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A Narrative Literature Review on the Influence of Learning Styles on 21st-Century Competencies among Students

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Abstract

This study addresses the persistent challenge of students' limited mastery of 21st-century competencies, which is often attributed to the insufficient integration of diverse learning styles in classroom practices. The primary objective is to examine the relationship between students' learning styles and the development of critical thinking, communication, collaboration, and creativity (4C) skills. Employing a Narrative Literature Review (NLR) approach, this study synthesizes evidence from five carefully selected primary studies, complemented by secondary data from reputable open-access academic journals. The inclusion criteria encompassed topical relevance, publication within the last five years, accessibility, and indexing in recognized scholarly databases. The analysis indicates that multimodal learning approaches significantly enhance learning effectiveness and support the development of 4C competencies. Furthermore, the findings suggest that instructional strategies tailored to accommodate diverse learning preferences contribute to more meaningful and engaging learning experiences. In conclusion, the alignment between teaching practices and students' learning styles plays a critical role in fostering adaptive, creative, and sustainable educational outcomes, thereby supporting the demands of 21st-century learning environments.

INTRODUCTION

Many students still find it difficult to develop 21st-century skills such as critical thinking, effective communication, teamwork, and creativity within contemporary education. Students' limited capacity to solve problems independently and to collaborate effectively in interdisciplinary teams reflects this difficulty and remains a significant challenge in globalized education (Munastiwi, 2021). Instead of promoting the 4C skills necessary for the twenty-first century, many educators continue to use traditional teaching methods that emphasize rote memorization (Ryanti et al., 2023). However, students' varied learning styles, visual, auditory, kinesthetics or multimodal, are frequently disregarded, which leads to less inclusive and less efficient learning procedures (Budianti, 2025). As a result, learning environments that ought to be flexible enough to accommodate individual differences fail to fully develop students' critical and creative potential.

Project-based, inquiry-based and cooperative learning have been shown to enhance students' critical thinking, teamwork and creativity (Muchson, 2023; Inayah et al., 2023). Nevertheless, little research has looked at how these methods can be combined with unique learning style traits, especially those outlined in Fleming's VARK model. Designing instructional strategies that successfully support 21st-century competencies requires an understanding of learning styles (Novia et al., 2024). Furthermore, current 21st-century learning frameworks frequently ignore learner differences in pedagogical practice and remain conceptual (Wijayanti et al., 2025). This disparity shows that there is a gap between the practical implementation of differentiated instruction and the theoretical comprehension of 4C skills.

The purpose of this study was to examine how students' learning styles relate to their proficiency in 21st-century skills such as creativity, communication, critical thinking, and teamwork. This study also aimed to determine which learning styles best facilitate the development of the 4C skills and to offer strategic advice to educators on creating lessons that align with students' learning preferences (Hapsari & Prasetyarini, 2025). It is hoped that this literature-based analysis will enhance conceptual and empirical understanding of how students'21st century competencies can be enhanced by adapting teaching methods to their learning styles (Nugroho et al., 2025).

The significance of this study lies in the fact that the effectiveness of teaching in developing 21st-century skills is greatly influenced by learning styles. This study is based on the fact that the effectiveness of teaching in developing 21st-century skills is greatly influenced by learning styles, critical thinking, communication, collaboration, and creativity (Rocha et al., 2025). However, these skills are also very important life skills in an increasingly complex global society. Teachers can further design contextual, meaningful, emotionally and cognitively responsive learning experiences by incorporating learning styles into 21st-century pedagogy (Permatasari, et al., 2024). Thus, this study makes a theoretical contribution by linking learning style theory to a framework for 21st-century skills and a practical contribution by providing recommendations for learner-centered, adaptive teaching.

RESEARCH METHODS

A central issue addressed in this research is the gap between commonly used school instructional practices and the diversity of students' learning styles, a condition that hinders the optimal development of 21st-century skills such as critical thinking, communication, collaboration, and creativity. In many educational settings, teachers still rely on uniform teaching methods that do not respond to visual, auditory, or kinesthetic preferences, thereby limiting students' skill development. Given that these competencies are increasingly vital for preparing learners to meet global demands (Long et al., 2024). Learning styles become an important factor in determining both learning effectiveness and competency growth. Accordingly, this study examines the literature on the link between students' learning styles and the development of 21st-century competencies in contemporary education.

This research employs a Narrative Literature Review (NRL) approach, which emphasizes a narrative synthesis of literature relevant to the research topic. The NLR approch was chosen for its flexibility in integrating diverse empirical and theoretical findings without the rigid methodological restrictions typical of systematic reviews. This allows for a more comprehensive theoretical synthesis (Reddi & Javidi, 2025). Primary data in this research consist of 5 selected primary articles that specifically examine the relationship between students' learning styles and 21st-century competencies, while secondary data are derived from books, academic journals, and research reports discussing learning theories and

frameworks for 21st-century skills.

The article selection process was conducted using clear inclusion and exclusion criteria. The inclusion criteria were as follows: (1) articles directly relevant to the topic of learning styles and 21st-century competencies; (2) articles published within the last five years; (3) open access articles; and (4) articles published in reputable academic journals or indexed academic databases. The exclusion criteria included: (1) articles not directly related to the relationship between learning styles and 21st century competencies; (2) publications outside the five-year range; (3) non-open access publications; (4) non-academic sources or opinion-based articles without clear scholarly grounding; and (5) duplicate articles retrieved from more than one database. Only those who met the established criteria were retained for review. This approach enables a deep conceptual understanding of the intersection between theory and educational practice in modern learning environments (Penrabel et al., 2022).

This study is grounded in three foundational theories: Learning Style Theory by Neil D. Fleming (2008), Multiple Intelligences Theory by Howard Gardner (1983), and the Framework for 21st Century Learning (P21 Framework) by the Partnership for 21st Century Skills (Eisler, 2002). Fleming's theory proposes that individuals possess distinct preferences for learning, categorized into VARK (Visual, Auditory, Read/Write, Kinesthetic), which influence how they perceive and process information. Gardner's theory expands this view, asserting that humans possess multiple intelligences, each requiring different learning approaches aligned with individual strengths. Meanwhile, the P21 Framework underscores that education in the modern era must emphasize developing 4C skills: Critical Thinking, Communication, Collaboration and Creativity as core competencies for success in dynamic global environments. Together, these theories form the conceptual foundation for examining how learning styles influence students' acquisition of 21st-century skills (Roux et al., 2021).

The research follows four main stages: Identifying the topic related to learning styles and 21st century competencies, collecting literature from databases such as Scopus, ScienceDirect, Google Sholar and DOAJ using relevant keywords, selecting open access sources from the last five years based on relevance and quality and analyzing as well as synthesizing the chosen studies into a coherent conceptual narrative. In NLR, data collection remains flexible by incorporating diverse but relevant sources without applying rigid protocols such as PRISMA, reflecting its descriptive and interpretative orientation that emphasizes meaning-making rather than statistical generalization (Abdul Rahim et al., 2022). Through this process, literature is interrupted to build an integrated understanding of the link between learning styles and the development of 21st century skills.

Data in this research are analyzed using content analysis as the main technique to systematically examine patterns, themes and relationships across the reviewed literature. Using an inductive approach, the researcher carefully reads the sources, identifies units of analysis, classifies the findings and develops a conceptual synthesis that reveals major trends and key insights from previous studies (Damaševičius & Sidekerskienė, 2024). Instead of relying on statistical analyses, this approach emphasizes the interpretation and integration of core ideas from the literature to understand the interaction among learning styles, instructional strategies, and the development of 21st-century skills in modern education (Rakhma & Kafah, 2025).

RESULTS AND DISCUSSION

Results

Learning styles play an important role in shaping students'engagement and academic

achievement. Visual learners understand material more easily through graphics, diagrams and spatial elements (Chinnapun & Narkkul, 2024). Whereas auditory learners respond better to verbal explanations and discussions, and kinesthetic learners perform more effectively through practical activities and direct experience (Ahmed et al., 2024). Therefore, instruction should employ multimodal strategies to accommodate the diversity of students' characteristics in the classroom (El-Saftawy et al., 2024).

When instruction is matched to students' preferred modes in the VARK framework, comprehension tends to improve across disciplines (Indriyani & Nurmasitah, 2025). Even so, stronger gains are achieved in multimodal settings that integrate visual, auditory, and kinesthetic elements simultaneously. Such an approach not only strengthens academic performance but also enhances motivation and self-regulated learning (Budianti, 2025). In addition, learners who process information through multiple sensory pathways show greater adaptibility and resilience, suggesting that multimodal learning cultivates flexibility and cognitive engagement as essential competencies for 21st-century learning (Shaher et al., 2025).

Learning styles and 21st-century competencies are closely interconnected, as mismatches between teaching methods and students' preferred learning styles can reduce engagement and hinder the development of critical, creative, and collaborative skills (Novitra et al., 2021). Whereas instruction aligned with dominant learning styles, such as concept mapping for visual learners and simulations for kinesthetic learners, can improve cognitive performance and deepen understanding (Khamphaya et al., 2022). At the same time, 21st-century competencies, particularly the 4Cs of critical thinking, communication, collaboration and creativity, are widely recognized as essential indicators of educational success in the digital era (Stanikzai, 2023). Research shows that approaches such as Project-Based Learning and Collaborative learning, along with authentic tasks and reflective learning, significantly strengthen these competencies by promoting higher-order thinking and problem-solving abilities (Rocha et al., 2025; Nugroho et al., 2025).

Studies show that real-world problem solving, collaborative projects and digital integration effectively develop 4C skills, while interdisciplinary tasks further enhance students' cognitive flexibility and creativity (Yuniwati & Sitepu, 2025; Edwin et al., 2025). Because these competencies are built through guided, collaborative and self-regulated learning experiences, pedagogy should emphasize adaptive environments that prioritize the 4C over simple content delivery (Wijayanti et al., 2025).

Table 1. Research Samples

No.	Author(s) and Year	Title of Study / Article	Research Objective	Method / Approach	Key Findings
1.	Budianti (2025)	Learning Style, Self-Regulated Learning, and Academic Performance among Students.	To examine the relationship between students' learning styles and self-regulated learning in relation to academic performance.	Quantitative (Correlational Study)	Multimodal learning styles positively contribute to students' motivation and academic outcomes.
2.	Rocha et al. (2025)	Assess the Impact of a Project-Based Learning Approach on the Development of 21st Century Skills.	To evaluate the effectiveness of *Project-Based Learning (PBL)* in enhancing students' 21st-century competencies.	Quasi-Experimental	PBL enhances students' critical thinking, collaboration, and creativity skills.
3.	Mustaqim et al. (2024)	Building the Foundation for Creativity and Collaboration: Knowledge Sharing Learning Models.	To develop a *knowledge-sharing* learning model aimed at improving collaborative learning among students.	Qualitative (Descriptive)	Knowledge-sharing–based learning strengthens students' creativity and teamwork.
4.	Djoeaeriah & Iskandar (2024)	Implementation of the Independent Learning Curriculum in Building Students' Creative Character	To analyze the impact of the *Merdeka Belajar* curriculum on students' creative character development.	Study case	The *Merdeka Belajar* curriculum effectively enhances students' independence and creativity.
5.	Yanuarto et al. (2025)	Strengthening 21st-Century Skills: A Community Service Initiative to Improve Computational, Critical, and Creative Thinking.	To enhance pre-service teachers' critical, creative, and collaborative thinking through community-based projects.	Action Research (Community Service-Based).	Collaborative and community-based learning significantly improves students' *4C* competencies.

Discussion

The findings show that limited 21st-century competencies often arise from teaching that ignores students' cognitive and sensory differences, reducing engagement, critical inquiry, and creativity (Djoeaeriah & Sofyan Iskandar, 2024). Teachers who fail to align teaching methods with learners' cognitive and sensory preferences inadvertently inhibit students' potential to engage critically and creatively. By contrast, differentiated, student-centered and technology-integrated learning increases motivation, autonomy, teamwork and deeper understanding, while Merdeka Belajar supports flexible and contextual learning that promotes collaboration and creativity (Budiyanto et al., 2024; Ritcha Saxena, 2023; Thomas et al., 2025). Likewise, digital tools, simulations, peer feedback and problem-based learning strengthen adaptability, reflection and shared understanding more effectively than teacher-centered models (Damaševičius & Sidekerskienė, 2024; Mustaqim et al., 2024).

The synthesis also confirms that aligning learning styles with multimodal and contextual instruction improves mastery of 21st-century competencies, especially the 4Cs (Zaqiah et al., 2024; Budianti, 2025; El-Saftawy et al., 2024). When instruction matches learners' preferred modalities, students show better engagement, adaptive thinking, creative problem solving and deeper understanding, consistent with constructivist learning and previous research on higher order cognition (Rocha et al., 2025; Indriyani & Nurmasitah, 2025). The articles' unique contribution lies in linking the VARK model with the 21st-century competency framework, showing that learning styles function not only as learners traits but also as a basis for instructional design that supports academic performance, creativity, collaboration, resilience and self-directed learning (Nugroho et al., 2025; Mustaqim et al., 2024; Djoeaeriah & Sofyan Iskandar, 2024).

Practically, these results suggest that teachers should identify learning styles early, design lessons that combine visual, auditory and kinesthetic modes, and embed explicit 4C goals into instruction and assessment (Edwin et al., 2025; Yuniwati & Sitepu, 2025). Teacher development, curriculum design and school policy should therefore prioritize differentiated instruction, digital and simulation-based learning, collaboration tasks and reflective assessment to build an inclusive and evidence-based classroom (Jalinus et al., 2023; Rakhma & Kafah, 2025).

This is important because stronger outcomes emerge when instructional adaptability, learner motivation and active knowledge construction work together through multimodal learning experiences (Chinnapun & Narkkul, 2024; Damaševičius & Sidekerskienė, 2024).

CONCLUSION

This study confirms that learning styles are important determinants of students' 21st-century competencies, as instruction that aligns with learners' preferred modalities more effectively develops critical thinking, communication, collaboration, and creativity, while multimodal learning further strengthens adaptability, creativity, and readiness for dynamic educational contexts. The study contributes theoretically by linking Learning Style Theory with the P21 Framework and, practically, by emphasizing the value of student-centered, differentiated, and technology-supported instruction to build 4C skills in inclusive classrooms. As this research is based on a Narrative Literature Review, future studies should provide more concrete evidence through classroom experiences, comparative studies across school levels, and mixed method designs that measure the impact of learning style-based instruction on students' 4C achievement, as well as examine how artificial intelligence and learning analytics can be applied to identify learning preferences and support more adaptive teaching.

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