



Future Prospects of Learning Innovation Development

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Abstrak : Perkembangan teknologi digital dan tuntutan keterampilan abad ke-21 menuntut adanya inovasi pembelajaran yang adaptif dan berkelanjutan. Namun demikian, masih terdapat kesenjangan antara pesatnya perkembangan teknologi dengan kesiapan guru, ketersediaan sarana prasarana, serta integrasi nilai pedagogik dan karakter dalam proses pembelajaran. Penelitian ini bertujuan untuk menganalisis prospek pengembangan inovasi pembelajaran di masa depan ditinjau dari aspek teknologi, pedagogik, dan penguatan karakter peserta didik. Penelitian ini menggunakan metode *mixed methods* (metode campuran) dengan desain sequential explanatory, yang mengombinasikan data kuantitatif dan kualitatif secara berurutan untuk memperoleh pemahaman yang komprehensif. Penelitian dilaksanakan di beberapa satuan pendidikan tingkat dasar dan menengah di Kabupaten Bekasi, Jawa Barat. Populasi penelitian adalah guru pada jenjang tersebut, dengan sampel sebanyak 20 guru yang dipilih melalui teknik purposive sampling berdasarkan kriteria pengalaman dalam penerapan inovasi pembelajaran. Jumlah sampel ini tidak ditujukan untuk generalisasi statistik, melainkan untuk memperoleh data yang mendalam dan mencapai ketercukupan informasi (*data saturation*). Data kuantitatif diperoleh melalui angket untuk mengukur tingkat kesiapan dan implementasi inovasi pembelajaran, kemudian dianalisis secara deskriptif menggunakan SPSS. Selanjutnya, data kualitatif diperoleh melalui wawancara mendalam dan observasi guna memperkuat serta menjelaskan temuan kuantitatif, yang dianalisis menggunakan model interaktif Miles dan Huberman yang meliputi reduksi data, penyajian data, dan penarikan kesimpulan. Hasil penelitian menunjukkan bahwa mayoritas guru telah menerapkan inovasi pembelajaran berbasis digital dan blended learning. Sebanyak 70% guru berada pada kategori siap, dan 80% responden menyatakan adanya peningkatan hasil belajar siswa setelah penerapan inovasi. Disimpulkan bahwa prospek inovasi pembelajaran di masa depan sangat besar apabila dikembangkan secara terintegrasi antara teknologi, pedagogik, dan penguatan karakter.

Keywords:

Learning Innovation, Educational Technology, Character Education

Abstract: *The rapid development of digital technology and the demands of 21st-century skills require adaptive and sustainable learning innovation. However, there remains a gap between technological advancement and teacher readiness, infrastructure*

availability, as well as the integration of pedagogical and character values in the learning process. This study aims to analyze the future prospects of learning innovation development from technological, pedagogical, and student character perspectives. This study employed a mixed methods approach with a sequential explanatory design, combining quantitative and qualitative data sequentially to obtain a comprehensive understanding. The research was conducted in several primary and secondary educational institutions in Bekasi Regency, West Java, Indonesia. The population consisted of teachers at these levels, with a sample of 20 teachers selected through purposive sampling based on their experience in implementing learning innovation. The sample size was not intended for statistical generalization but to achieve in-depth insights and data saturation. Quantitative data were collected through questionnaires to measure the level of readiness and implementation of learning innovation and were analyzed descriptively using SPSS. Qualitative data were obtained through in-depth interviews and observations to strengthen and explain the quantitative findings, analyzed using the interactive model of Miles and Huberman, which includes data reduction, data display, and conclusion drawing. The results indicate that the majority of teachers have implemented digital-based learning innovation and blended learning approaches. Approximately 70% of teachers were categorized as ready, and 80% of respondents reported improvements in student learning outcomes after the implementation of innovation. It is concluded that the prospects for future learning innovation are highly promising when developed through the integrated application of technology, pedagogy, and character education.

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INTRODUCTION

The rapid development of digital technology in the era of the Industrial Revolution 4.0 and Society 5.0 has significantly transformed educational systems. Learning is no longer limited to conventional face-to-face instruction but is increasingly integrated with digital platforms, artificial intelligence, data analytics, and hybrid learning models. This transformation reflects the demands of 21st-century learning which emphasize the integration of technology, creativity, and critical thinking Daryanto & Karim (2017). In Indonesia, this transformation is reinforced by educational policies that emphasize student-centered learning and the integration of technology. However, gaps still exist in terms of teacher readiness, infrastructure availability, and pedagogical adaptation. This indicates that the effectiveness of learning innovation is closely related to the quality of the teaching and learning process Hamalik (2019). This is consistent with the findings of Silva C, et al. (2022) and Brill (2025), which indicate that digital transformation in education has not yet been fully supported by adequate human resources and infrastructure readiness.

Several previous studies demonstrate that technology-based learning innovation has a positive impact. Research by Syafrillah Najjar and Harni Oktasari (2023) highlights that mobile learning enhances flexibility, accessibility, and interactivity in the learning process. Furthermore, Muh. Rijal (2024) shows that digital technology plays a crucial role in improving vocational skills relevant to industry demands. Meanwhile, Luh De Lisk, et al (2025) prove that the integration of artificial intelligence significantly improves students' conceptual understanding and learning outcomes. These findings are further supported by Zawacki-Richter et al. (2020) and Holmes W (2022) who argue that the use of artificial intelligence in education enables more personalized and adaptive learning experiences.

Nevertheless, these studies tend to focus primarily on the technical aspects of technology use and its effectiveness in improving learning outcomes. Comprehensive studies that integrate technology with pedagogical approaches and character education remain limited. In addition, factors such as teacher readiness, infrastructure conditions, and the sustainability of innovation have not been extensively explored. This is in line with OECD (2021), which emphasizes that the success of digital transformation in education depends not only on technology but also on pedagogical competence and the overall readiness of the educational system.

Based on these gaps, this study offers novelty by adopting an integrated approach that combines technological, pedagogical, and character aspects in analyzing the prospects of learning innovation holistically. This study also seeks to formulate a sustainable learning innovation model by considering supporting and inhibiting factors in the field.

The research questions are formulated as follows: (1) What are the future prospects of learning innovation development from technological, pedagogical, and character perspectives? (2) What supporting and inhibiting factors influence its implementation? (3) How can an effective and sustainable learning innovation model be formulated within the Indonesian educational context? The hypothesis of this study states that learning innovation that integrates technology, pedagogy, and character education has stronger prospects in improving learning quality compared to approaches that focus solely on technology.

Accordingly, the objectives of this study are to analyze the prospects of learning innovation, identify supporting and inhibiting factors, and formulate an integrated and

sustainable innovation model. This research is expected to contribute a conceptual framework that bridges technological advancement with pedagogical and moral dimensions, ensuring that educational innovation remains humanistic and contextual.

METHODS

Research Approach and Design

This study employed a mixed methods approach with a sequential explanatory design, which combines quantitative and qualitative data in a sequential manner to obtain a comprehensive understanding. The initial stage involved the collection and analysis of quantitative data to identify general patterns, followed by qualitative data to further explore and explain these findings in a contextual manner. This approach was selected because it integrates the strengths of quantitative data, which are generalizable, with qualitative data, which provide in-depth insights, thereby offering a more holistic understanding of the phenomenon under study, as proposed by Creswell (2018) and Sugiyono (2019).

Research Location

The research was conducted across several primary and secondary educational institutions in Bekasi Regency, West Java, Indonesia. One of the selected research sites was SDIT Al-Barkah Katimaha Bekasi, located at Jl. K.H. Abu Bakar, Katimaha Area RT/RW 002/006, Karang Anyar Village, Sukakarya District, Bekasi Regency. The selection of research sites was purposively determined based on their heterogeneous educational characteristics, including variations in infrastructure availability, teachers' digital competence, and the extent of technology integration within instructional practices.

Population and Sample

The population of this study consisted of teachers working in primary and secondary schools in Bekasi Regency, which encompasses a large number of schools with diverse infrastructure conditions and varying levels of teacher competence. Therefore, this study does not aim to achieve statistical representativeness.

The sample was selected using purposive sampling, focusing on teachers who had implemented or were in the process of adopting digital-based learning innovations. A total of 20 teachers were involved as primary participants. In addition, several school principals and supervisors were included as supporting informants to enrich the qualitative findings.

The sample size was considered adequate to achieve data saturation and to provide in-depth insights into the phenomenon under investigation, in line with qualitative research principles.

Types and Sources of Data

This study utilized two types of data:

1. Primary data, obtained directly from participants through in-depth interviews, classroom observations, and questionnaires regarding the implementation of learning innovation.
2. Secondary data, derived from school documents, policy reports from the Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi Republik Indonesia, books, and relevant

national and international journal articles related to learning innovation and digital education.

Research Stages

The research was conducted through several systematic stages:

1. Planning Stage: preparation of research instruments, determination of research sites, and selection of participants.
2. Data Collection Stage: conducting interviews, distributing questionnaires, observing classroom activities, and collecting documentation.
3. Data Processing Stage: organizing, reducing, and categorizing collected data.
4. Data Analysis and Interpretation Stage: analyzing findings and interpreting results in relation to research objectives.
5. Reporting Stage: compiling the research findings into a scientific journal article.

Data Collection Techniques

Data were collected using the following techniques:

1. In-depth interviews to explore teachers' experiences and perceptions of learning innovation.
2. Direct observation of classroom learning processes involving digital innovation.
3. Questionnaires to measure teachers' readiness and perceptions quantitatively.
4. Documentation to gather supporting evidence such as lesson plans and digital learning media.

Data Analysis Techniques

Qualitative data were analyzed using the interactive model of Miles dan Huberman, which includes data reduction, data display, and conclusion drawing/verification.

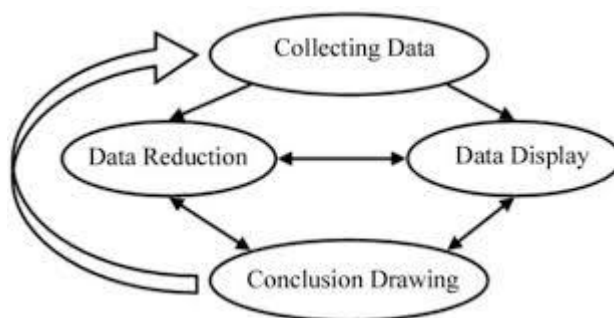


Figure 1. Interactive model of data analysis Miles & Huberman (2014)

Thematic coding was conducted to identify patterns and categories relevant to innovation development.

Quantitative data obtained from questionnaires were analyzed using descriptive statistics with the assistance of SPSS (Statistical Package for the Social Sciences) to determine percentages, mean scores, and response trends.

To ensure data validity and credibility, triangulation of sources and techniques was applied by comparing interview, observation, questionnaire, and documentation data.

RESULTS AND DISCUSSION

Results

1. Level of Learning Innovation Implementation

Table 1.
Level of Learning Innovation Implementation Among Teachers in Bekasi Regency

Category	Number of Teachers	Percentage
Very High	5	25%
High	7	35%
Moderate	6	30%
Low	2	10%
Total	20	100%

Based on Table 1 above, it can be seen that 60% of teachers fall into the high and very high categories in implementing learning innovation. However, 10% of teachers are still categorized as having low implementation levels.

2. Teacher Readiness in Developing Digital Innovation

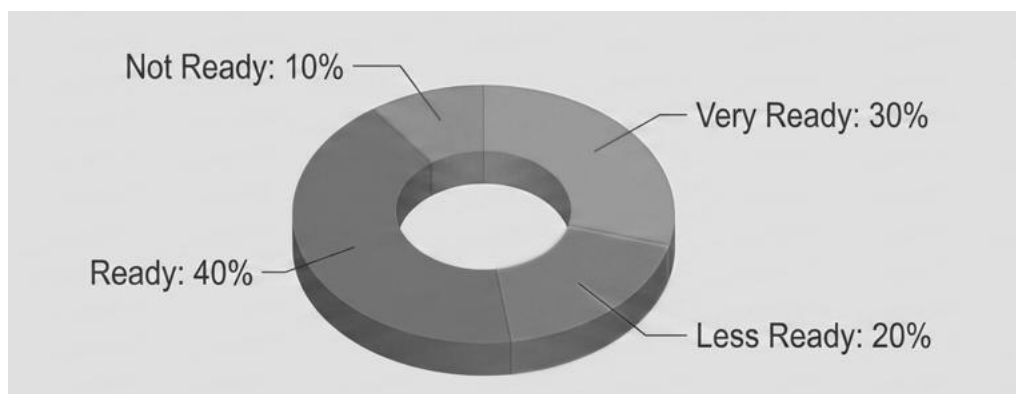


Figure 2. Teacher Readiness Toward Digital Learning Innovation

- a. Very Ready : 30%
- b. Ready : 40%
- c. Less Ready : 20%
- d. Not Ready : 10%

Based on the diagram above, the majority of teachers (70%) are categorized as ready or very ready to develop digital learning innovation, while a small proportion still show limited readiness.

3. Availability of Supporting Infrastructure

Table 2. Availability of ICT Infrastructure in Schools

Infrastructure	Available	Not Available
LCD/Projector	80%	20%
School Internet Access	75%	25%

Computer Laboratory	55%	45%
Students' Digital Devices	60%	40%

Based on Table 2 above, infrastructure support is relatively adequate for basic digital learning implementation. However, computer laboratories and student device availability remain uneven.

4. Forms of Learning Innovation Applied

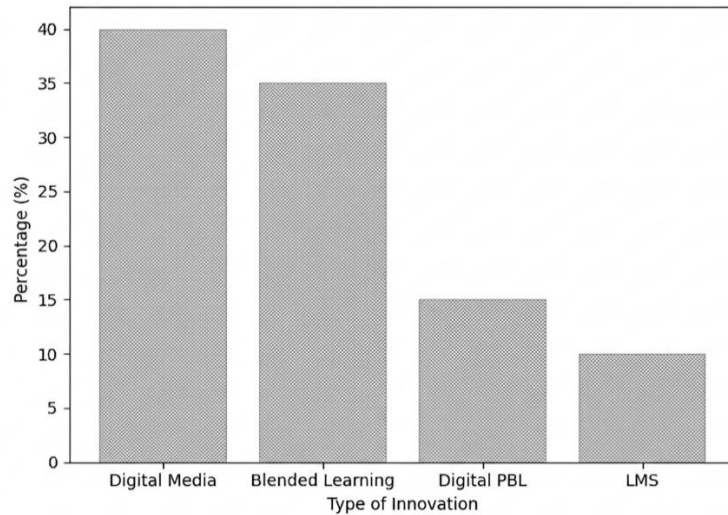


Figure 3. Types of Learning Innovation Applied by Teachers

- a. Digital learning media (interactive presentations, videos)
- b. Blended learning
- c. Digital-based Project-Based Learning
- d. Learning Management System (LMS) utilization

Based on Figure 1 above, digital learning media and blended learning are the most frequently implemented forms of innovation among teachers.

5. Impact on Student Learning Outcomes

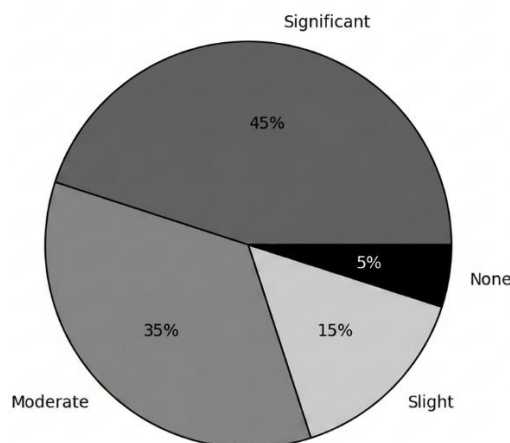


Figure 2 Percentage of Reported Improvement in Student Learning Outcomes

- a. Significant Improvement : 45%
- b. Moderate Improvement : 35%
- c. Slight Improvement : 15%
- d. No Improvement : 5%

Based on the graph above, 80% of respondents reported moderate to significant improvement in student learning outcomes after implementing learning innovation.

Discussion

The findings indicate that learning innovation implementation among teachers in Bekasi Regency is generally categorized as high. The majority of teachers have integrated digital media and blended learning approaches into classroom practices. This shows that teachers play a crucial role as agents of change in implementing innovative learning Mulyasa (2021). This result confirms that technological transformation in education is progressively taking place at the school level. The positive readiness rate (70%) also reflects a growing awareness among teachers regarding the necessity of innovation in responding to 21st-century educational demands. Learning innovation must also be supported by appropriate strategies and instructional planning Priansa (2019).

The results align with contemporary theories of digital pedagogy, which emphasize that effective innovation depends not only on technology availability but also on teachers' competence and pedagogical adaptation. Effective learning requires systematic design and meaningful learning processes Trianto (2010). Previous studies highlight that blended learning enhances student engagement and flexibility, while digital media integration supports interactive and student-centered learning environments. This is in line with findings that digital-based learning innovation can improve learning effectiveness Suryani & Hendry (2020). The use of innovative learning media also supports the development of interactive and student-centered learning environments Suryani (2022). Additionally, research on technology-enhanced learning indicates that digital innovation can significantly improve motivation and academic performance when supported by proper instructional design.

However, the uneven availability of infrastructure reveals structural challenges that may limit the sustainability of innovation development. The success of digital transformation is also influenced by education policies and institutional readiness Kemendikbudristek (2022). Limited computer laboratories and unequal student access to digital devices indicate that technological advancement does not automatically guarantee equal implementation. This finding supports earlier research arguing that digital transformation must be accompanied by systemic policy support and infrastructure equity.

Moreover, although technological integration shows measurable academic benefits, the discussion of character education remains essential. Innovation that focuses solely on technical aspects risks neglecting moral and humanistic dimensions. Therefore, the novelty of this research lies in emphasizing the balanced integration of technology, pedagogy, and character reinforcement. The study demonstrates that sustainable learning innovation requires a holistic framework rather than a purely technological orientation. Furthermore, digital learning innovation has been widely implemented in various contexts and contributes to improving the effectiveness of learning processes Hulu et al., (2025).

Overall, the research confirms the hypothesis that integrated innovation—combining technological advancement, pedagogical depth, and character education—offers stronger prospects for improving educational quality compared to technology-centered approaches alone.

CONCLUSION

This study was conducted to analyze the future prospects of learning innovation development from technological, pedagogical, and character-building perspectives within the Indonesian educational context. Through a qualitative-descriptive approach supported by quantitative data, the research systematically explored the level of innovation implementation, teacher readiness, infrastructure conditions, and the broader implications for sustainable educational transformation. The findings confirm that the development of learning innovation holds strong prospects when technology integration is aligned with sound pedagogical principles and reinforced by character education values. The research process demonstrates that innovation in education should not be understood merely as technological adoption, but as a holistic transformation that integrates humanistic, ethical, and instructional dimensions in a balanced manner.

However, this study has several limitations. The research was conducted within a limited geographical scope in Bekasi Regency and involved a relatively small sample of participants, which may restrict the generalizability of the findings. In addition, the study primarily relied on descriptive and perceptual data without conducting experimental validation to measure long-term impacts on student achievement and character development. The rapid evolution of educational technology also means that the findings represent conditions within a specific time frame, which may shift as technological ecosystems continue to develop.

Future research is recommended to expand the geographical coverage and involve a larger and more diverse sample to enhance generalizability. Longitudinal or experimental studies are also needed to measure the sustained impact of integrated learning innovation on academic performance and character formation. Further exploration into artificial intelligence-based learning systems, data-driven personalization models, and ethical frameworks for digital education may provide deeper insights and contribute to the development of a more comprehensive and sustainable innovation model in the future.

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