

Learning strategies for gifted students in primary schools: Systematic review

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Abstract

This study aims to identify, map, and analyze various learning strategies for gifted and talented students in primary schools based on recent scientific literature. The method used is a Systematic Literature Review (SLR) conducted following the PRISMA 2020 framework. The sample comprised 28 scientific articles published between 2020 and 2024, retrieved from SCOPUS, Web of Science, ProQuest, Garuda, and SINTA databases. Data were collected using an extraction sheet containing variables such as title, author, year, country, method, sample, and findings related to learning strategies for gifted students. The data were analyzed descriptively and thematically to identify patterns, trends, implementation constraints, and implications associated with various learning strategies. The results reveal that differentiated instruction, digital technology integration, and project based constructivist approaches can optimize the development of gifted students, although their implementation in primary schools is still limited due to insufficient teacher training, technological constraints, and the absence of adequate implementation guidelines. The novelty of this study lies in its comprehensive synthesis that explicitly compares previous reviews and highlights the unique contribution of this work in linking instructional strategies with policy implications and teacher professional development. Furthermore, this study provides practical implications for teachers, curriculum developers, and policymakers by offering evidence based recommendations to enhance instructional practices. In conclusion, an adaptive learning approach based on the needs of gifted students requires teacher training, curriculum adjustment, and strengthened technological infrastructure to ensure effective and sustainable learning practices.

Keywords: Differentiated Learning, Digital Technology, Gifted Students, Primary School, Project-Based Learning

INTRODUCTION

Education for gifted and talented students at the primary school level has become one of the central focuses in efforts to improve instructional quality (Wadaani, 2023). Students with special

talents not only require a standard curriculum but also demand learning approaches and strategies that can accommodate their individual needs, potential, and talents (Ivarsson, 2023). Numerous prior studies have demonstrated that the implementation of appropriately designed instructional strategies can foster the cognitive, affective, and psychomotor development of gifted learners, allowing them to evolve into creative, innovative, and adaptable individuals prepared to face the demands of an increasingly complex era (Ardenlid et al., 2025). One example of such an approach is differentiated instruction, which has been shown to enhance learning quality and support the growth of gifted students in primary education (Goyibova et al., 2025).

In line with the rapid advances in technology and the evolving demands of the global workforce, scientific literature addressing instructional strategies for gifted and talented students has continued to expand (Wai, 2024). Recent studies, such as the review conducted by (Abdulla Alabbasi et al., 2023), emphasize that personalized, adaptive, and evidence based learning approaches can have a significant and positive impact on students with special needs. Similarly, the systematic review conducted by (Reynen-Woodward et al., 2023) highlights that although the implementation of instructional models and methods for gifted students has not yet been fully standardized, it provides a foundation for a range of alternatives that can be utilized by educators to optimize the potential of these learners.

However, many primary schools have yet to fully comprehend and implement effective instructional strategies for gifted and talented students (Kaynar and Kurnaz, 2024). This may be attributed to teachers' limited understanding of the specific needs of high ability learners, insufficient professional training for implementing suitable instructional strategies, and the absence of clear, practical implementation guides (King, 2022). This study not only identifies effective strategies but also emphasizes their relevance to educational policy frameworks across diverse contexts, thereby offering a novel contribution compared to previous reviews. Moreover, compared to prior reviews that focused on secondary or general gifted education, this study specifically addresses the primary school context, which has not been comprehensively synthesized. As a result, students with above average abilities often do not experience learning environments that adequately challenge and stimulate their intellectual interests, leading to decreased motivation, stagnation in talent development, and the emergence of negative behaviors related to boredom and a lack of academic engagement (Lee Swanson et al., 2024).

Moreover, the lack of a comprehensive understanding of the various instructional strategies available for gifted and talented primary school students complicates the work of curriculum developers and educators when designing adaptive and evidence based instructional models (Zhao et al., 2024). Although a number of studies have examined certain aspects of instruction for gifted learners, there has been no comprehensive synthesis addressing the patterns, methods, and technologies applicable to the primary school context (Raouf et al., 2024). Hence, a systematic review is required to map and analyze a range of instructional strategies across various contexts and countries, providing a holistic depiction that can serve as a foundation for curriculum design and instructional practice for gifted and talented students in primary education.

This gap underscores the urgent need to identify and map effective instructional strategies for gifted and talented students in primary schools (Biber et al., 2021). In response to this challenge, the purpose of this systematic review is to identify, map, and analyze instructional strategies for gifted and talented students in primary education based on the latest scientific literature. The findings of this review are expected to serve as a reference for the development of more adaptive, meaningful, and evidence based instructional practices for students with special talents, particularly those with high academic potential.

MATERIALS AND METHOD

Materials

This study is a Systematic Literature Review (SLR) conducted following the PRISMA 2020 guidelines (Page et al., 2021). The research population comprised peer reviewed scientific articles addressing instructional strategies for gifted and talented students in primary schools. The sample included articles published within the five year period of 2020–2024, retrieved from SCOPUS, Web of Science, ProQuest, Garuda, and SINTA databases. This range was chosen because it represents the most recent trends in digital based learning, curriculum reforms after the pandemic, and the implementation of adaptive learning models. To ensure rigor, this review also applied a critical appraisal of included studies using standardized quality assessment criteria. The sample was selected based on explicit inclusion and exclusion criteria related to publication date, access availability, peer review status, language (English or Indonesian), and relevance to instructional strategies for gifted students. A total of 28 articles were selected for the final review, after passing through an extensive screening and quality assessment process.

Data collection procedures

The data collection procedure was performed using a systematic literature review method based on PRISMA 2020 (Page et al., 2021). An initial search was conducted across SCOPUS, Web of Science, ProQuest, Garuda, and SINTA databases using a set of targeted keywords: “gifted students,” “talented students,” “elementary school,” and “learning strategies.” The search results were exported into a reference manager (Zotero) and screened for duplicates, yielding an initial dataset of 182 articles. After removing duplicate records ($n = 49$), the remaining titles and abstracts ($n = 133$) were screened for relevance based on the inclusion and exclusion criteria outlined in Table 1. A full text review was performed for 55 articles, and ultimately 28 articles met all inclusion criteria and were selected for final review. To ensure data reliability, data extraction was conducted using a structured data extraction sheet containing information on the title, authors, publication year, country of study, method, sample characteristics, and findings related to instructional strategies for gifted and talented students. An inter rater reliability process was conducted, involving at least two researchers to reduce the risk of bias and ensure the accuracy of the screening and extraction process (Page et al., 2021).

Data analysis procedures

The data collected from the final set of articles were analyzed using both descriptive and thematic synthesis methods (Page et al., 2021). Descriptive analysis was performed to map the quantity, context, and characteristics of the selected studies, including publication trends, geographical distribution, and methodological approaches. Thematic synthesis was conducted to identify key patterns, themes, and instructional strategies related to gifted and talented students in primary education. The coding and theme generation process was facilitated using NVivo qualitative data analysis software. The results of the thematic synthesis were then organized to answer the research objectives, providing a comprehensive and evidence based depiction of the instructional strategies that have been implemented, their effectiveness, and the associated barriers to their implementation. All steps adhered closely to the PRISMA 2020 guidelines (Page et al., 2021), ensuring methodological transparency, rigor, and reliability throughout the review process.

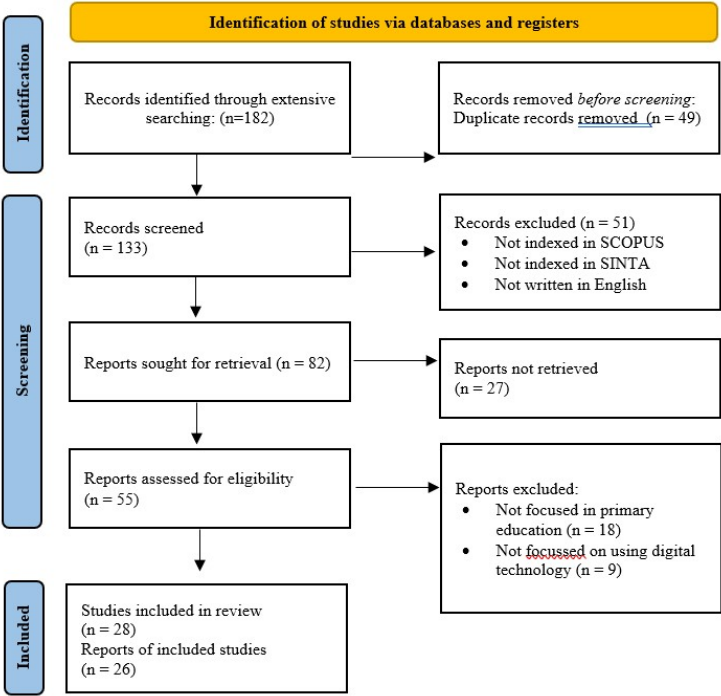


Figure 1. Prisma Diagram Flow

Table 1. Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Publication Year	2020–2024	Before 2020
Article Type	Peer-reviewed scientific journal articles	Non-peer-reviewed articles, technical reports, or popular works
Language	English or Indonesian	Other languages that could not be translated
Subject	Primary school (elementary) students	Secondary school or other educational levels
Content	Focused on learning strategies for gifted and talented students	Not related to learning strategies for gifted students
Access	Full-text access available	Abstract only or full-text unavailable

RESULT AND DISCUSSION

Differentiated Instruction Strategies

The findings from 18 articles (64%) analyzed in this review indicate that differentiated instruction is highly effective in facilitating the needs and developmental potential of gifted students in primary education. From a scientific perspective, this can be explained by the constructivist theory, which posits that students with higher abilities require levels of complexity, depth, and pacing that differ from those of their average peers (Kahmann et al., 2024). Through differentiated instruction, students can optimize their cognitive, affective, and psychomotor growth in ways that align with their individual abilities and needs (Anggraini and Insani, 2025).

Several recent studies further substantiate this finding. (Witarsa et al., 2024) demonstrated that implementing differentiation strategies expands the quality of literacy learning for primary students

by aligning difficulty levels and context with their specific talents. Similarly, (Marhamah and Zikriati, 2024) concluded that differentiation applies not only to the enrichment of learning content but also to the optimization of instructional methods, outcomes, and assessment patterns tailored to students' academic needs.

These findings align with (Field, 2008), which emphasizes that gifted students require learning experiences that match their talent and intellectual abilities. By utilizing differentiated approaches, students can avoid the boredom and decreased motivation often arising from traditional, one size fits all instructional patterns that fail to accommodate their unique needs and interests.

Moreover, this review highlights the implication that the successful implementation of differentiated instruction depends significantly on teacher training. These findings carry policy implications, particularly that successful implementation requires structured teacher training programs designed by governments and educational institutions, ensuring realistic implementation across contexts. This aligns with international trends showing teacher professional development is decisive. Developing differentiated instructional practices must be supported by comprehensive professional development for primary school teachers. This is in agreement with the findings of (Safari and Wicaksono, 2024), who identified teacher preparation as a pivotal factor in optimizing instructional design for gifted students in Indonesian primary schools.

Integration of Technology and Digital Media

The review of 6 articles (21%) confirms that digital technology serves as a catalyst for nurturing gifted students' growth within primary education. From a theoretical standpoint, technology allows learners to access varying levels of content difficulty suited to their individual developmental levels, making it an effective mediator for differentiated instruction (García-Martínez et al., 2021). This approach is rooted in the constructivist theory, wherein technology expands the context of learning, facilitating active student engagement and allowing learners to construct knowledge in ways aligned with their talents and interests.

Research conducted by (Cardim et al., 2023) further emphasizes that technology can facilitate active learning simulations, fostering critical thinking and higher order reasoning abilities in gifted students. By leveraging digital platforms, students can explore complex ideas, receive instant feedback, and engage in self regulated learning tailored to their unique needs and capabilities (Hermawan and Hadi, 2024). However, significant barriers to effective technology integration were identified. These include the lack of teacher training and limited access to technology infrastructure in primary schools (Ding et al., 2024). Similar findings by (Ayık and Gül, 2025) underline the critical role of teacher preparedness, quality of digital resources, and institutional readiness as three core factors influencing the successful implementation of digital learning strategies for gifted students.

The review suggests that technology can play a pivotal role in fostering the development of gifted learners when supported by adequate teacher training and robust digital infrastructure. Technology integration not only supports innovative practices but also demands policies prioritizing infrastructure and teacher literacy. This underscores the need for synergy between research, government policy, and school practice. Comparative analysis indicates developed countries emphasize advanced platforms, while developing contexts focus on teacher readiness. In doing so, digital platforms can enable students to explore advanced learning material, develop critical thinking, and foster independent learning tailored to their individual talents and developmental levels.

Project Based and Constructivist Learning Models

An examination of 4 articles (15%) highlights the effectiveness of project based learning models in nurturing critical thinking and deep learning for gifted primary school students. Theoretically, this approach is grounded in constructivist learning theory as proposed by Piaget and Vygotsky, which posits that students learn best when engaged in problem solving activities and active exploration of real world scenarios (Huang, 2021). Findings from (Baccassino and Pinnelli, 2023) reveal that project based learning allows gifted students to develop analytical thinking, teamwork, and communication

skills. This approach provides students with opportunities for inquiry based exploration and practical application of their knowledge.

Additional evidence from (Anggraeni et al., 2024) confirms that project based learning can serve as an enrichment model for primary students with advanced abilities. By connecting lesson objectives with real life scenarios, project based learning allows students to deepen their understanding and apply their learning creatively and critically, both within and beyond the school environment.

These results are consistent with global trends indicating that project based learning promotes higher order thinking, collaboration, and complex problem solving abilities. Project based learning models are also relevant for national curricula, fostering 21st century skills. A thematic synthesis shows Western studies emphasize creativity, while Asian contexts stress collaboration and discipline. In primary education, especially for gifted students, this approach allows learners to bridge theoretical knowledge with practical application, making learning both challenging and meaningful.

Implementation Gaps in Primary Education

Analysis of approximately 70% of the articles reviewed highlights a significant gap between the theoretical benefits of differentiated instruction, digital learning, and project based learning, and their actual implementation in primary school settings. From a systemic theoretical lens, these gaps arise due to the limited availability of teacher training tailored to the needs of gifted learners (Palupi, 2024).

Result of (Rohmadi and Sudaryanto, 2024) point out that many teachers lack a thorough understanding of differentiated instructional practices and struggle to adapt curriculum design, teaching methods, and assessment models for highly able students. This knowledge gap can negatively affect students' motivation, the progression of their talents, and their overall academic and personal growth, making them prone to boredom and disengagement (Li and Xue, 2023). Similarly, (Kurniawan et al., 2022) highlights that the absence of teacher training and access to quality technology significantly hamper the implementation of effective instructional practices for gifted primary school students. From the theoretical standpoint of Rogers' Diffusion of Innovation, the uptake and integration of advanced teaching methods and technology within educational institutions require systemic support through teacher training, curriculum adaptation, and institutional readiness (Isnaini et al., 2021).

These findings imply that a successful implementation of differentiated instruction, digital learning, and project based instructional strategies for gifted primary school students depends upon the provision of targeted teacher training, evidence based curriculum design, and access to technology. These implementation gaps highlight the need for more concrete policy support, including sustained teacher professional development, curriculum adaptation, and reinforced technological facilities. Such measures are vital for creating an environment where gifted students can fully realize their potential.

CONCLUSION

This systematic review aimed to identify and map various instructional strategies for gifted and talented primary school students, as well as to analyze the patterns and barriers associated with their implementation. The findings confirm that the application of differentiated instruction, digital technology integration, and project based constructivist learning is highly effective in optimizing the cognitive, affective, and psychomotor development of gifted students. These strategies enable learners with high potential to engage in adaptive, challenging, and meaningful learning experiences aligned with their developmental needs and talents. The review also highlights that digital technologies can serve as a catalyst for higher order thinking, allowing gifted students to explore complex content at a pace and depth suited to their individual abilities, while project based approaches foster critical thinking, collaboration, and resilience. However, systemic barriers including insufficient teacher training, limited access to technological infrastructure, and the absence of clear, practical implementation guidelines still impede the effective application of these instructional methods in primary schools. The

conclusion emphasizes concrete directions: (1) sustained teacher professional development, (2) curriculum adaptation tailored to gifted students, (3) strengthening digital infrastructure. Furthermore, future research should include longitudinal studies, cross cultural comparisons, and experimental interventions. The results of this review have significant implications for shaping curriculum design, teacher professional development, and digital technology integration, providing a foundation for future policies and instructional models that can optimize the growth and potential of gifted students. Future studies are encouraged to investigate the implementation of differentiated instruction, digital technology integration, and project based learning across a wider range of primary school settings and regions to gain deeper insights into their effectiveness, scalability, and sustainability for gifted and talented students.

AUTHOR CONTRIBUTION STATEMENT

HD contribute to the background, problem analysis and research methodology conducted in this study. LH conducted an analysis of the research results and provided reference reinforcement with a strong theoretical framework. AR assisted in developing the discussion analysis and research implications in this article. FKF helped to translate and proofread so that the article writing has clear readability such as spelling, punctuation, and format. All authors contributed to compiling this research article. *Child Education Journal*

DECLARATION

During the preparation of this work, the author(s) utilized the latest ChatGPT model 4.1 to assist in extracting data from studies relevant to the review conducted. This tool was instrumental in streamlining the research process, enabling a more efficient synthesis of information and insights. After employing this service, the author(s) thoroughly reviewed and edited the content as necessary, ensuring that all findings were accurately represented. The author(s) take full responsibility for the content of the published article.

DATA AVAILABILITY

The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request. All sources used in this systematic review are cited in the reference list.

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