Challenges and Strategies: Curriculum Implementation in 21st Century Learning

Annisa Zauhar Nafisah[1✉], Agus Pahrudin[2], Sri Rahmi[3]

[1,2]Master's Program in in Islamic Education Management, State Islamic University (UIN) Raden Intan Lampung, Jl. ZA. Pagar Alam, Labuhan Ratu, Kedaton District, Bandar Lampung City, Lampung 35142, Indonesia
[3]Master's Program in in Islamic Education Management, State Islamic University (UIN) Ar-Raniry Banda Aceh, Jl. Syech Abdurrauf, KOPELMA Darussalam, Syiah Kuala District, Banda Aceh City, Aceh 23111, Indonesia
✉*Corresponding Address: nafisahannisazauhar182@gmail.com*

Article Info	Abstract
	Education is fundamentally a process of shaping character and developing students' abilities. However, the expected educational outcomes have not been fully achieved, as evidenced by the low academic performance of many students. This study aims to examine aspects of curriculum implementation and the learning process. A qualitative research method was employed using a case study approach. The findings reveal that curriculum implementation, particularly in the learning process, involves student interaction with teachers and engagement with real-world problems both inside and outside the classroom. The stages of curriculum implementation consist of planning, implementation, and evaluation. Several factors hinder effective curriculum implementation, including a lack of teacher innovation, limited teacher skills and knowledge of new methodologies, inadequate facilities, misaligned policies, and low motivation to adopt innovations. Curriculum implementation is influenced by three main factors: curriculum characteristics, implementation strategies, and the characteristics of curriculum users.

INTRODUCTION

21st-century learning demands a paradigm shift in the teaching and learning process (Pradana et al., 2025). The development occurring in the fields of science and technology has progressed very rapidly. Various scientific fields such as telecommunications, health, agriculture, and others have experienced significant advancements (Ilham, 2022). However, this is in stark contrast to the developments in the field of education, particularly in the area of teaching or educational personnel (Nurmalasari et al., 2013). Moreover, if we look deeper into remote areas and schools located in rural villages, the expected educational outcomes have not yet been achieved. The reality shows that the majority of students still attain unsatisfactory levels of academic achievement (Maskur et al., 2020).

Education in Indonesia is based on the national goals stated in the fourth paragraph of the Preambule to the 1945 Constitution (UUD 1945). These national goals are inseparable from the implementation of the education system. Achieving the goals of education is not solely the responsibility of teachers or educators; all components of the educational system must be involved in the effort to achieve these planned objectives.

The curriculum is one of the most important elements in supporting the achievement of educational goals (Rahmawati et al., 2021).

Essence of the curriculum is that it is a program developed within an educational setting and implemented to support the attainment of specific educational objectives. In Arabic, the term for educational curriculum is *manhaj ad-dirasah* (Cahyati et al., 2023), which means a set of plans and media used by educational institutions as a foundation for realizing educational goals. The curriculum is also closely related to the Qur'an. The Qur'an explains the purpose of human life and the materials that must be studied, understood, and practiced by humans, which aligns with the components of the curriculum. Additionally, the curriculum outlines learning objectives, the teaching and learning process, and assessment tools. The implementation of the curriculum as the foundation for educational practices in institutions is a policy set by the central government to align the system with educational goals. The need for balance and alignment in achieving educational goals compels the government to develop curricula that suit the progress and development of education in each era.

The development of the curriculum has undergone several changes. The first curriculum change began in 1947 with the introduction of the 1947 Lesson Plan (Abidin et al., 2023). The use of curricula that meet the educational needs of each era certainly differs in its application. Each curriculum has its own characteristics. During the period of the national struggle for independence, for instance, the curriculum did not prioritize technological advancement but instead focused on forming the character of Indonesian citizens who are independent and equal to other nations. The proper implementation of curriculum and educational systems will create quality human resources with strong competitiveness (Alkampary et al., 2024; Sanga & Wangdra, 2023).

Fundamentally, the curriculum is one way to prepare children to participate as productive members of society. Although each curriculum may have different patterns, it consistently contains certain components, including goals and objectives, selection and organization of content, forms of teaching and learning activities, and evaluation of learning outcomes.

Various efforts have been made by the government to address the challenges in education, but weaknesses and shortcomings are still found in its implementation, whether at the primary, secondary, or higher education levels. One fundamental weakness lies in the implementation of the curriculum, whose function and role rest on the shoulders of teachers (educational practitioners). This indicates that teachers' ability and competence in implementing the curriculum still need to be improved.

Therefore, this paper will discuss curriculum implementation, including the definition of curriculum implementation, principles of curriculum execution, approaches and models of curriculum implementation, parties involved in the implementation, stages of implementation, and the actual practice of curriculum application.

It is hoped that the information presented in this paper will help educational practitioners, in particular, to implement the curriculum effectively in their respective educational units, so they may fulfill their roles and responsibilities as capable curriculum implementers.

RESEARCH METHODS

This study uses a qualitative research method with a case study approach. This study focuses on collecting data contained in various existing reading sources. Various library materials and information data used are sourced from

the annual report of SMP Islam El-Syihab Bandar Lampung, SMP Islam El-Syihab Bandar Lampung curriculum books, observations, interviews, documentation, books, scientific journals, mass media (both print and electronic), government data, articles, and other reading sources.

This type of research is also one of the types of research that focuses on developing theories or finding solutions to problems that are conceptual in nature. The data collection technique employed in this study is a research method that utilizes the literature review approach.

This literature review method is one of the activities to find data on several things that can be in the form of notes, books, articles, mass media, and several other reading sources that can be accepted as true based on existing scientific studies.

Based on the use of references, researchers can use two models of review or analysis of the studies conducted. Deductive analysis is carried out based on existing and relevant general theories or concepts, and inductive analysis is carried out based on the synthesis of previous research.
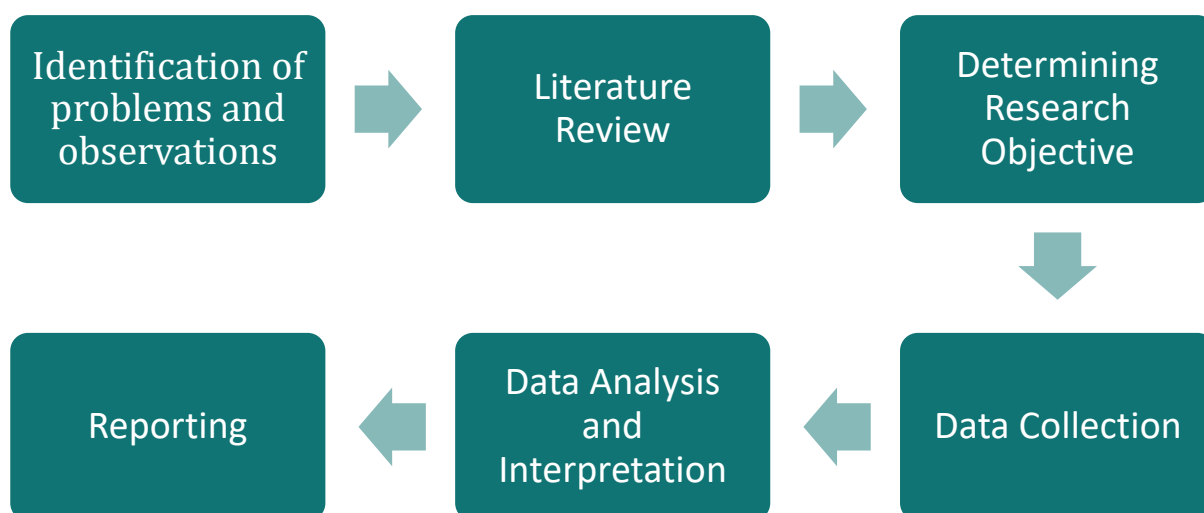

Figure 1. The Special Stages of Qualitative Research

The special stages of qualitative research include: (1) Identification of problems and observations; researchers must start with what is the target of the research, meaning the specifications of the issue/phenomenon to be studied/researched. (2) Literature review (literature search); in this section, researchers must look for materials or reading sources related to the phenomenon to be studied, so that researchers must be able to find novelty or advantages of their research compared to previous research. (3) Determining research objectives; researchers must identify the main purpose/objective of their research.

(4) Data collection; researchers must pay attention to selecting and determining potential objects/participants, in order to reach the ability of participants are actively involved in the research. (5) Data analysis and interpretation; data that has been obtained by researchers is then analyzed or interpreted to produce new ideas or theories. (6) Reporting: The researcher made a report on the results of his research in a descriptive manner, because he used a qualitative method so that it required a broad description in his report and had to position the reader as if he were someone involved in the research.

From this context, this research was developed to examine the challenges and strategies for implementing the curriculum in 21st-century learning.

RESULTS AND DISCUSSION

Curriculum Implementation in 21st Century Learning

In the Oxford Advanced Learner's Dictionary it is stated that implementation is "outsome thing into effect" or the application of something that has an effect (Tsuraya et al., 2022). Curriculum implementation can also be interpreted as the actualization of a written curriculum in the form of learning. This is in line with what Miller and Seller expressed that "in some cases implementation has been identified with instruction" further explained that curriculum implementation is an application of the concept of a program idea or curriculum structure is an application of the concept of a program idea or curriculum structure into learning practices or various new creativity so that changes occur in a group of people who are expected to change (Harahap et al., 2022).

Curriculum implementation involves many factors such as attitudes, mindsets, perceptions, philosophical assumptions, teacher feelings, and school culture, it is very strategic if continuous clarification is carried out on various aspects of change that will occur if the curriculum is implemented. Therefore, Fullan (2016) explains that there are factors that influence the success of curriculum implementation, namely the implementer must understand the characteristics of the changes to be made, understand the changes comprehensively, and know the benefits of curriculum changes for schools.

The implementation of 21st-century curriculum in educational institutions reveals a complex landscape marked by multiple interrelated challenges. Through qualitative data collected from interviews, classroom observations, and focus group discussions with teachers, school leaders, and curriculum supervisors, the study identified four primary categories of challenges: pedagogical competence, technological infrastructure, institutional resistance, and policy-practice alignment. Each of these factors has direct implications for the effectiveness of curriculum delivery in the 21st-century context..

Challenges to Curriculum Implementation in 21st Century Learning

The findings of this study indicate that the implementation of 21st-century curriculum remains challenged by a range of structural and pedagogical issues, particularly in relation to teacher preparedness. Many educators report difficulties in effectively applying key components of 21st-century learning, including critical thinking, collaboration, creativity, and communication.

This misalignment between curriculum design and classroom practice suggests a need for more grounded, contextualized professional development programs. Existing training initiatives have often been theoretical, lacking clear applicability to the dynamic classroom environments teachers navigate daily.

In addition to pedagogical gaps, infrastructural limitations, especially in terms of access to digital technologies pose significant barriers. Inadequate internet connectivity and a lack of digital devices restrict schools from integrating technology into teaching and learning processes. This technological gap undermines the principles of 21st-century learning, which emphasize digital literacy and the integration of ICT tools to support collaborative, student-centered learning environments (Trilling & Fadel, 2009).

Another major challenge identified is resistance to change among educators and stakeholders. Teachers often perceive curriculum innovation as burdensome, particularly when excluded from curriculum planning and policy formation. The absence of participatory mechanisms

reduces their sense of ownership and commitment, weakening curriculum implementation. As Fullan (2016) notes, meaningful change in education requires deep engagement from those who enact it at the ground level, namely teachers.

Pedagogical Competence and Professional Readiness

One of the most consistent themes emerging from the data is the limited pedagogical competence of teachers in applying 21st-century learning principles. Teachers reported difficulty in designing learning experiences that promote critical thinking, collaboration, creativity, and communication. Many still rely on teacher-centered methods and traditional assessments, with limited integration of student-led inquiry or project-based learning.

As conveyed by a teacher at SMP Islam El-Syihab Bandar Lampung, "We are asked to integrate critical thinking and collaboration skills into every lesson, but we are never trained on how to design these activities effectively. The training we receive is more theoretical." This finding indicates a gap between policy expectations and professional capacity. As stated by Voogt & Roblin (2012), 21st-century learning requires a paradigm shift in learning strategies, which cannot be achieved without continuous, contextual, and targeted professional development.

Technological Infrastructure and Access

Limited access to reliable technology infrastructure was another prominent issue. Many schools, particularly in rural and underfunded areas, struggle with outdated hardware, insufficient internet bandwidth, and a lack of digital teaching resources. Teachers expressed frustration over their inability to conduct digital-based instruction or use learning management systems effectively.

During an observation in SMP Islam El-Syihab Bandar Lampung, it was noted that the only available projector had been non-functional for weeks, and no technical support was provided. Furthermore, several teachers expressed concerns about students' unequal access to devices at home, which further exacerbates digital learning disparities. These limitations directly hinder the integration of information and communication technology (ICT) into instruction, an essential aspect of 21st-century learning (UNESCO Institute for Statistics & Wallet, 2014).

Resistance to Change and Cultural Constraints

Institutional resistance to change, both from educators and administrators, also emerged as a barrier. Many educators perceive the curriculum reform as an externally imposed mandate that increases workload without offering practical benefits. Resistance is often rooted in anxiety about changing long-established routines and uncertainty about new expectations.

The Curriculum Vice Principal stated, "Some teachers attended the training but went back to their old ways because they believed that the 'new methods' were not suitable for our students or were too idealistic." This highlights the mismatch between policy design and classroom realities, as well as the lack of effective change management strategies at the institutional level. As Fullan (2016) has argued, educational reform is unlikely to succeed without the emotional involvement and active engagement of those responsible for implementation.

Policy-Practice Disconnection

The data also reveal a disconnection between the curriculum documents and practical classroom needs. Teachers indicated that the curriculum is often too broad and lacks concrete examples or contextualized guidelines. This ambiguity leaves much of the interpretation to individual teachers, who may lack the time

or expertise to adapt the curriculum effectively.

One participant commented, "There are too many competencies to cover and not enough time to go in-depth. We end up rushing to finish the syllabus rather than focusing on meaningful learning." This situation leads to superficial implementation and undermines the development of the higher-order thinking skills central to 21st-century education (Saavedra & Opfer, 2012).

Strategic Approaches to Curriculum Implementation in 21st Century Learning

Effective strategies to address these challenges include the provision of ongoing, practice-based professional development. Schools demonstrating successful curriculum implementation typically conduct regular in-house training aligned with real classroom scenarios. These sessions are often facilitated by experienced educators who understand local contexts and can offer relevant, actionable solutions. Such capacity-building efforts align with the model of professional learning communities, which emphasize collaborative reflection and continuous pedagogical improvement (DuFour & Eaker, 1998).

Collaboration among teachers also emerges as a critical enabler of curriculum reform. Peer learning through lesson study groups or teacher learning communities fosters a reflective culture in which educators share strategies, solve problems, and co-develop instructional practices. This collaborative approach not only enhances teacher competence but also cultivates a culture of innovation and mutual support within schools (Stoll et al., 2006).

Leadership by school principals further contributes to successful implementation. Transformational leadership, characterized by encouragement, support, and vision—has been shown to inspire educators to embrace curricular change. Principals who actively create space for pedagogical experimentation and recognize teacher efforts can significantly enhance teacher motivation and the sustainability of innovation efforts (Leithwood & Jantzi, 2005).

Overall, the study underscores that successful implementation of 21st-century curriculum requires more than policy reform; it demands a cultural shift within educational institutions. The interplay between professional development, leadership, infrastructure, and collaboration forms the backbone of systemic transformation. Without addressing these elements holistically, curriculum innovation risks remaining at the level of rhetoric, failing to translate into meaningful changes in teaching and learning practices.

Despite the challenges, several effective strategies have been identified across schools that demonstrate progress in 21st-century curriculum implementation. These strategies span four key domains: professional development, peer collaboration, instructional leadership, and policy contextualization.

Practice-Oriented Professional Development

Schools that reported stronger curriculum implementation often engaged in ongoing, in-house training focused on practical teaching scenarios. These workshops typically included peer modeling, co-teaching, and classroom simulations. Rather than relying on centralized seminars, professional development was localized and embedded in the school context. This aligns with the research by Darling-Hammond et al. (2017), which emphasizes the importance of job-embedded professional learning for effective instructional change.

Collaborative Teaching Communities

Establishing teacher learning communities or lesson study groups proved to be a highly effective approach to addressing curriculum demands collaboratively. In these communities, teachers plan lessons together, observe each other's classes, and engage in reflective dialogue. This not only strengthens instructional design but also reduces professional isolation and resistance to change.

A principal explained, "We started a weekly learning circle where teachers share what worked and what didn't. It has really helped to build confidence and collective ownership of the curriculum goals."

Transformational School Leadership

The presence of visionary and supportive school leaders played a critical role in facilitating curriculum innovation. Effective principals provided teachers with autonomy to experiment, allocated time for peer learning, and recognized innovative teaching practices. Leadership that fosters a culture of trust and shared learning is crucial for sustainable reform (Leithwood & Jantzi, 2005).

Local Adaptation and Curriculum Simplification

Finally, schools that succeeded in aligning curriculum with classroom realities often adapted and simplified the curriculum based on student needs and available resources. This did not mean diluting standards, but rather prioritizing key competencies and ensuring meaningful depth of learning. Schools also developed context-specific learning modules that blended national curriculum goals with local relevance.

CONCLUSIONS AND SUGGESTIONS

The implementation of the 21st-century curriculum is a multifaceted process that extends beyond structural reforms. It requires shifts in teacher capacity, institutional culture, and leadership approaches. Although significant challenges remain, particularly in areas such as pedagogical readiness, technological access, and resistance to change, this study highlights that localized, collaborative, and leadership-driven strategies can foster more effective and sustainable curriculum implementation. Future reforms should prioritize empowering schools through contextualized support systems and active stakeholder engagement, ensuring that 21st-century learning becomes not only a policy aspiration but a lived reality in every classroom.

Based on the research findings, it is recommended that stakeholders focus on strengthening teacher capacity and school leadership through contextual training, as well as ensuring equitable access to technology. Active community involvement and the development of an institutional culture that supports innovation are also key to the successful implementation of the 21st-century curriculum. For future research, it is suggested to explore contextual factors influencing implementation, conduct comparative studies across regions or educational levels, and analyze the role of transformational leadership and its impact on student learning outcomes.

REFERENCE

Abidin, D., Retnaningrum, E., Parinussa, J. D., Kuning, D. S., Manoppo, Y., & Kartika, I. M. (2023). Curriculum development in Indonesia from a historical perspective. *Journal of Education Research*, *4*(2), 443–451.

Alkampary, A. I., Muhlis, W., & Norazizah, S. (2024). Definition and History of Educational Curriculum Development in Indonesia (1947-2013). *Borneo Journal of Language and Education*, *4*(1), 159–174.

Cahyati, L., Tatang, T., & Maulani, H. (2023). Analisis Faktor Kesulitan dalam Pembelajaran Bahasa Arab Siswa Kelas VIII SMP Miftahul Iman Kota Bandung. *Journal of Arabic Teaching, Linguistic and Literature*, *3*(1), 16–30.

Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). Effective teacher professional development. *Learning Policy Institute*.

DuFour, R., & Eaker, R. (1998). *Professional learning communities at work: Best practices for enhancing student achievement*. Solution Tree.

Fullan, M. (2016). *The new meaning of educational change*. Teachers College Press.

Harahap, M. R., Lubis, M., Syafaruddin, S., & Syukri, M. (2022). Implementasi Kebijakan Kurikulum dalam Peningkatan Mutu Lulusan di MIN se-Kota Sibolga. *Al-Fikru: Jurnal Ilmiah*, *16*(1).

Ilham, R. W. (2022). Perkembangan Teknologi di Bidang Pendidikan. *COMSERVA Indonesian Jurnal of Community Services and Development*, *2*(5), 468–475.

Leithwood, K., & Jantzi, D. (2005). Transformational leadership. *The Essentials of School Leadership*, *31*, 43.

Maskur, R., Sumarno, Rahmawati, Y., Pradana, K., Syazali, M., Septian, A., & Palupi, E. K. (2020). The Effectiveness of Problem Based Learning and Aptitude Treatment Interaction in Improving Mathematical Creative Thinking Skills on Curriculum 2013. *European Journal of Educational Research*, *9*(1), 375–383. https://doi.org/10.12973/eu-jer.9.1.375

Nurmalasari, R., Dian, R., Wati, P., Puspitasari, P., Diana, W., & Dewi, N. K. (2013). *Peran Guru Dalam Implementasi Kurikulum 2013*. 722–733.

Pradana, K. C., Noer, S. H., & Sutiarso, S. (2025). 'MATHUB': Development and Usability Evaluation of an Interactive App for Learning Number Patterns in Middle School. *Ensiklopedia: Jurnal Pendidikan Dan Inovasi Pembelajaran Saburai*, *5*(01), 13–23.

Rahmawati, Y., Pradana, K. C., Novalia, N., Rinaldi, A., & Syazali, M. (2021). Curiosity and creative characters: The impact on students' numerical ability. *Desimal: Jurnal Matematika*, *4*(2), 231–246. https://doi.org/10.24042/djm.v4i2.10182

Saavedra, A. R., & Opfer, V. D. (2012). Learning 21st-century skills requires 21st-century teaching. *Phi Delta Kappan*, *94*(2), 8–13.

Sanga, L. D., & Wangdra, Y. (2023). Pendidikan adalah faktor penentu daya saing bangsa. *Prosiding Seminar Nasional Ilmu Sosial Dan Teknologi (SNISTEK)*, *5*, 84–90.

Stoll, L., Bolam, R., McMahon, A., Wallace, M., & Thomas, S. (2006). Professional learning communities: A review of the literature. *Journal of Educational Change*, *7*(4), 221–258.

Trilling, B., & Fadel, C. (2009). *21st century skills: Learning for life in our times*. John Wiley & Sons.

Tsuraya, F. G., Azzahra, N., Azahra, S., & Maharani, S. P. (2022). Implementasi kurikulum merdeka dalam sekolah penggerak. *Jurnal Pendidikan, Bahasa Dan Budaya*, *1*(4), 179–188.

UNESCO Institute for Statistics, & Wallet, P. (2014). *ICT in Education in Asia: A Comparative Analysis of Integration and E-Readiness*. UNESCO: United Nations Educational, Scientific and Cultural Organisation.

Voogt, J., & Roblin, N. P. (2012). A comparative analysis of international frameworks for 21st century competences: Implications

for national curriculum policies. *Journal of Curriculum Studies, 44*(3), 299–321.