Elements of Computational Thinking Models in Early Childhood Science Literacy: A Recent Comprehensive Structured Review

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ABSTRACT

In recent years, the integration of computational thinking (CT) models in early childhood science literacy has gained increasing attention due to their potential to enhance cognitive skills and problem-solving abilities in preschool learners. This systematic literature review aims to provide a comprehensive analysis of the applications and impacts of CT models in preschool education. The primary problem addressed is the need for a structured overview of how CT is being utilized to improve science literacy and learning outcomes at the preschool level. To achieve this, we conducted an extensive search of scholarly articles from reputable databases such as Scopus and Web of Science, focusing on studies published between 2023 and 2024. The flow of the study followed the PRISMA framework. A total of 29 primary studies were included in the final dataset, which were thoroughly analysed. The findings are divided into three key themes: (1) Teaching Methodologies and Educational Technologies, (2) Impact of Computational Thinking on Learning Outcomes, and (3) Curricular Integration and Teacher Education. The analysis reveals that CT models in early childhood education enhance cognitive and problem-solving skills, promote creativity and collaboration, and support the development of critical thinking. Additionally, the review highlights the need for well-structured, age-appropriate CT frameworks that engage young learners. It also emphasizes the importance of teacher training to effectively integrate CT into the science curriculum. Based on these findings, the review recommends further development of age-appropriate CT teaching materials, the exploration of effective strategies for curricular integration, and investment in professional development programs for teachers to enhance the implementation of computational thinking in preschool education.

Keywords: computational thinking, science literacy, early childhood education, models

INTRODUCTION

In the evolving landscape of early childhood education, the integration of computational thinking (CT) into science literacy represents a significant pedagogical advancement (Braun & Huwer, 2022; Peel et al., 2022a; Proctor, 2022). As the digital age continues to permeate every aspect of learning, the imperative to equip our youngest learners with foundational skills in computational thinking has become increasingly apparent. This paradigm shift aims to develop not only technological proficiency but also critical thinking, problem-solving, and analytical skills from an early age. Recognizing this, the article "Elements of Computational Thinking Models in Early Childhood Science Literacy" seeks to explore the critical components and pedagogical strategies that make up effective CT integration in preschool settings (Hanid et al., 2022; Krause et al., 2023; Yusoff et al., 2021). By dissecting various models and frameworks currently in use, this introduction sets the stage for a deep dive into how these elements can be effectively tailored to enhance science literacy among preschoolers, ensuring their readiness for a technology-driven future.

Research in early childhood education consistently highlights the importance of a robust curriculum that supports cognitive development through engaging, contextually relevant and experiential learning activities (Johnstone et al., 2022; Koslinski et al., 2022; Yapandi & Jayanti, 2023). In the context of computational thinking, this involves a nuanced approach that goes beyond mere exposure to technology. Effective CT education in early childhood science literacy demands a blend of unplugged activities those not requiring digital devices and hands-on technological interactions to foster an environment where abstract CT concepts become tangible and understandable for young learners (Caeli & Yadav, 2020; P. Chen et al., 2023; Çiftçi & Topçu, 2023; Tsortanidou et al., 2023). The core elements of CT, such as pattern recognition, algorithmic thinking, and debugging, are interwoven with scientific inquiry to create a rich, multidisciplinary learning experience (Diago Nebot et al., 2018; Gerosa et al., 2022; Malallah et al., 2023). This article examines how these foundational elements are implemented in early childhood classrooms around the world, assessing their impact on young learners' ability to apply scientific and computational concepts in real world scenarios.

Moreover, the challenge of integrating computational thinking within the science literacy framework in early childhood education raises several critical questions about teacher preparedness, curriculum alignment, and assessment methods (Bower et al., 2017; Esteve-Mon et al., 2019; Syafril et al., 2022; Ung et al., 2022). There is a growing body of literature suggesting that while the demand for such an integrated approach is high, significant gaps remain in teacher training and resource availability. This article delves into empirical studies and expert analyses to identify effective strategies for overcoming these barriers. It also discusses the potential for scalable CT models that can be adapted across diverse educational settings, thereby broadening the reach and impact of these initiatives. By providing a comprehensive overview of the current state of CT in early childhood science literacy, this introduction underscores the need for continued research and innovation in this field, paving the way for a detailed exploration of its elements throughout the subsequent sections of the article.

LITERATURE REVIEW

The integration of computational thinking (CT) into early childhood science literacy represents a critical enhancement of educational frameworks, essential for equipping young learners with necessary 21st-century skills. This comprehensive literature review explores diverse studies focusing on the effective embedding of CT into science curricula, emphasizing the significant boost it provides in problem-solving capabilities and deeper scientific understanding. Researchers like Aytekin and Topçu (2024) have highlighted the transformative impacts of CT integration into complex science topics such as the circulatory system, demonstrating that both digital and non-digital teaching methods can substantially enhance conceptual learning and CT skills. This adaptability in instructional methods ensures robust educational outcomes regardless of the medium used. Echoing this flexibility, Songkram et al. (2024) showed that interactive and scenario-based learning through robotics significantly enhances students' engagement and computational abilities.

Further elaborating on pedagogical frameworks Liu (2024) and Yang (2024) emphasize the importance of developmentally appropriate practices. They advocate for the use of tangible tools like robotics and unplugged activities to make abstract CT concepts accessible and engaging for young minds. These tools provide concrete experiences that facilitate an intuitive understanding of complex ideas. Falloon (2024), underscores the benefits of structured and problem-based learning approaches that enhance students’ abilities in sequencing, algorithm authoring, and pattern recognition. These methods support higher-order thinking and complex problem-solving skills from an early age, challenging traditional developmental theories. Additionally Peel et al. (2022b) and Holincheck et al. (2022) discuss how CT serves as a crucial component of scientific literacy, using computational tools to deepen students' engagement with scientific phenomena and enhance their overall learning experience. Integrating CT into early childhood education requires a developmentally appropriate framework that addresses various pedagogical strategies and cultural considerations, enhancing children's understanding of scientific concepts and fostering essential skills. Critically, a structured curriculum is essential with emphasizing the need for lesson plans that aid educators, particularly those without computing backgrounds in effectively integrating CT (Critten & Hagon, 2024). The incorporation of community and cultural relevance, as discussed by Liu (2024) and Quinn et al. (2023) enriches learning experiences by making them relatable and impactful, fostering a sense of belonging and motivation in STEM fields.

Moreover, the use of tangible tools like robotics and coding kits, highlighted by Yang, W., Su, J., and Li (2024), supports a concrete understanding of CT concepts and encourages creativity and critical thinking through a blend of structured tasks and open-ended exploration. Despite these advancements, challenges remain, particularly in equipping all educators with the skills and resources needed to effectively implement these 8

MATERIAL AND METHODS

Identification

In this research, essential procedures of the systematic review method were employed to collect a significant body of pertinent literature. The process started with choosing keywords, then proceeded to look up associated terms using dictionaries, thesauri, encyclopedias, and previous studies. All pertinent terms were pinpointed, and search strings for the Web of Science and Scopus databases were formulated (see Table 1). This initial stage of the systematic review resulted in 1140 relevant publications from the two databases related to the research topic. Identification is the initial step in the Systematic Literature Review (SLR) process, which is crucial for establishing a comprehensive foundation for further research. In this phase, researchers use databases such as Scopus and Web of Science to search for records that match predefined keywords relevant to their study topic. For this specific SLR, the keywords used were "computational thinking," "element," "science literacy," and "early childhood education." These keywords are designed to target studies that focus on the integration of computational thinking into early childhood science education, examining both the components (elements) and the educational context. The search through Scopus resulted in 76 records being identified, while a search through Web of Science identified 78 records. This gives a total of 154 records identified from both databases. This total indicates a substantial body of literature that potentially addresses the intersection of computational thinking and early childhood science literacy, suggesting an active area of research with diverse contributions.

TABLE 1: The search string.

Scopus	TITLE-ABS-KEY ((("Computational Think*" OR "Unplugged Computational thinking" OR "Computational Learning") AND ("component" OR element OR construct OR item OR model*) AND ("Science Literacy" OR "science education" OR " teaching") AND ("Early Childhood" OR early* OR preschool OR "young children" OR "schoolchildren" OR kindergarten OR children OR student) AND (education OR school*))) AND PUBYEAR > 2022 AND PUBYEAR < 2025 AND (LIMIT-TO (SRCTYPE , "j")) AND (LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (SUBJAREA , "SOCI"))
	Date of Access: January 2025
Wos	(("Computational Think*" OR "Unplugged Computational thinking" OR "Computational Learning") AND ("component" OR element OR construct OR item OR model*) AND ("Science Literacy" OR "science education" OR " teaching") AND ("Early Childhood" OR early* OR preschool OR "young children" OR "schoolchildren" OR kindergarten OR children OR student) AND (education OR school*)) (Topic) and 2023 or 2024 (Publication Years) and Article (Document Types) and English (Languages) and Education Educational Research or Social Sciences Other Topics (Research Areas) **Date of Access: January 2025**

Screening

During the screening phase, research items are assessed to confirm their alignment with the set research questions. This step often involves choosing research items that focus on the Elements of Computational Thinking Models in Early Childhood Science Literacy and removing any duplicates. Initially, 986 publications were discarded, leaving 154 papers for deeper review according to specific inclusion and exclusion criteria (refer

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to Table 2). The primary criterion focused on literature as a key source of practical recommendations, excluding non-English works, conference proceedings, books, and reviews in press. Fields such as Computer Science, Engineering, and Environmental Science, not covered in the latest research, were also excluded. The review was restricted to English-language publications from the years 2023 to 2024. Ultimately, 39 publications were eliminated due to duplication.

Table 2: The selection criterion is searching

Criterion	Inclusion	Exclusion
Language	English	Non-English
Time line	2023 – 2024	< 2022
Literature type	Journal (Article)	Conference, Book, Review
Publication Stage	Final	In Press
Subject Area	Social Science, Education educational Research	Besides Engineering, Environmental Science

Eligibility

In the eligibility phase, the third step of the process, 115 articles were readied for evaluation. At this stage, the titles and core content of all articles were meticulously reviewed to confirm their compliance with the inclusion criteria and relevance to the research goals. As a result, 86 articles were discarded due to being out of scope, having irrelevant titles, abstracts not aligned with the study objectives, or lacking access to the full texts based on empirical evidence. Consequently, 29 articles were retained for further review.

Data Abstraction and Analysis

An integrative analysis was used as one of the assessment strategies in this study to examine and synthesis a variety of research designs (quantitative methods). The goal of the competent study was to identify relevant topics and subtopics. The stage of data collection was the first step in the development of the theme. Figure 2 shows how the authors meticulously analyze a compilation of 31 publications for assertions or material relevant to the topics of the current study. The authors then evaluated the current significant studies related to Elements of Computational Thinking Models in Early Childhood Science Literacy. The methodology used in all studies, as well as the research results, are being investigated. Next, the author collaborated with other co-authors to develop themes based on the evidence in this study's context. A log was kept throughout the data analysis process to record any analyses, viewpoints, riddles, or other thoughts relevant to the data interpretation. Finally, the authors compared the results to see if there were any inconsistencies in the theme design process. It is worth noting that, if there are any disagreements between the concepts, the authors discuss them amongst themselves.

To verify the validity of the problem, assessments were conducted by two experts, including one specialized in computational thinking and early childhood education. This expert review phase was crucial for confirming the clarity, significance, and adequacy of each sub-theme by establishing domain validity. Modifications were made at the author's discretion based on the feedback and suggestions provided by the experts. The authors also compared the findings to resolve any discrepancies in the theme creation process. Note that if any inconsistencies on the themes arose, the authors address them with one another. Finally, the developed themes were tweaked to ensure their consistency. The questions are as follows below:

1. What are the key elements of a successful computational thinking model for integrating into science literacy in early childhood education?
2. How can a computational thinking model enhance science literacy development among preschool children, and what are the measurable outcomes of its implementation?
3. How do preschool teachers perceive the challenges and benefits of implementing a computational thinking model in science literacy and what supports do they need for effective integration?

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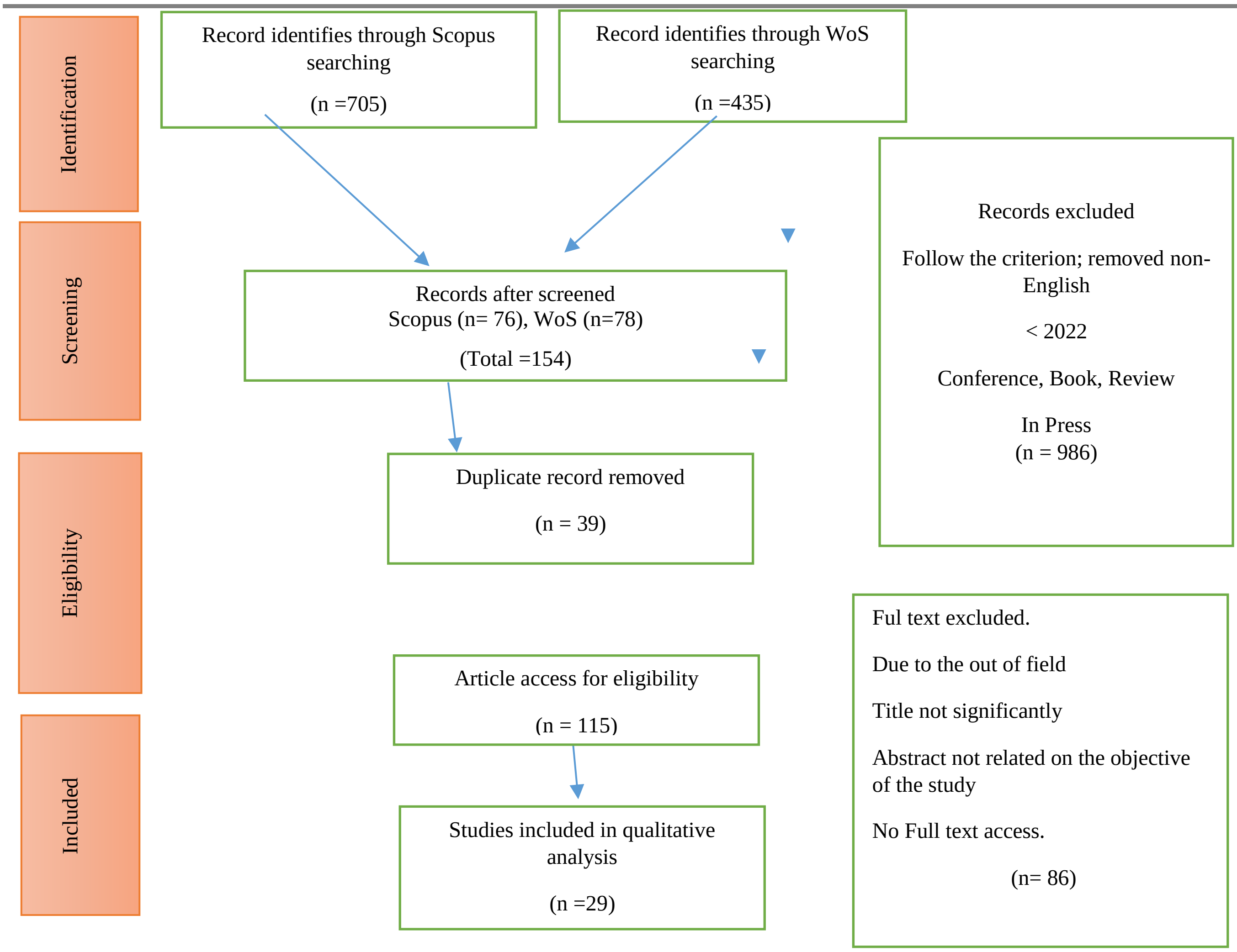

Figure 1. Flow diagram of the proposed searching study

Table 3: The final title of the 29 articles after the eligibility process

No	Authors	Title	Year	Source title	Scopus	Web of Science
1	Aytekin & Topçu (2024)	The effect of integrating computational thinking (CT) components into science teaching on 6th grade students' learning of the circulatory system concepts and CT skills	2024	Education and Information Technologies	/	
2	Songkram et al. (2024)	Unlocking the power of robots: enhancing computational thinking through innovative teaching methods	2024	Interactive Learning Environments	/	/
3	Kerimbayev et al. (2023a)	Educational Robotics: Development of computational thinking in collaborative online learning	2023	Education and Information Technologies	/	
4	Bowers et al. (2023)	Examining Student Testing and Debugging Within a Computational Systems Modeling Context	2023	Journal of Science Education and Technology	/	/

5	Abouelenein & Nagy Elmaadaway (2023)	Impact of Teaching a Neuro-Computerized Course Through VLE to Develop Computational Thinking Among Mathematics Pre-service Teachers	2023	Journal of Educational Computing Research	/	/
6	Kong & Lai (2023)	Effects of a teacher development program on teachers' knowledge and collaborative engagement, and students' achievement in computational thinking concepts	2023	British Journal of Educational Technology	/	
7	Arastoopour Irgens et al. (2024)	User experience testing and co-designing a digital game for broadening participation in computing with and for elementary school children	2024	International Journal of Child-Computer Interaction	/	
8	Huang & Qiao (2024)	Enhancing Computational Thinking Skills Through Artificial Intelligence Education at a STEAM High School	2024	Science and Education	/	
9	Fayanto et al. (2024)	The Analyze Comparative of Physics Computational Thinking Skill (CTs) in Experiment Laboratory	2024	Qubahan Academic Journal	/	
10	Wang et al. (2024)	The Application of an Unplugged and Low-Cost Children’s Coding Education Tool in a Gamification Context	2024	Pertanika Journal of Social Sciences and Humanities	/	
11	Alfaro-Ponce et al. (2023)	Components of computational thinking in citizen science games and its contribution to reasoning for complexity through digital game-based learning: A framework proposal	2023	Cogent Education	/	/
12	Krakowski et al. (2024)	Computational Thinking for Science: Positioning coding as a tool for doing science	2024	Journal of Research in Science Teaching	/	/
13	Kang et al. (2023)	Developing College students’ computational thinking multidimensional test based on Life Story situations	2023	Education and Information Technologies	/	
14	Martin et al. (2024)	Primary school students' perceptions and developed artefacts and language from learning coding and computational thinking using the 3C model	2024	Journal of Computer Assisted Learning	/	/
15	S. Liu et al. (2023)	What influences computational thinking? A theoretical and empirical study based on the influence of learning engagement	2023	Computer Applications in	/	/

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		on computational thinking in higher education		Engineering Education		
16	Herrero-Álvarez et al. (2024)	Training future engineers: Integrating Computational Thinking and effective learning methodologies into education	2024	Computer Applications in Engineering Education	/	/
17	Chen et al. (2023)	The Effect of Time Management and Help-Seeking in Self-Regulation-Based Computational Thinking Learning in Taiwanese Primary School Students	2023	Sustainability (Switzerland)	/	
18	Rehder et al. (2024)	Exploring the Potentials of Unplugged Activities: Developing Computational Thinking in Teacher Education	2024	Nordic Journal of Comparative and International Education	/	
19	Molina-Ayuso et al. (2024)	Computational Thinking with Scratch: A Tool to Work on Geometry in the Fifth Grade of Primary Education	2024	Sustainability (Switzerland)	/	
20	Moon & Cheon (2023)	An Investigation of Affective Factors Influencing Computational Thinking and Problem-Solving	2023	International Journal of Information and Education Technology	/	
21	El-Hamamsy et al. (2023)	How are primary school computer science curricular reforms contributing to equity? Impact on student learning, perception of the discipline, and gender gaps	2023	International Journal of STEM Education	/	/
22	Yadav & Chakraborty (2023)	Introducing school children to computational thinking using smartphone apps: A way to encourage enrollment in engineering education	2023	Computer Applications in Engineering Education	/	/
23	Misirli & Komis (2023)	Computational thinking in early childhood education: The impact of programming a tangible robot on developing debugging knowledge	2023	Early Childhood Research Quarterly	/	/
24	Musaeus et al. (2024)	Computational modelling in high school biology: A teaching intervention	2024	Journal of Biological Education	/	
25	Li et al. (2024)	Engagement predicts computational thinking skills in unplugged activity: Analysis of gender differences	2024	Thinking Skills and Creativity	/	/
26	Jehan & Akram (2023)	Introducing Computer Science Unplugged in Pakistan: A Machine Learning Approach	2023	Education Sciences	/	/

27	Tang et al. (2023)	Development of Project-Based Learning (PBL) in Cloud Education Model to Enhance the Application Ability and Computational Thinking for Undergraduate Students	2023	Pakistan Journal of Life and Social Sciences	/	
28	Christensen & Lombardi (2023)	Biological evolution learning and computational thinking: Enhancing understanding through integration of disciplinary core knowledge and scientific practice	2023	International Journal of Science Education	/	/
29	Herrero-Alvarez et al. (2024)	Training future engineers: Integrating Computational Thinking and effective learning methodologies into education	2024	Computer Applications in Engineering Education	/	/

RESULT AND FINDING

Teaching Methodologies and Educational Technologies

The integration of computational thinking (CT) skills in educational environments is a growing focus, particularly in enhancing students' problem-solving capabilities through innovative teaching methods and technologies. Several studies have highlighted the impact of robotics and scenario-based learning on fostering CT skills among students. Songkram et al. (2024) demonstrated that robots designed as teaching assistants can significantly improve primary students' attitudes towards technology and their behaviour intention to use technology, showcasing the effectiveness of robotics in enhancing CT skills. Similarly, Kerimbayev et al. (2023b) found that educational robotics, particularly during online collaborative learning has been instrumental in developing CT skills such as algorithmic thinking and efficiency in teamwork. Furthermore, the use of digital games and artificial intelligence in teaching computational thinking has been explored, emphasizing the need for culturally responsive and sustaining computational learning environments. Arastoopour Irgens et al. (2024) found positive impacts from co-designing games with children, which helped improve their engagement and interest in CT through character designs and narratives that promote inclusivity.

Likewise, Huang and Qiao (2024) observed that integrating AI education within the STEAM framework significantly boosted students' computational thinking skills, learning motivation, and self-efficacy, illustrating the profound potential of interdisciplinary approaches in CT education. The effectiveness of unconventional and innovative educational tools, such as unplugged coding tools and gamification, has also been substantiated. Wang et al. (2024), demonstrated that gamified coding tools, which do not rely on traditional plug-in methods can significantly enhance the learning experience and promote teamwork among students. This finding aligns with Molina-Ayuso et al. (2024), who highlighted the benefits of using Scratch for teaching geometry, thereby integrating CT skills in a subject traditionally not associated with computing. These studies collectively emphasize the transformative potential of incorporating robotics, artificial intelligence, and innovative educational tools into teaching computational thinking. They underline the importance of adaptive learning environments that cater to the diverse needs of students and highlight the effectiveness of integrating CT into various educational disciplines, paving the way for a comprehensive approach to education that equips students with essential 21st-century skills.

Impact of Computational Thinking on Learning Outcomes

Analyzing the impact of computational thinking (CT) components integrated into diverse educational contexts reveals significant advancements in learning outcomes, notably in understanding complex scientific concepts

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and enhancing problem-solving skills. Studies have demonstrated that both plugged and unplugged CT activities enrich conceptual learning among students. For example, Aytekin and Topçu (2024) found that integrating CT into science lessons notably enhanced sixth graders' understanding of the circulatory system and their CT skills. This supports the notion that CT integration, irrespective of the use of digital tools, effectively fosters deeper understanding and skill development in students. Further emphasizing the role of CT in science education, Bowers et al. (2023) observed that students engaging in computational systems modeling, specifically through testing and debugging, significantly deepened their understanding of scientific phenomena. This engagement not only helped students identify discrepancies in their models but also encouraged them to refine their understanding actively. This continuous modeling and debugging process offers a practical application of CT in real-world problem-solving scenarios and is essential for cultivating rigorous scientific thinking.

Moreover, the pedagogical impact of CT extends into teacher development and its cascading effect on student achievement. Kong and Lai (2023), highlighted that teacher development programs focusing on enhancing teachers' CT knowledge and collaborative engagement directly correlated with improved student achievements in CT concepts. This suggests that empowering educators with CT competencies is equally vital as direct student engagement in CT activities for optimizing educational outcomes. In synthesizing these findings, it is evident that the integration of computational thinking within the educational framework from primary to tertiary education serves as a catalyst for enhancing conceptual understanding and problem-solving skills. These studies collectively underscore the transformative potential of CT across different levels of education and subject domains, advocating for its broader adoption to prepare students more effectively for the challenges of the 21st century.

Curricular Integration and Teacher Education

The integration of computational thinking (CT) into curricula has been increasingly recognized as crucial for developing students' analytical and problem-solving skills across various educational stages. Significant research illustrates the varied impacts and methodologies of CT implementation across educational frameworks. Krakowski et al. (2024) detailed an instructional model, CT+S, which successfully integrated CT into science education, showing improvements in students' competency beliefs and value assigned to computation in STEM. This integration strategy emphasizes the use of CT as a tool to solve real world problems and thus broadens participation in STEM pathways. Similarly, Herrero-Álvarez et al. (2024) explored the impacts of different teaching modalities on CT skills during the COVID-19 pandemic, finding that in-person training significantly outperformed online methods in developing these skills, particularly at the secondary education level.

Further exploring the educational strategies, Kang et al. (2023) developed a multidimensional assessment tool to evaluate college students' CT skills across five identified dimensions, demonstrating the tool's effectiveness in differentiating between disciplines. This tool provides a robust method for understanding and enhancing CT education at the university level. On a different note, Martin et al. (2024) introduced the 3C Model in primary education, which not only enhanced engagement and learning outcomes but also provided a structured pedagogical approach to teaching CT and coding in line with students' developmental stages. These findings highlight the importance of a thoughtful integration of CT into curricula, which not only enhances subject-specific knowledge but also prepares students for complex problem-solving in real-world contexts. The research underscores the necessity of suitable pedagogical strategies that align with students' educational stages and the conditions of learning environments, whether they are online or in-person.

DISCUSSION AND CONCLUSION

The integration of computational thinking (CT) across various educational landscapes is revolutionizing the way

students approach problem-solving and understand complex concepts. Through the strategic employment of both traditional and innovative teaching methods including robotics, artificial intelligence (AI), and game-based learning educational curricula are being enhanced to foster critical CT skills effectively. Robotics, for example, has been pivotal in increasing primary students’ engagement and improving their attitudes toward technology, which in turn promotes a deeper understanding and proficiency in CT. Similarly, the use of AI and digital games within a STEAM framework has shown considerable success in boosting students’ motivation, engagement, and self-efficacy, indicating the significant potential of interdisciplinary approaches in education. Moreover, the adaptation of unplugged coding activities and gamification strategies introduces students to CT skills through non-traditional subjects like geometry, moving away from conventional teaching methods to encourage active participation and collaboration. Such innovative tools not only cater to diverse learning environments but also ensure that students are equipped with essential skills needed for the 21st century. The application of CT in educational settings extends beyond student interaction, significantly affecting teacher development as well. Programs focused on enhancing educators' understanding of CT and their collaborative skills have been directly linked to improved student outcomes in CT competencies, highlighting the importance of teacher preparedness in the effective delivery of CT education.

At the university level, the development of multidimensional assessment tools has provided a robust method for evaluating and enhancing CT education, offering a tailored approach that recognizes the unique needs and progress of students across various academic disciplines. On a broader scale, the integration of CT into science education has not only improved students' computational skills within STEM but also bolstered their competency beliefs, enabling them to effectively tackle real-world problems. This approach has expanded participation in STEM fields by positioning CT as a practical tool in everyday problem-solving scenarios. The effectiveness of CT integration has been further demonstrated during challenging periods such as the COVID-19 pandemic, where traditional in-person teaching methods have outperformed online modalities, especially at the secondary education level. This underscores the adaptability and resilience of CT teaching strategies under varying circumstances. The findings from these diverse educational frameworks illustrate the transformative impact of CT, advocating for its broader adoption across educational stages and disciplines to prepare students more effectively for future challenges.

Collectively, these insights underline the necessity of embedding CT deeply within the educational fabric to enhance conceptual understanding and equip students with robust problem-solving skills. By aligning pedagogical strategies with students’ developmental stages and the specific conditions of learning environments, educational systems can optimize outcomes and ensure that learners are not only proficient in technical skills but are also prepared to think critically and creatively in diverse situations. This comprehensive approach to education, which bridges traditional subject boundaries, is essential for cultivating a wide array of cognitive and interpersonal skills that are indispensable in the modern world.

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