



Developing an Adaptive Curriculum for 21st-Century Competencies: An Islamic Education Management Perspective

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Abstract

This study aims to analyze the development of a 21st-century competency-based adaptive curriculum from the perspective of Islamic education management in Islamic high school. Rapid technological developments and global educational transformations require educational institutions, including Islamic schools, to design adaptive, contextual, and competency-oriented curricula. This study uses a descriptive qualitative approach with a single case study design. Data were collected through participant observation, semi-structured interviews, and documentation studies. Data analysis refers to the interactive model of Miles, Huberman, and Saldana, which consists of data condensation, data presentation, and conclusion drawing. The findings indicate that understanding of the adaptive curriculum concept among stakeholders is still partial and uneven. The implementation of the adaptive curriculum has not been systematically institutionalized and largely relies on individual teacher initiatives. The strongest supporting factors are innovative school leadership, teacher commitment, and foundation support, while major obstacles include limited digital infrastructure, inadequate teacher training, and cultural barriers related to students' reluctance to express critical opinions. This study also formulates an Adaptive Curriculum Management Model consisting of four-cycle phases: needs analysis, 4C-based planning, responsive implementation, and cycle evaluation. This research provides theoretical and practical contributions to the development of adaptive curriculum management in Islamic educational institutions, especially private madrasas that face the challenges of 21st century education.

Keywords: Adaptive Curriculum, 21st Century Competencies, Islamic Education Management, Curriculum Management, Islamic Higher Education

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INTRODUCTION

Rapid social and technological transformations over the past few decades have fundamentally reshaped educational paradigms worldwide. The expansion of digital technologies—including artificial intelligence, the Internet of Things, and automation—has altered the ways knowledge is produced, accessed, and applied across multiple sectors, including education. These changes require education systems to become more adaptive, responsive, and future-oriented in preparing students with the competencies needed for the twenty-first century (Madkour & Alaskar, 2024; Sun et al., 2023). In Indonesia, this challenge is further intensified by persistent structural issues, such as unequal access to



digital technology, disparities in educational infrastructure, and uneven institutional readiness to implement curriculum reform (Farwati, 2024; Rad et al., 2022; Suwastika et al., 2025).

Within this context, curriculum occupies a central position as the core framework through which educational goals are translated into learning experiences. Traditional curriculum models that primarily emphasize content transmission are increasingly viewed as inadequate for responding to contemporary demands. Current educational discourse highlights the need for more active, student-centered, and competency-based approaches that promote critical thinking, creativity, communication, collaboration, and learner autonomy (Al-Thani et al., 2021; Nievas & Montes, 2023; Sary et al., 2024). Accordingly, curriculum management has become a strategic issue in educational leadership, as it determines not only what students learn, but also how learning is organized, implemented, and evaluated in response to changing social and technological realities (Ainissyifa et al., 2024; Masykuroh et al., 2024; Thoha & Hannan, 2022).

In Indonesia, curriculum reform has evolved from the 2013 Curriculum to the more recent Merdeka Curriculum, which represents a significant policy shift toward flexibility, contextualization, and learner-centered instruction. The Merdeka Curriculum encourages schools to develop operational curricula suited to their contexts, implement differentiated learning, and use formative assessment as part of reflective teaching practice (Ainissyifa et al., 2024; Fathurrahman et al., 2022; Sholeh et al., 2024). Despite its progressive orientation, its implementation continues to face substantial challenges, particularly at the level of school and madrasah management. These challenges are especially evident in private Islamic educational institutions, which often operate under more complex structural, financial, and organizational constraints than public schools (Aditya et al., 2024; Masinde et al., 2023). For private Madrasah Aliyah (MA), curriculum reform involves a dual responsibility: maintaining the religious and cultural identity of Islamic education while simultaneously equipping students with globally relevant competencies.

Against this background, an adaptive curriculum approach becomes increasingly important. An adaptive curriculum is not merely a flexible arrangement of content, but a dynamic and context-sensitive framework that aligns curriculum planning, pedagogy, and assessment with students' needs, institutional realities, and broader societal change (Fullan, 2017). It emphasizes responsiveness to learner diversity, community expectations, and technological developments, while also promoting participatory and competency-based learning. This orientation is compatible with transformational perspectives on learning, which stress that meaningful education occurs when learners are encouraged to reflect, reinterpret experience, and develop new ways of thinking and acting (Ataman & Safitri, 2024; Musthofa & Prihananto, 2023; Zain et al., 2022). From this perspective, adaptive curriculum development requires not only pedagogical innovation but also managerial capacity to ensure coherence between curriculum goals, teaching practices, and institutional culture.

This issue is particularly relevant in the context of MA Hamzanwadi NW Gelogor, a private Islamic senior secondary school in West Nusa Tenggara operating under the Nahdlatul Wathan (NW) foundation, one of the largest Islamic organizations in the region. As a community-based madrasah, the institution has strong socio-religious legitimacy and cultural capital, yet it also reflects the structural limitations commonly experienced by private madrasahs in rural and semi-rural settings. Although efforts to integrate twenty-first-century competencies into learning have begun, the institution has not yet developed a systematic curriculum management framework that integrates these competencies in a measurable, coherent, and sustainable manner.

Existing studies on twenty-first-century competency-based curricula in Indonesia have largely focused on public schools, urban settings, or the general implementation of curriculum reform. Research addressing private madrasahs—particularly those shaped by

pesantren-oriented culture and regional Islamic educational traditions—remains limited. In addition, much of the existing literature is descriptive in nature and pays greater attention to classroom practices than to curriculum management as an institutional process. As a result, there remains a gap in the literature regarding how adaptive curriculum can be conceptualized and operationalized as a managerial model in private Islamic schools. This gap is significant because curriculum adaptation in madrasah settings is influenced not only by pedagogical factors, but also by leadership, organizational culture, teacher capacity, and the integration of religious values into school governance.

The present study addresses this gap by examining adaptive curriculum development from an educational management perspective. Conceptually, twenty-first-century competencies in this study are primarily framed through the 4C model developed by the Partnership for 21st Century Skills (P21)—critical thinking, creativity, communication, and collaboration—while also recognizing the relevance of digital literacy, information literacy, and social-emotional competencies as complementary dimensions. Curriculum development is understood not simply as a pedagogical task, but as an institutional process involving planning, organizing, implementation, and evaluation, with the principal acting as a key curriculum leader responsible for ensuring coherence across these dimensions (Guan & Asavisanu, 2023; Yugo et al., 2025). Using a qualitative case-study approach supported by document analysis and field data, this study aims to analyze the development of a 21st-century competency-based adaptive curriculum from the perspective of Islamic education management in Islamic high school at MA Hamzanwadi NW Gelogor. In doing so, it seeks to contribute both empirically and conceptually to the growing discussion on curriculum transformation in Islamic education by offering a contextually grounded adaptive curriculum management model for private Islamic high school.

RESEARCH METHOD

This research uses a descriptive qualitative approach with a single case study design. This approach was chosen because the researcher intended to understand the phenomenon in depth in its natural context, rather than simply measuring variables statistically. The case study was chosen because MA Hamzanwadi NW Gelogor presented a case that fit the research context. The sampling technique in this study used purposive sampling, namely the technique of determining informants based on certain considerations according to the researcher's needs. The informants in this study consisted of: 1. The Principal as the curriculum policy maker 2. 6 general and religious subject teachers, 3. 12 students in grades XI and XII in Table 1.

Table 1. Informant Profile

No	Information Category	Amount	Code	Sampling Techniques
1	Head of Madrasah	1 Person	KS	Purposive
2	Deputy Head of Curriculum	1 Person	WK	Purposive
3	Religious Education Teacher	2 People	GP1-GP2	Purposive
4	General Subject Teacher	4 People	GU1-GU4	Purposive
5	Grade XI students	6 People	SW1-SW6	Purposive and snowball
6	Grade XII Students	6 People	SW7-SW12	Purposive and snowball
Total		20 People		

Data collection techniques were carried out through 1. Participatory observation of the learning process in the classroom, 2. Semi-structured in-depth interviews using interview guides developed from indicator 4c and 3. Documentation studies of curriculum documents, lesson plans, and madrasah learning evaluation reports. Data analysis refers to an interactive model consisting of four stages: data condensation, data presentation, and drawing and

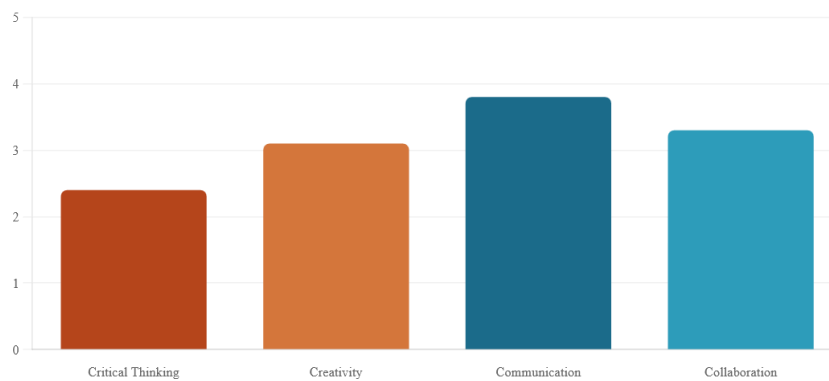
verifying conclusions. Data validity is guaranteed through triangulation of sources and techniques so that data validity can be guaranteed (Creswell & Creswell, 2023).

FINDINGS AND DISCUSSION

Conceptual Understanding of Adaptive Curriculum

The first finding is that understanding of the adaptive, competency-based curriculum for 21st-century graduates at MA Hamzanwadi NW Gelogor among stakeholders is partial and uneven. The madrasah leadership itself has a fairly good understanding of this, as demonstrated in the following interview "We have incorporated critical thinking and group work skills into the learning. However, this still requires local initiative from each teacher. We don't have a systematic guideline."

Senior teachers who encountered pedagogical literature from young teachers (under 35 years old) were compared with senior teachers who were 'conventional' and based on memorization. Of the six teachers interviewed, only two (33%) could fully explain the 4C framework, while 4 other people (67%) only understood one or two elements (see Graph 1).



Graph 1. Level of Teacher Understanding of the 4C Components (n=6 teachers)

In the communication section (average score of 3.8/5) is the component that is most familiar to teachers, while for critical thinking it has a low score (2.4/5), as can be seen in Figure 1. Teachers in private madrasas are more familiar with the communication aspect because they are used to conventional learning processes such as lecture methods, so they do not have concrete strategies to encourage students to think critically and systematically. These findings indicate that conceptual understanding of the adaptive curriculum at MA Hamzanwadi NW Gelogor remains uneven not only across stakeholder groups, but also across the specific competency dimensions embedded in the 4C framework. The relatively stronger understanding of communication, compared with critical thinking, suggests that teachers tend to interpret 21st-century competencies through practices that are already familiar within conventional classroom settings. In this case, communication is more easily recognized because it can be accommodated within lecture-based instruction, classroom questioning, or student presentations without requiring substantial changes in pedagogical design. By contrast, critical thinking demands a deeper shift in instructional orientation, including the use of inquiry, problem-solving, reflection, and open-ended tasks that encourage students to analyze, evaluate, and construct arguments.

The disparity between younger and senior teachers further suggests that exposure to recent pedagogical discourse significantly shapes curriculum understanding within the madrasah. Younger teachers appear to function as informal carriers of innovation, while senior teachers remain more closely attached to transmission-oriented models of learning that emphasize memorization and teacher authority. This generational pattern is important because it shows that curriculum adaptation is influenced not only by formal policy but also

by teachers' professional socialization, prior training, and willingness to reinterpret established teaching traditions. In this context, the absence of systematic institutional guidelines may widen the gap between individual teachers, allowing curriculum understanding to develop unevenly according to personal initiative rather than through a shared professional framework. Therefore, strengthening conceptual understanding of adaptive curriculum in the madrasah requires more than technical training; it also requires sustained professional dialogue, collaborative lesson planning, and school-level leadership that can bridge generational differences and transform isolated understanding into collective curricular capacity.

Implementation of Adaptive Curriculum Development

Based on observations and document analysis, the implementation of curriculum development at MA Hamzanwadi NW Gelogor can be categorized into three aspects: planning, implementation, and evaluation. Findings indicate that all three aspects are not synchronized.

Table 2. Adaptive Curriculum Implementation Matrix at MA Hamzanwadi NW Gelogor

Dimensions	Indicator	Field Findings	Category
Planning	Integration of 4C in RPP	There are 4 of G teachers; the format is not standardized yet	Develop
Planning	Student needs analysis	Done informally, not documented	Early
Implementation	Active learning methods	PBL and group discussion were implemented by 3 teachers	Develop
Implementation	Integration of digital technology	Limited to PowerPoint presentations	Early
Evaluation	Competency-based assessment	Written tests are dominant; portfolios are starting to be tried	Early
Evaluation	Curriculum evaluation cycle	Once a year, not based on student performance data	Not yet optimal

The findings in Table 2 show that adaptive curriculum development at MA Hamzanwadi NW Gelogor is still in a transitional phase. In the planning aspect, the school has demonstrated initial efforts to integrate 21st-century learning principles, particularly the 4C skills (critical thinking, creativity, collaboration, and communication) into lesson plans. However, the implementation remains inconsistent because the lesson plan format has not been standardized among teachers. In addition, student needs analysis is conducted only informally and is not supported by systematic documentation. This condition indicates that curriculum planning has not yet been fully data-driven, even though teachers have begun to recognize the importance of adjusting learning to students' characteristics and needs.

In the implementation stage, several teachers have started to apply adaptive learning strategies through Project-Based Learning (PBL) and group discussions. These methods reflect a shift from teacher-centered instruction toward more student-centered learning. Nevertheless, the findings reveal that such practices are still limited to only a few teachers and have not become a school-wide culture. The integration of digital technology also remains at an early stage, as it is mostly used for PowerPoint presentations rather than as an interactive learning tool that can support collaboration, independent learning, or differentiated instruction. This suggests that the implementation of the adaptive curriculum has not yet been carried out comprehensively and still depends heavily on individual teacher initiative and capacity.

In terms of evaluation, the adaptive curriculum at MA Hamzanwadi NW Gelogor has not yet been supported by an assessment system that fully reflects competency-based learning. Written tests continue to dominate the evaluation process, while alternative

assessments such as portfolios are only beginning to be introduced. Furthermore, curriculum evaluation is conducted only once a year and is not based on systematic analysis of student learning outcomes or performance data. As a result, the feedback generated from the evaluation process is still limited in informing curriculum improvement. These findings indicate that the three dimensions of adaptive curriculum development—planning, implementation, and evaluation—have not yet been fully aligned, so stronger coordination, standardization, and data-based decision-making are needed to ensure that the curriculum can respond effectively to students’ learning needs and educational changes.

Supporting and Inhibiting Factors

In addition to examining the planning, implementation, and evaluation of adaptive curriculum development, this study also identified a number of supporting and inhibiting factors that influence its implementation at MA Hamzanwadi NW Gelogor. These factors emerged from interview data, observations, and document analysis, and reflect both internal and external conditions that shape the effectiveness of curriculum adaptation in the madrasah context. The findings indicate that the implementation of an adaptive curriculum is not determined solely by pedagogical readiness, but is also strongly affected by leadership, teacher capacity, institutional support, infrastructure, and the socio-cultural environment in which the learning process takes place.

An interesting finding from this study is the emergence of cultural factors that have not previously been discussed in the literature. Madrasah students' tendency to respect teachers as the sole authority on knowledge becomes a structural barrier to the development of critical thinking and collaboration skills. The Madrasah principal referred to this as a "culture of respect that needs to be contextualized," as stated by the madrasah principal. *"Our students have a deep respect for their teachers. This is a value we uphold, but sometimes this respect makes them reluctant to express opinions or criticize. We need to find a way to ensure that respect and critical thinking can go hand in hand."* This finding was not found in previous studies conducted in public schools, and represents an original contribution of this study to the understanding of adaptive curriculum development in the madrasah context.

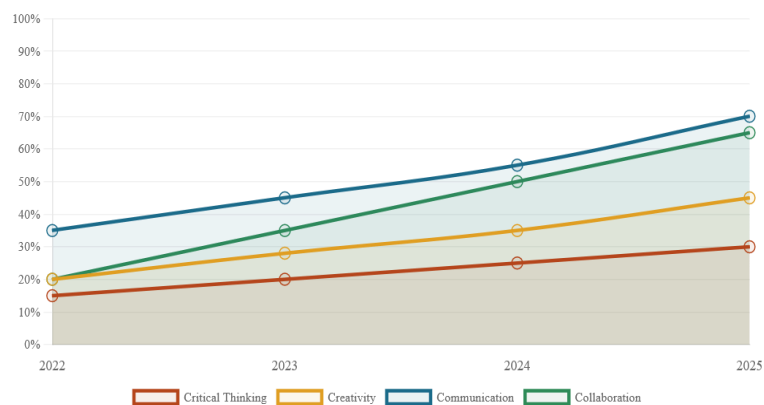


Chart 4. Development Trends in the Implementation of 4C Elements in Learning (2022-2025)

Chart 4 shows a positive trend in the integration of 4C elements into learning over the past three years. Based on the analysis of lesson plan documents, the collaboration element has increased significantly from 20% of the lesson plan in 2022 to 65% in 2025, this is in line with the gradual implementation of the project-based learning model. In contrast, the critical thinking element remains stagnant at 30% in 2025, indicating that the increase in collaboration has not been accompanied by a deepening of critical analysis skills. This suggests the need for training interventions that are more focused on strategy.

Adaptive Curriculum Management Model: Research Contribution

Based on the synthesis of field findings and theoretical foundations, this study formulates an adaptive curriculum management model consisting of four cyclical phases that are interconnected and not linear-terminal:

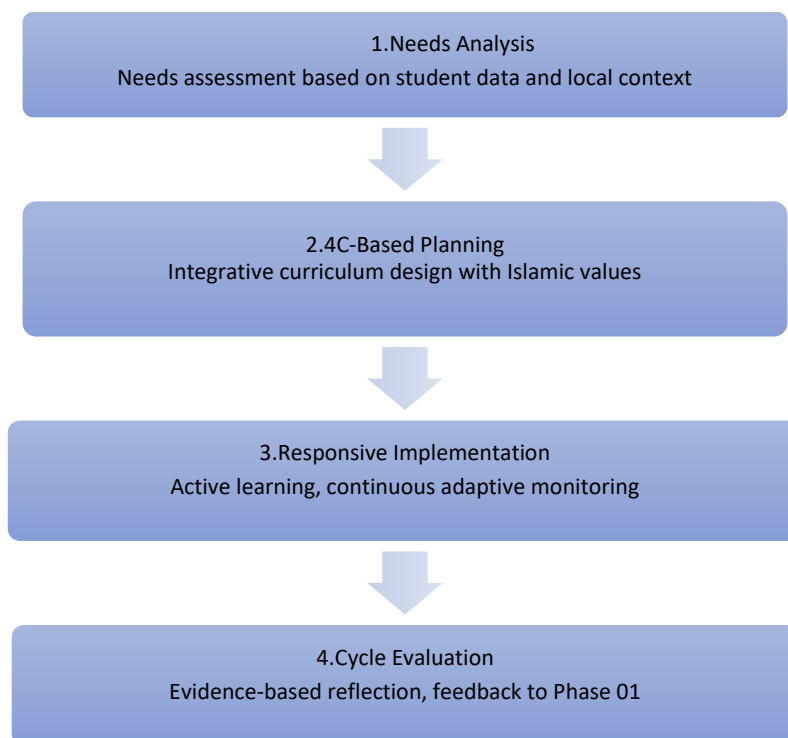


Figure 1. Adaptive Curriculum Management Model - MA Hamzanwadi NW Gelogor

The Adaptive Curriculum Management Model differs from the linear model (Rationale, 1949) because it explicitly incorporates feedback from the needs analysis re-evaluation. This model also differs from the UbD framework (Wiggins, 2005) because it integrates the dimensions of the madrasah's cultural context, especially the values of *ta'dzim* and Islamic-based character education, as variables that need to be managed managerially, not ignored in the curriculum adaptation process. Thus, the adaptive curriculum management model offers a more contextually embedded approach than existing generic models.

The adaptive curriculum management model proposed in this study demonstrates that curriculum development in madrasah settings cannot be understood as a one-time administrative process, but rather as a continuous cycle of diagnosis, implementation, reflection, and adjustment. The inclusion of re-evaluation as a recurring phase emphasizes that curriculum management must remain responsive to students' changing needs, teacher capacity, and institutional challenges. In this sense, the model highlights the importance of feedback loops in ensuring that curriculum decisions are not static, but are constantly refined based on evidence from classroom practice and learning outcomes. This cyclical orientation makes the model more flexible and relevant for educational institutions operating in dynamic social and technological contexts.

The model offers a contextual contribution by positioning madrasah culture as an integral component of curriculum management. Values such as *ta'dzim*, discipline, and Islamic character formation are not treated merely as background conditions, but as

educational realities that directly influence how adaptive learning can be planned and implemented. Therefore, the significance of this model lies in its ability to bridge contemporary curriculum demands—such as 21st-century competencies, student-centered learning, and data-based evaluation—with the cultural and religious identity of the madrasah. In conclusion, this study contributes an adaptive curriculum management model that is both theoretically relevant and practically applicable, because it combines cyclical curriculum improvement with sensitivity to the unique institutional culture of Islamic schools.

Discussion

The findings of this study indicate that adaptive curriculum management at MA Hamzanwadi NW Gelogor is still in a developmental stage, characterized by partial implementation across the dimensions of planning, implementation, and evaluation. This condition suggests that curriculum adaptation has been recognized normatively, but has not yet been fully translated into an integrated managerial practice. In the planning dimension, for example, teachers have begun to incorporate 21st-century learning orientations, particularly the integration of 4C competencies into lesson planning, yet the process remains fragmented due to the absence of a standardized format and documented needs analysis. This finding confirms the argument that curriculum reform often begins with conceptual acceptance before moving toward procedural institutionalization (Geletu & Mihiretie, 2023; Hindun et al., 2024). In other words, the school has shown an initial awareness of the need for adaptive curriculum development, but the supporting systems required to sustain it—such as common planning templates, data-based student mapping, and collaborative curriculum design—have not been fully established.

From the perspective of curriculum planning, the weak documentation of student needs analysis is particularly significant because adaptive curriculum, by definition, should be grounded in the characteristics, readiness, and learning profiles of students. Informal recognition of student diversity is an important starting point, but it is insufficient to support systematic curricular decisions. In adaptive curriculum theory, needs analysis functions as the basis for differentiating learning objectives, strategies, content emphasis, and assessment approaches (Ismail et al., 2024; Rodríguez & Stendardi, 2023). When such analysis is conducted only intuitively, teachers may struggle to align lesson design with actual learner needs, and adaptation becomes dependent on individual teacher sensitivity rather than institutional mechanisms. This finding also indicates that the curriculum at MA Hamzanwadi NW Gelogor is still teacher-responsive rather than system-responsive. As a result, curriculum flexibility exists in practice, but it has not yet evolved into a formally managed process that can be monitored, evaluated, and improved continuously.

In the implementation dimension, the use of Project-Based Learning (PBL) and group discussion by several teachers reflects an important shift toward student-centered learning and demonstrates the school's effort to accommodate adaptive pedagogical practices. This finding is relevant to the broader discourse on curriculum transformation, which emphasizes that adaptive curriculum is inseparable from active learning strategies that encourage critical thinking, collaboration, communication, and problem solving (Ainissyifa et al., 2024; Iman et al., 2024). However, because these methods were implemented only by a limited number of teachers, the transformation appears uneven and highly dependent on individual teacher initiative. This suggests that adaptive curriculum implementation has not yet reached the level of collective instructional culture. Instead of becoming a shared institutional practice, adaptive teaching remains localized in particular classrooms. Such a pattern is common in schools undergoing change, where innovation tends to be pioneered by motivated individuals before being adopted organizationally (Sliwka et al., 2024). Therefore, the challenge for the madrasah is not merely to introduce innovative methods, but to ensure that these practices are

diffused, supported, and normalized across subjects and teaching staff.

Another important issue emerging from the findings is the limited use of digital technology in learning. The fact that technology integration is still largely restricted to PowerPoint presentations indicates that digital tools have not yet been utilized as transformative instruments for adaptive learning, but rather as supplementary media for content delivery. This is important because, in the context of 21st-century curriculum, technology is expected to support interactivity, independent learning, collaboration, feedback, and access to diverse learning resources (Hindun et al., 2024; Tembrevilla et al., 2024). The weak digital integration found in this study may be interpreted as the result of two overlapping constraints: infrastructural limitations and limited teacher competence in digital pedagogy. This interpretation is consistent with the supporting and inhibiting factors identified in the study, where poor digital infrastructure and limited training emerged as dominant obstacles. Thus, the challenge is not simply technological availability, but the broader issue of digital readiness, which includes access, pedagogical confidence, institutional support, and time for experimentation. Without strengthening these aspects, digitalization in the curriculum risks remaining superficial and unable to function as a meaningful driver of adaptation.

The evaluation findings further reveal that curriculum management at MA Hamzanwadi NW Gelogor has not yet fully adopted a competency-based orientation. The dominance of written tests, combined with the limited use of portfolios and the annual nature of curriculum review, indicates that evaluation is still positioned as an administrative end-point rather than as an ongoing source of feedback for curriculum improvement. In adaptive curriculum management, evaluation should not merely measure student achievement, but also generate evidence for revising content, pedagogy, and support strategies (Kusumaputri et al., 2021; Rahmani et al., 2024). The absence of a data-based evaluation cycle weakens the school's ability to detect gaps between intended curriculum and actual learning experiences. This explains why the study found a lack of synchronization among planning, implementation, and evaluation: planning is not fully informed by learner data, implementation is uneven across teachers, and evaluation has not yet functioned as a feedback loop. In this regard, the adaptive curriculum management model proposed by this study becomes particularly relevant because it places re-evaluation at the center of the cycle, thereby correcting the linear tendency of conventional curriculum management models.

A major contribution of this study lies in its identification of cultural context as a managerial variable in adaptive curriculum development. The finding that students' strong respect for teachers may unintentionally inhibit critical dialogue and collaboration adds an important nuance to the literature on curriculum adaptation in Islamic educational settings. In many mainstream curriculum models, culture is often treated as a background context rather than as an active factor that shapes learning behavior, classroom interaction, and the feasibility of pedagogical innovation. Adaptive curriculum in madrasah settings should not simply import student-centered pedagogies from generic reform frameworks, but must reinterpret them within the ethical and relational norms of Islamic schooling. Therefore, the adaptive curriculum management model proposed in this study is significant because it bridges modern curriculum demands with local cultural realities. Rather than seeing culture as an obstacle to reform, the model positions it as an element that must be managed consciously so that curriculum adaptation remains pedagogically effective while still preserving the identity and values of the madrasah.

CONCLUSION

This study generated four main findings. First, understanding of the 21st-century competency-based adaptive curriculum at MA Hamzanwadi NW Gelogor remains uneven,

with the principal and several teachers showing better understanding than senior teachers and most students. Second, adaptive curriculum implementation is still inconsistent and largely depends on individual teacher initiative rather than a structured managerial system, with learning implementation showing stronger progress than curriculum evaluation. This study proposes an Adaptive Curriculum Management Model consisting of four cyclical phases: needs analysis, 4C-based planning, responsive implementation, and cyclical evaluation. Although this model offers a contextual framework for Islamic madrasahs, the findings are limited to one institution and should therefore be generalized with caution.

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