principal indicate that the school designs the Operational Curriculum (KOSP) by analyzing the latest regulations, vision and mission, potential and challenges faced, as well as student characteristics. This planning is outlined in the Medium-Term and Annual Work Plans. Evaluation and supervision of learning are carried out through supervision, reflection, feedback, and learning communities for

teachers. External parties, such as the school committee and the education office, are involved in the curriculum development process. To ensure implementation aligns with guidelines, the school routinely conducts surveys, supervision, and evaluations of teachers and students. Additionally, monthly training and mentoring programs are available for teachers, along with the annual implementation of the Teacher Competency Test (UKG). Technology integration is supported through the provision of digital learning media and innovation training. Differentiated learning is implemented to accommodate diversity among students. Although there is no specific system for students with special needs, the school provides teacher training and offers assistants with parental approval. The main challenge in curriculum implementation is the gap between expected competencies and the actual conditions of the students. The school addresses limitations in facilities and human resources by emphasizing efficient and result-oriented programs. Success evaluation is carried out through Key Performance Indicators (KPIs) and reflection on the curriculum. Future development is aimed at aligning with local potential and student needs. The curriculum is considered an ongoing process that actively involves all elements of the school. Specific details can be seen in the following Table 4.

Table 4. Interview Results with KS

Aspect	Brief Description
Curriculum Planning	Carried out through the analysis of regulations, school vision and mission, SWOT analysis, student characteristics, as well as the preparation of RKJM, RKT, and KOSP.
Monitoring and Evaluation	Carried out through supervision, reflection, feedback, good practice among teachers, and learning communities.
Involvement of External Parties	The school committee and the education office are actively involved in curriculum development.
Implementation Strategy	Through regular supervision, teacher and student surveys, and learning reflection.
Teacher Competency Development	Monthly training, curriculum mentoring, and annual UKG were organized.
Technology Integration	Facilitated through the provision of digital learning media and innovation training for teachers.
Differentiated Learning	Implemented to accommodate the diversity of students in the classroom.
Students with Special Needs	There is no special system, but teacher training and helper assistance are provided with parental consent.
Curriculum Challenges	The difference between the students' ideal condition and the targeted competencies.
Strategy to Overcome Limitations	Focus on innovative programs that are efficient and outcome-based.
External Support	The education office and other parties support the implementation of the Daarut Tauhiid curriculum.
Evaluation of Success	Carried out through performance indicators (KPIs) and curriculum reflection.
Future Development	Adjusting the curriculum to the potential of students, schools, and regions.
Curriculum Development Philosophy	The curriculum is a continuous process that involves all parties and must be in accordance with the local context.

3.3 Comparison and Recommendations for the Implementation of School A and B Curriculums

School A implements the curriculum in a structured manner through internal training (In-House Training), teacher collaboration, and supervision by the principal via a digital management system. The learning process is designed based on official documents and diagnostic assessments, while integrating technology such as Learning Management Systems (LMS) and tablets. Islamic values are incorporated into the learning process, and assessments are used as a basis for reflection. The main challenge faced is the gap in technology, but this is addressed through training and simple strategies. School A has begun applying the Backward Design approach to enhance focus on learning outcomes. Meanwhile, School B emphasizes the importance of flexibility and contextualization in learning. The curriculum is designed based on student characteristics and the institution's typical achievements, and is implemented through both in-class and out-of-class activities. Differentiated learning, the use of technology-based educational games, and the integration of character values are carried out

adaptively. Evaluation is conducted using a reflective and continuous approach. The main challenges arise from Generation Z learning styles and limited facilities, but these are addressed through tailored learning strategies and the development of independent teaching materials. Therefore, it can be concluded that School A has strengths in structure and quality control systems, while School B has strengths in flexibility and the ability to adapt to student needs and local contexts. The following table compares curriculum implementation between School A and School B.

Table 5. Comparison of curriculum implementation between School A and School B.

Aspect	School A	School B
Curriculum Development	Through IHT, working groups, and internal quality audits	Based on the analysis of achievements, SWOT, and student characteristics
Reference Document	Graduate Competency Standards, teaching modules, textbooks	Learning achievements and institution-specific competencies
Implementation of Learning	Structured through LMS and teaching modules, with tablet support per student	Classroom learning, outdoor learning, and daily habits
Differentiation Approach	Project, discussion, presentation, according to diagnostic assessment	Based on the interests, abilities, and learning styles of Gen Z
The Use of Technology	LMS, tablet, yet access still remains a challenge	Educational games, innovation training for teachers
Integration of Character Values	Islamic values in teaching materials and learning	Typical institutional values in SOPs, objectives, and assessments
Assessment System	Formative, summative, project, and portfolio; for reflection	Formative, summative, project; for improving methods
Curriculum Evaluation	With IKU, school principal supervision, and SIM	Through KPIs, teacher reflection, and learning communities
Teacher & Training	Regular training, IT assistance due to limited competencies	Monthly training, annual UKG, learning community
Main Challenge	Limited access to technology and IT teacher competencies	Adjusting learning to Gen Z and limited resources
Solutions & Suggestions	Use the Backward Design strategy, regular training	Prepare independent teaching materials that are relevant and flexible

Based on the analysis of curriculum implementation at School A and School B, there are several recommendations that can serve as guidelines for strengthening curriculum practices in other schools. First, there needs to be an integration between systematic and adaptive approaches. School A demonstrates strengths in structured planning through management and supervision systems, while School B excels at adjusting learning in a contextual and responsive manner to students' needs. Collaboration between these two approaches will result in an effective, measurable, and still flexible learning system in classroom implementation. In addition, the implementation of differentiated learning needs to be reinforced. Although both schools have applied differentiation approaches, teachers need support through practical training focused on concrete strategies in the classroom, such as flexible grouping, task options, and adaptation of learning media. In addition, the use of technology should be adapted to the context and capabilities of each school. Technology does not always need to be high-tech, but it must be relevant and support learning objectives. Solutions are needed to address gaps in access and digital competencies, for both students and teachers, through training and the provision of adequate devices. Furthermore, assessments should be viewed not only as tools to measure achievement but also as means for reflection and continuous improvement. The use of formative, summative, project-based, and portfolio assessments should be accompanied by a structured reflection process, both individually and within teacher communities. Fifth, curriculum development should include the integration of character values, local potential, and contemporary challenges, including the learning styles of Generation Z. An integrated curriculum, which combines academic, spiritual, life skills, and leadership aspects, is essential to comprehensively meet students' needs. Sixth, teachers need to be empowered to act as curriculum designers and evaluators. The practice of independently and reflectively developing teaching materials, as implemented at School B, should be expanded and supported. Teacher learning communities can serve as platforms for sharing best practices and continuously developing learning innovations. Finally, although still rarely implemented, schools should begin designing services for students with special needs and gifted students. This reflects a commitment to inclusive, potential-focused education, in line with national education policies. Overall, a hybrid approach that combines institutional

structure with flexibility in the field will be an effective strategy in implementing a curriculum that is more relevant to the needs of the times.

School A excels in structured teacher collaboration, which involves practices such as joint planning, classroom observation, feedback, and iterative refinement. This model promotes professional development on three levels: individual, school team, and inter-school professional exchange [10]. The implementation of continuous and structured professional development, such as competency-based training with a heutagogical approach, has been proven effective in enhancing teacher competence [11]. School B excels in a personalized adaptive approach for each student or group of students according to their abilities. The adaptive learning system uses machine learning algorithms to select the lessons most relevant to the students at the moment [12]. Research shows that when learning content and activities are contextualized according to specific cohorts, student engagement and performance increase significantly [13]. Adaptive learning technology that personalizes instruction and assignments according to students' current ability levels, although it faces challenges such as program complexity and time demands on teachers [14].

The implementation of classroom assessments that emphasize developmental functions has been accepted and initiated by teachers, although there is still a need for further reflection and mastery of assessment skills [15]. Sustainable and needs-based professional development for teachers, such as easily accessible online informal training, is crucial for enhancing technical and pedagogical knowledge related to technology [16]. Limited technological infrastructure and insufficient professional training are the main obstacles to inclusive technology integration [17]. Findings from this study indicate that curriculum development in 21st-century education needs to be carried out with a balanced approach between the rigidity of standardization and maximum flexibility. This aligns with perspectives in the literature which state that modern education must be able to adapt quickly and creatively through the use of technology and student-centered approaches [18], [19]. Study by Duman [20] It also emphasizes that strong instructional leadership can drive positive changes in the curriculum. In addition, integrating technology into teaching has been shown to enhance student motivation and engagement. This indicates that to ensure the success of 21st-century education, adequate infrastructure and adaptation of teaching methods need to be a primary concern [21].

Generalization and Implications of Research Results From these findings, it can be concluded that for the development of an effective curriculum, there is an urgent need to implement educational policies that support accountability and flexibility in learning. These policies should include strong inclusion elements and be relevant to all students, including those with special needs [22]-[24]. The implication of good education policies is the improvement of the overall education system [25]. Further implications suggest the need for training educators in using technology to manage learning and ensure that they can meet the needs of all students [26]. This is also in line with the findings of Setiawan and Yusoff [26] which highlights the importance of a multidisciplinary approach in educational development.

The novelty of this study is the development of an integrative model that brings managerial efficiency into a responsive pedagogical framework, taking into account diversity in the educational context [27]. This model contributes to the educational literature by offering a new perspective on how curriculum innovation can be effectively implemented in the Indonesian context, as exemplified by Angga et al in their analysis of the Merdeka Curriculum [28]. Research Limitations Although the findings of this study are significant, there are several limitations that need to be acknowledged. The study's focus on a specific context may limit the generalization of the results to a larger population. In addition, some issues related to technology readiness in schools and teachers' ability to integrate new technologies also need to be addressed [29] . This indicates that significant challenges still exist in the adoption of new policies in the educational field.

Recommendations Based on the results above, the researcher recommends several practical actions for stakeholders in education. Policymakers need to design strategies that include inclusive education and adaptations for the diverse needs of students [23]. As a basis for inclusive education policy, policymakers need to understand that project-based learning (PBL) is one of the effective approaches to creating an inclusive learning environment. With PBL, students can learn according to their styles and needs, thereby supporting the participation of students with special needs [30]. In addition, inclusive education plays a role in bringing together the diversity of students, although this poses its own challenges for teachers [31]. Therefore, it is important for guidance and counseling teachers to have relevant competencies to address these diversity issues. Adaptive Curriculum and Implementation Challenges The development of an adaptive curriculum is highly necessary to enhance a more personalized and effective educational experience for students. This curriculum model must be able to adjust to the learning styles and individual needs of students [32]. However, there are various challenges that must be faced in the implementation of the new curriculum, including social and economic gaps as well as resistance to change. Strategies to overcome these challenges include the development of policies that support equitable access to education, adequate training for educators, and effective managerial approaches [33]. School Management in Inclusive Education In the context of inclusive education management, adaptation to the eight national education standards is important to ensure effective implementation. This includes processes of organization, supervision, and evaluation related to inclusive education. The principal has a strategic role in

building an inclusive culture in the school, with visionary and collaborative leadership [34]. The success of inclusive education management heavily depends on the competence of school principals and teachers, as well as the support of a conducive school environment [35]. Perception and social support are important for conducting research on parents' and students' perceptions of inclusive education programs, because support from parents greatly influences the effectiveness of the implementation of this program [36] Research on regular students' social support for their peers with special needs shows that social interaction is key to building a good inclusive environment [37].

Providing intensive training for teachers to be able to utilize technology in managing learning effectively, as suggested by Soffianningrum et al [38]. Training for teachers is very important in improving their competence in using technology for more effective learning management. Numerous studies show that professional training for teachers not only enhances their pedagogical skills but also has a direct impact on student learning outcomes [39], [40]. The application of technology in learning can enhance student interaction and engagement, making it important for teachers to have adequate knowledge and skills in educational technology. The Impact of Training on Teacher Competence Effective training can strengthen teachers' understanding of student psychology development and the application of technology in the classroom. For example, reports Dewi et al [40] shows that teacher professional development programs have a significant impact on student learning outcomes, especially in technology integration. This is in line with findings by Brown and Brown [42] which notes that teacher training in certain contexts can lead to significant improvements in student learning outcomes, especially in the field of technology. Approaches Applied in Training Various approaches, such as project-based learning and inquiry-based learning (IBL), have been proven effective in linking teacher professional development with improved student learning outcomes [41]. Training should not only focus on knowledge transfer, but also on opportunities to collaborate and share best practices [43]. Integration of Technology in the Curriculum The use of technology in education requires an appropriate pedagogical approach. The implementation of modern technology changes the structure and content of teachers' work [39]. Challenges in Technology Training Although there are benefits to technology integration, challenges in technology training often include a lack of infrastructure, uncertainty in technology utilization, and the need for continuous learning [44], [45].

Building collaboration between education, industry, and the community to ensure the curriculum remains relevant to market demands [46]. Many studies indicate that collaboration between educational institutions and industry can improve the alignment of the curriculum with workforce needs. As stated by Widodo et al [47] This collaboration not only enhances academic quality but also strengthens students' ability to compete in the job market. Furthermore, Yasin stated that industry involvement in curriculum development is crucial in aligning academic competencies with market needs [48]. This is in line with Niyonzima's view, who emphasizes that the industry should be involved in all stages of curriculum development to ensure the relevance of education [49]. Conducting regular evaluations of teaching policies and practices to improve the effectiveness and efficiency of education management [50]. Thus, this study not only addresses the challenges of developing a 21st-century curriculum but also paves the way for further research and practice in improving the quality of education in Indonesia. Regular evaluations aim to ensure that the educational policies and teaching practices implemented are effective in achieving educational goals. In this context, the analysis conducted by Daniati et al [51] shows the need for comprehensive improvements in methodology, evaluation, and policy to consistently enhance the quality of education in Indonesia. In addition, research by Gunawan et al [52] emphasizing that strict monitoring and evaluation by government stakeholders is the foundation for sustainable educational development.

4. CONCLUSION

The comparison of curriculum implementation at School A and School B shows that both institutions have developed strong approaches, despite having different characteristics. School A stands out in terms of being systematic, collaborative, and monitored based on a structured management system. The planning and implementation of learning are closely connected with official documents as well as quality control tools such as the Management Information System (MIS) and Learning Management System (LMS). On the other hand, School B demonstrates strengths in a more adaptive, contextual, and reflective approach. Teachers at School B are highly sensitive to student characteristics and prioritize differentiated learning based on students' learning styles and interests. Both schools have implemented good practices, such as integrating character values, using assessments as a basis for reflection, and efforts for professional development for teachers. However, common challenges faced include gaps in technological competence, limited facilities, and suboptimal services for students with special needs or gifted students. Based on this analysis, the main recommendation is to integrate the strengths of the structure possessed by School A with the flexibility of the approach applied at School B. An ideal strategy includes strengthening the planning and evaluation system, implementing genuine and measurable differentiated learning, using technology contextually, and empowering teachers in the development of teaching

materials and learning reflection. The curriculum should be designed as a continuous process, involving all stakeholders, and tailored to local potential as well as the dynamics of today's student generation. Thus, combining these two approaches will result in a curriculum implementation model that is more effective, inclusive, and focused on student needs and the educational challenges of the 21st century.

ACKNOWLEDGEMENTS

The author expresses deep gratitude to all parties who have contributed to the implementation and completion of this research. Special thanks are directed to the Principals, teachers, and management teams from School A and School B who have taken the time, provided data, and offered invaluable insights regarding the implementation of the curriculum in each institution. The author also appreciates the support from colleagues, academic advisors, and educational institutions that have provided guidance, feedback, and motivation throughout the research process. Without the participation and collaboration of various parties, this research would not have been successfully completed. It is hoped that the results of this research can provide a positive contribution to curriculum development and the improvement of education quality in the future.

AUTHOR CONTRIBUTIONS

EP was responsible for the research design, data collection, data analysis, and manuscript preparation. NW contributed to conceptual development, RS and RCJ, contributed to research methodology guidance, and critical review of the manuscript. All authors have read and approved the final version of the manuscript.

CONFLICTS OF INTEREST

The author(s) declare no conflict of interest.

USE OF ARTIFICIAL INTELLIGENCE (AI)-ASSISTED TECHNOLOGY

The authors declare that no artificial intelligence (AI) tools were used in the generation, analysis, or writing of this manuscript. All aspects of the research, including data collection, interpretation, and manuscript preparation, were carried out entirely by the authors without the assistance of AI-based technologies.

REFERENCES

[1] M. Y. Worku, "Rhetoric–Reality gap in curriculum implementation: insights from secondary school science enactment in Ethiopia," *African J. Res. Math. Sci. Technol. Educ.*, pp. 18117295, 2025, doi: 10.1080/18117295.2025.2494166.

[2] T. M. Q. Sánchez, F. E. L. Pérez, J. J. A. Justo, and J. Rivera-Muñoz, "Effects of the implementation of the school curriculum: Successes and failures," *Int. J. Early Child. Spec. Educ.*, vol. 12, no. 1, pp. 390–397, 2020, doi: 10.9756/INT-JECSE/V12I1.201018.

[3] M. L. Mogale, "Pedagogical implications on curriculum support for learner progression," *J. Curric. Stud. Res.*, vol. 5, no. 3, pp. 65–79, 2023, doi: 10.46303/jcsr.2023.31.

[4] R. Susilana, H. Ihsan, and A. Hadiapurwa, "Peran implementasi kurikulum dalam meningkatkan religiusitas mahasiswa [The role of curriculum implementation in increasing student religiosity]," *TARBAWY Indones. J. Islam. Educ.*, vol. 7, no. 2, pp. 195–209, 2020, doi: 10.17509/t.v7i2.26853.

[5] A. A. Z. Rosyiddin, R. C. Johan, and D. Mulyadi, "Inovasi pembelajaran sebagai upaya menyelesaikan problematika pendidikan Indonesia [Learning innovation as an effort to solve Indonesian education problems]," *Inov. Kurikulum*, vol. 19, no. 1, pp. 44–53, 2022, doi: 10.17509/jik.v19i1.42679.

[6] I. M. Mulenga andC.Mwanza, "Teacher's voices crying in the school wilderness: Involvement of secondary school teachers in curriculum development in Zambia," *J. Curric. Teach.*, vol. 8, no. 1, pp. 32–39, 2019, doi: 10.5430/jct.v8n1p32.

[7] H. T. T.Dang, D. T.Bui, Q. A.Vuong, H. G. T.Phan, C. T.Nguyen, andB. D. T.Pham, "Teachers' perspectives on the implementation of the new national curriculum-Dataset from Vietnam," *Data Br.*, vol. 49, pp. 109451, 2023, doi: 10.1016/j.dib.2023.109451.

[8] S. M. Yusoff, A. F. M. Marzaini, N.Zakaria, andH.Lijie, "Exploring the Implementation of Classroom-Based assessment in Malaysian secondary schools: Alignment with policy and teacher practices," *Malaysian Online J. Educ. Manag.*, vol. 13, no. 1, pp. 81–101, 2025.

[9] A. M. Sierra-Piedrahita and P. A. Echeverri-Sucerquia, "Governmental professional development initiatives for the implementation of language policies and curriculum guidelines: Secondary school teachers' experiences, challenges and views," *Ikala*, vol. 25, no. 1, pp. 137–152, 2020, doi: 10.17533/udea.ikala.v25n01a13.

[10] K. Carroll, S. K.Patrick, andE.Goldring, "School factors that promote teacher collaboration: Results from the tennessee instructional partnership initiative," *Am. J. Educ.*, vol. 127, no. 4, pp. 501–530, 2021, doi: 10.1086/715002.

[11] S. Sherly, S. Gultom, E. Daryanto, and N. Nasrun, "Management of continuous professional development through competency-based training model for junior high school teachers," *Emerg. Sci. J.*, vol. 7, no. 1, pp. 190–206, 2023, doi: 10.28991/ESJ-2023-07-01-014.

[12] P. D. Simon and L. M. Zeng, "Behind the scenes of adaptive learning: a scoping review of teachers' perspectives on the use of adaptive learning technologies," *Educ. Sci.*, vol. 14, no. 12, p. 14121413, 2024, doi: 10.3390/educsci14121413.

[13] K. Kelly, "Contextualising curriculum for a multi-course classroom: A case study," *Curric. Teach.*, vol. 37, no. 2, pp. 39–53, 2022, doi: 10.7459/ct/37.2.04.

[14] M. Liu, E. McKelroy, S. B. Corliss, and J. Carrigan, "Investigating the effect of an adaptive learning intervention on students' learning," *Educ. Technol. Res. Dev.*, vol. 65, no. 6, pp. 1605–1625, 2017, doi: 10.1007/s11423-017-9542-1.
[15] H. Jiang and M. F. Hill, "Teacher learning with classroom assessment: Perspectives from Asia Pacific," *Teach. Learn. with Classr. Assess. Perspect. from Asia Pacific*, pp. 1–201, 2018, doi: 10.1007/978-981-10-9053-0.
[16] M. Mailizar and K. Umam, "Designing a blended teacher professional development on the integration of dynamic mathematics software in the classroom: A preliminary study," *AIP Conf. Proc.*, vol. 2886, no. 1, p. 154630, 2023, doi: 10.1063/5.0154630.
[17] T. Charles and A. Alshamsi, "Navigating challenges in technology integration for inclusive classrooms: Insights for pre-service teachers," *Empower. Pre-Service Teach. to Enhanc. Incl. Educ. Through Technol.*, pp. 87–125, 2025, doi: 10.4018/979-8-3693-8759-7.ch004.
[18] K. A. Fadhluzzakiyy, F. Ismail, and M. Astuti, "Paradigma inovasi pendidikan berkelanjutan: Analisis literatur terhadap konsep discovery, invensi, inovasi dan modernisasi era digital [Paradigm of sustainable education innovation: Literature analysis of the concepts of discovery, invention, innovation and modernization in the digital era]," *Jiip - J. Ilm. Ilmu Pendidik.*, vol. 8, no. 6, pp. 6546–6557, 2025, doi: 10.54371/jiip.v8i6.8195.
[19] M. U. Lubis, F. A. Siagian, Z. Zega, N. Nuhdin, and A. F. Nasution, "Pengembangan kurikulum merdeka sebagai upaya peningkatan keterampilan abad 21 dalam pendidikan [Development of an independent curriculum as an effort to improve 21st century skills in education]," *Anthor Educ. Learn. J.*, vol. 2, no. 5, pp. 691–695, 2023, doi: 10.31004/anthor.v1i5.222.
[20] M. Duman, M. S. Taat, and M. K. Abdullah, "Hubungan kepemimpinan instruksional pengetua dengan sikap guru terhadap perubahan dalam pendidikan abad ke-21 [The relationship of principals' instructional leadership to teachers' attitudes toward changes in 21st century education]," *Malaysian J. Soc. Sci. Humanit.*, vol. 6, no. 3, pp. 241–251, 2021, doi: 10.47405/mjssh.v6i3.722.
[21] R. D. Pohan, "Management of basic school management and infrastructure in Pasir Penyu District," *Indones. J. Educ. Learn.*, vol. 2, no. 1, p. 174, 2018, doi: 10.31002/ijel.v2i1.1055.
[22] A. Pahrudin, W. Wakidi, and V. Anggini, "Critical analysis of curriculum management development in 21st century islamic education," *Edutec J. Educ. Technol.*, vol. 7, no. 4, 2024, doi: 10.29062/edu.v7i4.821.
[23] R. Noviyanti, N. Mariana, and W. Wiryanto, "Critical thinking skills in mathematics learning through a differentiated learning approach in the era of independent curriculum: Systematic literature review," *J. Innov. Res. Prim. Educ.*, vol. 4, no. 3, pp. 856–865, 2025, doi: 10.56916/jirpe.v4i3.1453.
[24] N. Hidayati, E. Mulyasari, D. Hendriawan, and R. F. Nuryani, "Kurikulum matematika abad ke-21 di pendidikan dasar: Tinjauan literatur sistematis terhadap kemampuan berpikir kritis dan kreativitas [21st century mathematics curriculum in primary education: a systematic literature review on critical thinking skills and creativity]," *Kalam Cendekia J. Ilm. Kependidikan*, vol. 13, no. 2, 2025, doi: 10.20961/jkc.v13i2.97640.
[25] S. Bukhari, M. Rafiq-uz-Zaman, and S. Bano, "Analysing the impact of education policies and their implementation on the school education system in Punjab, Pakistan," *Ijss*, vol. 4, no. 1, pp. 98–110, 2025, doi: 10.63544/ijss.v4i1.136.
[26] A. R. Setiawan and M. Yusoff, "Islamic village development management: A systematic literature review," *J. Ekon. Syariah Teor. Dan Terap.*, vol. 9, no. 4, pp. 467–481, 2022, doi: 10.20473/vol9iss20224pp467-481.
[27] U. Kalsum, "Managing inclusive education through the merdeka curriculum," *Int. J. Asian Educ.*, vol. 6, no. 3, pp. 326–336, 2025, doi: 10.46966/ijae.v6i3.501.
[28] A. Angga, C. Suryana, I. Nurwahidah, A. H. Hernawan, and P. Prihantini, "Komparasi implementasi kurikulum 2013 dan kurikulum merdeka di sekolah dasar Kabupaten Garut [Comparison of the implementation of the 2013 curriculum and the independent curriculum in elementary schools in Garut Regency]," *J. Basicedu*, vol. 6, no. 4, pp. 5877–5889, 2022, doi: 10.31004/basicedu.v6i4.3149.
[29] L. Noviearty, T. Berliani, and S. Setiawan, "Manajemen pembelajaran prakarya dan kewirausahaan [Management of practical and entrepreneurship learning]," *Equity Educ. J.*, vol. 2, no. 1, pp. 54–61, 2020, doi: 10.37304/eej.v2i1.1687.
[30] K.Khotimah, "Analisis penerapan pendidikan berbasis proyek untuk mewujudkan pendidikan inklusi di era modern [Analysis of the application of project-based education to realize inclusive education in the modern era]," *Learn. J. Inov. Penelit. Pendidik. Dan Pembelajaran*, vol. 5, no. 1, pp. 74–82, 2025, doi: 10.51878/learning.v5i1.4310.
[31] M. M.Yusuf, T. I. B. Manullang, S. Sunardi, and I. Saripah, "Persepsi mahasiswa program studi bimbingan dan konseling terhadap kompetensi konselor di lingkungan pendidikan inklusif [Perceptions of guidance and counseling study program students regarding counselor competence in an inclusive educational environment]," *J. Pendidik. Kebutuhan Khusus*, vol. 6, no. 2, pp. 128–137, 2022, doi: 10.24036/jpkk.v6i2.637.
[32] S. Laia, F. Firmansyah, K. Krismonika, and P. Bogha, "Transformasi pendidikan melalui pengantar kurikulum: Tinjauan terkini dan tantangan masa depan [Transforming education through curriculum delivery: A current review and future challenges]," *Ej*, vol. 4, no. 1, pp. 197–210, 2024, doi: 10.62738/ej.v4i1.78.
[33] T. S. Negeri, and M. K. Kendal, "Manajemen sekolah penyelenggara pendidikan inklusif: kajian aplikatif pentingnya menghargai keberagaman bagi anak-anak berkebutuhan khusus [Management of schools providing inclusive education: an applied study of the importance of respecting diversity for children with special needs]," *J. Manaj. Pendidik.*, vol. 1, no. 2, 2012, doi: 10.26877/jmp.v1i2.321.
[34] A. L. Hanan, D. E. Pujasmara, R. N. Sopiah, S. P. Tosaini, S. M. Syahidah, and P. Prihantini, "Peran kompetensi kepala sekolah dalam membangun budaya inklusif di sekolah dasar [The role of principal competence in building an inclusive culture in elementary schools]," *Cendekia J. Ilmu Pengetah.*, vol. 5, no. 1, pp. 277–289, 2025, doi: 10.51878/cendekia.v5i1.4216.
[35] A. Syafi'i, M. Saied, and A. R. Hakim, "Efektivitas manajemen pendidikan dalam membentuk karakter diri [The effectiveness of educational management in shaping character]," *J. Econ. Bus. Ubs*, vol. 12, no. 3, pp. 1905–1912, 2023, doi: 10.52644/joeb.v12i3.237.
[36] V. M. Yunita, A. Salim, and S. Sunardi, "The analysis of regular students' parents perception towards inclusion

program," *Jartika J. Ris. Teknol. Dan Inov. Pendidik.*, vol. 3, no. 1, pp. 140–148, 2020, doi: 10.36765/jartika.v3i1.33.
[37] F. L. Damas, "Study of regular students' social support for students with special needs: how does it relate to social acceptance?," *JKKP (Jurnal Kesejaht. Kel. Dan Pendidikan)*, vol. 12, no. 2, pp. 125–135, 2025, doi: 10.21009/jkkp.122.01.
[38] I. Soffianningrum, Y. Yufiarti, and E. Yetti, "ECE educator performance: Teaching experience and peer teaching ability through basic tiered training," *Jpud - J. Pendidik. Usia Dini*, vol. 16, no. 1, pp. 52–68, 2022, doi: 10.21009/jpud.161.04.
[39] N. Almazova, E. Krylova, A. Rubtsova, and M. Odinokaya, "Challenges and opportunities for russian higher education amid covid-19: Teachers' perspective," *Educ. Sci.*, vol. 10, no. 12, pp. 368, 2020, doi: 10.3390/educsci10120368.
[40] A. E. R. Dewi, N. C. Kalil, H. Hidayat, and S. Juniati, "Exploring the relationship between teacher professional development and student learning outcomes," *Nawala Educ.*, vol. 1, no. 5, pp. 109–116, 2024, doi: 10.62872/a5xyk576.
[41] S. Guo and Y. Yang, "Project-Based learning: An effective approach to link teacher professional development and students learning," *J. Educ. Technol. Dev. Exch.*, vol. 5, no. 2, 2012, doi: 10.18785/jetde.0502.04.
[42] R. S. Brown and E. A. Brown, "Estimating the effect of a teacher training program on advanced placement outcomes," *Int. J. Comput. Sci. Educ. Sch.*, vol. 2, no. 4, pp. 3–21, 2019, doi: 10.21585/ijcses.v2i4.35.
[43] J. M. T.Torres, H.Hossein-Mohand, M. G.García, H.Hossein-Mohand, andM. P. C.Reche, "Mathematics teachers' perceptions of the introduction of ICT: The relationship between motivation and use in the teaching function," *Mathematics*, vol. 8, no. 12, p. 2158, 2020, doi: 10.3390/math8122158.
[44] A. Lisa, A. Faridi, D. A. L. Bharati, and M. Saleh, "TPACK-in practice model: Effects on EFL students' professional knowledge and online teaching practices," In *ELTLT 2021: Proceedings of the 10th UNNES Virtual International Conference on English Language Teaching, Literature, and Translation, ELTLT 2021, 14-15 August 2021, Semarang, Indonesia* (p. 227). European Alliance for Innovation, 2022, doi: 10.4108/eai.14-8-2021.2317611.
[45] A. V. Alvarez and L. Corcuera, "The webinar experiences of higher education instructors in the time of emergency remote education," *Uluslararası Eğitim Araştırmacıları Derg.*, vol. 4, no. 2, pp. 134–145, 2021, doi: 10.52134/ueader.983093.
[46] S. E. Yuwantiningrum, B. H. Rainanto, N. R. Utami, and B. E. Sukma, "Enhancing curriculum relevance in vocational hospitality education: A community engagement experience at smk negeri 3, Bogor City," *Abdi Dosen J. Pengabdi. Pada Masy.*, vol. 9, no. 3, pp. 1304–1319, 2025, doi: 10.32832/abdidos.v9i3.3015.
[47] C. Widodo, F. D. Isnantyo, A. Budianto, S. Sukatiman, and M. N. A. Wahyudi, "Strategy for continuous quality improvement at vocational high school," *Scaffolding J. Pendidik. Islam Dan Multikulturalisme*, vol. 7, no. 1, pp. 229–243, 2025, doi: 10.37680/scaffolding.v7i1.6975.
[48] G. Yasin, "Leveraging Taiwan's competency-based curriculum model: Implications for low and middle-income countries," 2025, doi: 10.21203/rs.3.rs-6819720/v1.
[49] E. Niyonzima, "Industry participation in curriculum development and in the preparation and implementation of study programs at higher learning institutions in East Africa," *Przegląd Badań Eduk.*, vol. 2, no. 57, 2025, doi: 10.12775/pbe.2025.028.
[50] P. M. S. Son, A. I. Susanti, and H. Susiarno, "Implementation of IPE in health education curriculum: Challenges and strategies," *Inov. Kurikulum*, vol. 21, no. 3, pp. 1683–1698, 2024, doi: 10.17509/jik.v21i3.72596.
[51] D. Daniati, R. Susanti, E. R. Safitri, and F. Gulo, "Analisis aspek pembelajaran di singapura serta perbandingannya di Indonesia [Analysis of learning aspects in Singapore and its comparison in Indonesia]," *Learn. J. Inov. Penelit. Pendidik. Dan Pembelajaran*, vol. 4, no. 4, pp. 1036–1043, 2024, doi: 10.51878/learning.v4i4.3483.
[52] A. Gunawan, N. R. Yunus, and F. Husna, "Contribution of government policy stakeholders in improving the quality of education in Indonesia," *Salam J. Sos. Dan Budaya Syar I*, vol. 10, no. 3, pp. 961–976, 2023, doi: 10.15408/sjsbs.v10i3.33950.