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A Systematic Literature Review on Teaching Method Using Graphic Design for Primary Schools in Malaysia

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Abstract

This paper presents a comprehensive review of studies focused on the teaching method using graphic design for primary schools in Malaysia. We used the PRISMA model, with three basic phases including identification, screening, and eligibility, as a guideline to select relevant articles for this paper. All articles were categorised based on three main themes, which are Innovative Teaching Approaches (20 articles), Educational Technology (13 articles), and Global Education Challenges (9 articles). The examination of Innovative Teaching Approaches reveals that integrating graphic design into primary education enhances student engagement, comprehension, and critical thinking skills. The theme of Educational Technology explores the implementation of visual aids and design elements, indicating that technology, when incorporated judiciously, contributes to a more dynamic and effective learning environment. Addressing Global Education Challenges, the review underscores the potential of graphic design to address issues of accessibility and inclusivity in diverse educational settings. Collectively, these themes underscore the significance of incorporating graphic design in primary school teaching methods, offering insights into innovative approaches, the integration of educational technology, and potential solutions to global education challenges.

Keywords Graphic design; Education; Primary school; Teaching methods
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Introduction

In today's rapidly evolving educational landscape, the integration of graphic design into teaching methodologies offers a promising avenue for enhancing student engagement and learning outcomes. As Malaysia strives to improve its primary education system, graphic design emerges as a powerful tool that can simplify complex concepts, especially in subjects like mathematics, language, and science. By utilizing visual aids and interactive elements, educators can cater to diverse learning styles, enabling students to grasp abstract ideas more effectively. Such a visual approach is particularly crucial in early childhood education, where attention spans are limited, and students benefit greatly from engaging, colorful materials that stimulate curiosity.

The importance of developing innovative teaching strategies is underscored by recent studies that highlight various educational challenges and solutions. Researchers such as Ramli et al. (2022) advocate for game-based learning, which combines entertainment and education to foster motivation among students. Similarly, the works of Khazali et al. (2023), Xian et al. (2021) and Ibrahim et al. (2024) emphasise the effectiveness of augmented reality (AR) in language teaching, which aligns with the idea that interactive visual tools can facilitate more immersive learning experiences. The combination of graphic design with these methodologies can revolutionise classroom dynamics, offering teachers creative avenues to present lessons in an engaging and effective manner.

Moreover, the rise of digital platforms and e-learning, accelerated by the COVID-19 pandemic, has prompted a shift toward more student-centered approaches in education. As Kasim et al. (2022) observe, the transition to e-learning has placed emphasis on self-directed learning, where visual content plays a key role in helping students retain information. Incorporating graphic design into educational games, flipped classrooms, and e-learning platforms can bridge the gap between traditional and modern teaching methods, making education more accessible and relatable for students.

In the Malaysian context, the focus on enhancing primary education through graphic design is supported by ongoing research on teaching methods and student engagement. By integrating well-designed visuals into lesson plans, educators can foster a more inclusive learning environment where all students, regardless of their academic abilities, can thrive. This approach aligns with Malaysia’s broader educational goals, particularly in fostering Higher Order Thinking Skills (HOTS) and preparing students for the challenges of the 21st century.

Material and Method

The systematic review consists of three basic phases — identification, screening, and eligibility— which help select relevant articles for this paper.

Identification

As part of this investigation, a systematic review approach was employed in three key stages to identify a significant number of relevant articles. The initial phase focused on selecting keywords and identifying related terms using resources such as dictionaries, encyclopedias, thesauruses, and prior studies. After finalising the relevant terms, search strings were created for the Scopus and ERIC databases. In this first step of the systematic review, a total of 9,306 articles were retrieved from both databases. The keywords used in the search included "graphic design," "education," and "primary school." Table 1 provides the search strings for both Scopus and Eric.

Table 1: Search strings for Scopus and ERIC.

Category	**Description**
Scopus	TITLE-ABS-KEY ((graphic OR design OR "graphic design") AND (education OR learn* OR study*) AND "primary school") AND (LIMIT-TO (SRCTYPE , "j")) AND (LIMIT-TO (AFFILCOUNTRY , "Malaysia")) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (PUBYEAR , 2021) OR LIMIT-TO (PUBYEAR , 2022) OR LIMIT-TO (PUBYEAR , 2023))
Eric	https://eric.ed.gov/?q=graphic+OR+design+OR+graphic+design+AND+education+OR+study+OR+learn+AND+primary+school&ff1=dtySince_2019&ff2=pubJournal+Articles&ff3=eduElementary+Education&ff4=locMalaysia

Screening

During the screening process, research items that are potentially relevant are evaluated to ensure they correspond with the predefined research questions or topic. One of the frequently used criteria in this phase involves selecting studies related to the teaching methods using graphic design for primary education in Malaysia. Duplicate articles are eliminated at this stage. After applying various inclusion and exclusion criteria, 78 articles were evaluated in the second screening stage, following the exclusion of 9,228 publications in the first. Table 2 outlines the criteria used in selecting the articles. Since research articles provide the most valuable recommendations, this criterion was prioritised. The review also considered gaps in prior studies. Furthermore, only English-language publications from 2020 to 2023 were included, and no studies were discarded due to duplication.

Table 2 Criteria used for selection during the search process.

Criterion	**Inclusion**	**Exclusion**
Language	English	Non-english
Timeline	2020 – 2023	<2020
Literature type	Journal (Article)	Besides Journal (Article)
Publication stage	Final	In Press
Country	Malaysia	Besides Malaysia

Eligibility

In the third phase, known as the eligibility assessment, a total of 78 articles were gathered. During this stage, the titles and key content of each article were carefully reviewed to verify their adherence to the inclusion criteria and relevance to the research aims. As a result, 49 articles were excluded due to their lack of relevance to the research field, insufficiently informative titles, or abstracts that did not align with the study's empirically driven objectives. Ultimately, 29 articles were selected for further examination, as illustrated in Figure 1.

Data Abstraction and Analysis

An integrative analysis was employed as one of the assessment methods in this study to review and synthesise diverse research designs, including quantitative, qualitative, and mixed methods. The study aimed to identify key topics and subtopics. The initial phase involved gathering data to aid in the development of themes. Figure 1 illustrates how 29 publications were compiled for relevant assertions or material aligned with the study's focus. Afterward, important contemporary studies on graphic design implementation in primary education were reviewed. The methodologies and results from all the studies were thoroughly examined. Following this, themes were constructed based on the evidence within the context of the study. A log was maintained during data analysis to document any insights, interpretations, challenges, or reflections relevant to the data interpretation process. Finally, the findings were compared to identify any inconsistencies in the theme development. The final themes were adjusted to ensure coherence and alignment.

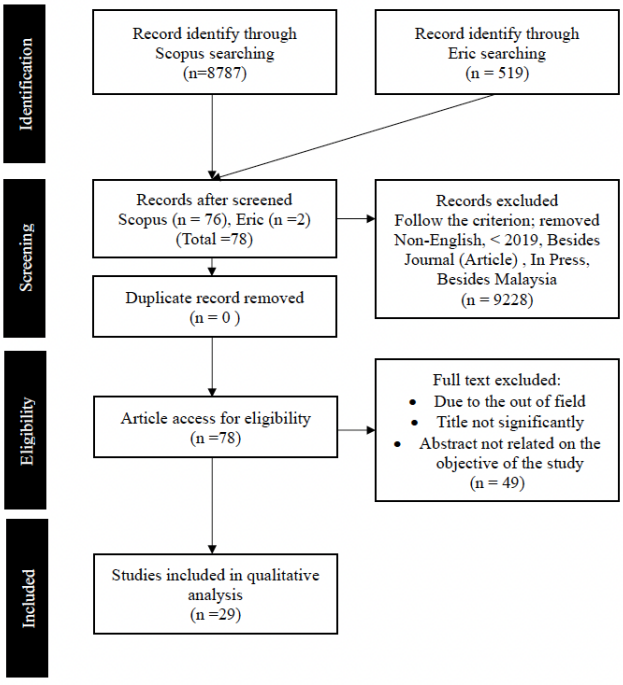

Figure 1. Flow Diagram of the Three Phases in the Searching Process.

Result and Finding

The study on using graphic design in teaching methods for primary schools in Malaysia found that incorporating visual elements, such as pictures and diagrams, improved students' understanding and engagement. Teachers observed increased interest and participation, and students showed enhanced creativity and critical thinking skills. In summary, using graphic design in primary school teaching appears to be a helpful way to make lessons more effective and enjoyable. All articles were categorised based on three main themes, which were (20 articles), Educational Technology (13 articles), and Global Education Challenges (9 articles).

Innovative Teaching Approaches

Innovative teaching methods refer to creative and non-traditional strategies used by educators to improve the learning process and more effectively engage students. These methods go beyond conventional instruction, integrating new technologies, hands-on activities, and individualised approaches to address various learning preferences. Examples include project-based learning, flipped classrooms, gamification, and the use of multimedia tools. The aim is to cultivate critical thinking, problem-solving abilities, and a deeper grasp of the material, equipping students for the complexities of the modern world. Such methods foster a more interactive and engaging learning environment, encouraging curiosity, collaboration, and adaptability. Table 3 presents a summary of the themes associated with innovative teaching approaches.

Table 3 Summary of innovative teaching approaches.

Authors	Title	Year	Source Title	Methodology	Advantages
Ishak & Hussin (2022)	Predictive Validity Study of Sustainable Leadership for Learning Questionnaire	2022	International Journal of Instruction	Testing the validity of the Sustainable Leadership for Learning Questionnaire (SLLQ) in predicting teacher satisfaction towards teaching. The study also aims to test the convergent and discriminant validity of the SLLQ. The data collected were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM).	The Sustainable Leadership for Learning Questionnaire (SLLQ) is a reliable tool for assessing teacher satisfaction in teaching, according to a study of 190 teachers in Kedah, Malaysia, using the Teaching Satisfaction Scale.
Azrul Azwan Mohd Abdul Aziz et al. (2021)	The Development of The Hots Mathematical Problem-Solving Framework Using the Bar Model Strategy- A Need Analysis	2021	Review of International Geographical Education Online	The study uses a modified DDR approach to develop a mathematical problem-solving framework for primary school students, focusing on improving their Higher Order Thinking Skills.	The study aims to improve primary school pupils' achievement, motivation, and attitude towards complex math problems using the Higher Order Thinking Skills (HOTS) mathematical problem-solving framework (HMPSF) using the Bar Model strategy.education.
Don et al. (2021)	Challenges For Using Organizational Climate Tools for Measuring Teacher Job Satisfaction	2021	International Journal of Evaluation and Research in Education	The study investigates primary school teachers' job satisfaction and school environment in Kedah, Malaysia, using surveys and interviews. Key themes include student relationships, decision-making, infrastructure, teamwork, and educational creativity.	The research explores factors influencing teacher satisfaction in Kedah, Malaysia, including learning resources, student relations, communication, decision-making, and instructional innovation, using surveys and interviews with 220 teachers.

Yoong et al. (2023)	The Design and Development of a Dyscalculia Checklist Based on a Focus Group Interview	2023	British Journal of Special Education	The article presents a qualitative study on dyscalculia symptoms, involving five special education experts and a 59-item dyscalculia checklist. The findings can aid early detection in primary schools, benefiting the Ministry of Education, educators, and students globally.	The study identifies dyscalculia as a math learning difficulty in Malaysian primary school students. Five experts developed a checklist based on six dyscalculia constructs, including math anxiety. This could aid early intervention and benefit the Ministry of Education.
Asep Sunandar et al. (2022)	Healthy School Management Model of Child-Friendly Schools: Children Nutrition Status and Learning Atmosphere	2022	Malaysian Online Journal of Educational Management	The study analyzes 33 schools' health programs, focusing on childhood obesity. It examines factors like child-friendly schools, learning atmosphere, and comfort's impact on children's nutritional status. The findings suggest attention to these factors is crucial for maintaining children's health.	The study examines health challenges, particularly childhood obesity, in 33 primary schools, focusing on child-friendly schools, positive learning atmospheres, and comfort as crucial for maintaining nutritional status and preventing obesity.
Khazali et al. (2023)	Smart Pictorial Dictionary Via Mobile Augmented Reality	2023	Bulletin of Electrical Engineering and Informatics	The study developed a mobile app combining augmented reality and a pictorial dictionary to enhance children's English language learning, following the ADDIE model.	The study proposes a 3D pictorial dictionary using augmented reality (AR) technology in primary schools to address English learning difficulties. Implemented using the ADDIE model, the study shows successful implementation and improved children's learning experiences.
Tinggie et al. (2023)	Peer Scaffolding Among Primary Esl Learners' Writing Task: Learners' Behaviors and Triggering Factors	2023	International Journal of Learning, Teaching and Educational Research	The study investigates the impact of peer scaffolding on the writing development of Year 6 ESL learners in primary school. It found that scaffolding behaviors, particularly questioning, are consistent and influenced by learners' competency and language access.	The study explores student support during English as a Second Language (ESL) learning, highlighting the importance of human interaction and the challenges of the COVID-19 pandemic. It highlights the impact of continuous support, particularly through questioning, on students' writing abilities.
Mohd Afifi Bahurudin Setambah et al. (2021)	Fraction Cipher: A Way to Enhance Student Ability in Addition and Subtraction Fraction	2021	Infinity Journal	The study introduces Fraction Cipher, a tool for primary school students struggling with fractions, and "Sake-Beda" strategy to improve math achievement and attitude towards learning fractions, based on design research.	The Fraction Cipher innovation, integrating Malay language with mathematics, significantly improves primary school students' understanding of fractions and algebra. It introduces a strategy called "Sake-Beda" to simplify problem-solving, enhancing their performance in fractional addition and subtraction.
Baskaran et al. (2023)	Specific Gaming Features in An Interactive PowerPoint on The Enhancement of Grammar Skill	2023	World Journal of English Language	The study investigates the impact of interactive PowerPoint features on teaching grammar to primary students in Pulau Tikus, Malaysia, highlighting positive effects but challenges like resource shortages and limited training.	The study explores the use of interactive PowerPoint with gaming features in primary school education, highlighting the efficiency and interest of technology in teaching grammar skills, such as letter pronunciation and reading.
Roslizam Hassan et al. (2022)	Professional Learning Community's Practices: Exploring Malaysian Primary School Teacher Strategies	2022	Malaysian Online Journal of Educational Management	The study explores the implementation of professional learning community strategies by 15 primary school teachers in the Southern Zone of Malaysia, revealing their active engagement in these strategies.	The study investigates the implementation of professional learning community strategies by 15 primary school teachers in the Southern Zone of Malaysia, aiming to improve teaching quality and student performance.
Namoco et al. (2023)	Satisfaction With School Life: Capturing Malaysian Pupils' Voice from A Multiethnic Perspective	2023	Kajian Malaysia	The study examines factors affecting Malaysian primary school students' satisfaction with school life, focusing on emotional contentment, academic achievements, a safe learning environment, and 21st-century	The study explores factors influencing students' satisfaction with school life in Malaysia, involving 18 pupils from different schools. Key themes identified include emotional contentment, curricular achievements, a safe learning

				skill development, offering practical insights for improving school experience.	environment, and 21st-century skill development.
Mohd Nazri Abdul Rahman & Lee Hui Ting (2022)	Exploring Before Transforming: A Phenomenological Study on Home Learning Culture of Indigenous Semai Primary School Students in Perak	2022	Malaysian Online Journal of Educational Management	This study investigates the home learning culture of Semai primary school students in Perak, Malaysia, focusing on cultural norms, formal education values, and developmental/modernisation values, aiming to inform educators' support for these students.	The research explores home learning culture of six indigenous Semai students using a phenomenological design, utilizing photography, interviews, and naturalistic observations for data collection and interpretation.
Yoon & Khambari (2022)	Design, Development, And Evaluation of The Robobug Board Game: An Unplugged Approach to Computational Thinking	2022	International Journal of Interactive Mobile Technologies	The study emphasizes the importance of cultural norms, formal education values, and developmental values in indigenous home learning culture, suggesting educators should provide appropriate resources for their learning improvement.	The Robobug board game, designed for Malaysian primary school students, aims to enhance computational thinking and promote collaborative learning, despite computer and internet access challenges, thereby boosting student engagement and achievement.
Singh et al. (2021)	Card Game as A Pedagogical Tool for Numeracy Skills Development	2021	International Journal of Evaluation and Research in Education	This study evaluates Math Zap, a card game, as a tool for developing numeracy skills in primary school students aged 12-13, using a mixed-method approach.	The Math Zap card game, designed to improve numeracy skills in mental computation, has shown significant improvement in pre-post test scores among 34 primary school students aged 12-13, with a positive attitude towards the game.
Endot & Jamaluddin (2023)	Antecedent Factors Influencing Teacher's Readiness in Teaching Design and Technology Education	2023	Journal of Technical Education and Training	The study examines teacher readiness among 368 RBT teachers in Peninsular Malaysia, focusing on self-efficacy, intrinsic motivation, ICT skills, and support training, using a validated questionnaire and SPSS software for data analysis.	Research on 368 teachers reveals high teacher readiness, particularly in School-Based Assessment skills, highlighting the importance of self-efficacy, intrinsic motivation, ICT skills, and support training.
Setambah et al. (2023)	Non-Digital Gamification: Effects of Teaching on Mathematics Achievement and Student Behavior	2023	Nurture	The study explores the effect of non-digital game-based teaching methods on students' fractions achievement in a quasi-experimental design with 100 primary school students in Perak.	The study explores the impact of non-digital game-based learning (NDGBL) on fractions achievement in primary school students in Perak, offering practical insights for innovative teaching methods.
Rahimah Ismail et al. (2022)	A Visual-Based Project Production Package for Design and Technology Subject Based on Computational Thinking Skills Across-Stem	2022	International Journal on Informatics Visualization	This study develops and evaluates a Visual-Based Project Production Package Model (KHP4) for primary school students, focusing on enhancing computational thinking skills through interactivity and fun learning.	The Visual-Based Project Production Package Model (KHP4) integrates Computational Thinking into primary education, enhancing students' problem-solving skills and cultivating critical, creative, and innovative thinking.
Abdullah et al. (2021)	Does The Use of Smart Board Increase Students' Higher Order Thinking Skills (Hots)?	2021	IEEE Access	The research uses the ADDIE model and a quasi-experimental design to assess the effectiveness of the ALuSB program on students' HOTS, using pre-tests and post-tests.	The study introduces an Active Learning instruction program, ALuSB, using smart boards to improve Higher Order Thinking Skills (HOTS) in Malaysian students, demonstrating its effectiveness.
Nadzri et al. (2023)	The Effect of Using Augmented Reality Module in Learning Geometry on Mathematics Performance Among Primary Students	2023	International Journal of Information and Education Technology	The study, involving 59 Year 4 students, found a significant difference in overall mean scores between the experimental and control groups, with the experimental group showing better performance.	The study explores the benefits of incorporating Augmented Reality (AR) into Year 4 Geometry education, demonstrating enhanced learning performance, clearer visualization, and improved conceptual understanding.

Catherine Hui Tiing Wong & Melor Md Yunus (2023)	Let "Flippity" Speak: Using Online Board Game to Improve Speaking Skills Among Elementary Pupils	2023	European Journal of Educational Research	The study uses a quasi-experimental mixed-method design, including a speaking pre-test, post-test, and interviews with 30 participants, to assess improvements in accuracy, fluency, and coherence.	"Flippity" enhances learning by enhancing interest and participation, promoting positive attitudes among students. It's potential for use in other language skills, highlighting its potential for further research.

Educational Technology

Educational technology, commonly referred to as EdTech, involves utilizing technological innovations to enhance both teaching and learning processes. This field includes a wide variety of tools, platforms, and resources designed to boost educational outcomes by making learning more engaging, accessible, and efficient. Examples of EdTech range from interactive whiteboards and educational software to online learning platforms, virtual reality tools, and other digital applications. The primary goal of EdTech is to harness the power of technology to accommodate various learning styles, encourage collaboration, and offer personalised learning experiences. It has become an essential element in contemporary education systems, supporting remote learning, adaptive learning pathways, and data-driven instructional strategies. As technology progresses, so too does its potential to reshape and improve the educational landscape. Table 4 presents a summary of the key themes related to educational technology.

Table 4 Summary of educational technology.

Authors	Title	Year	Source Title	Methodology	Advantages
Tengku Sarina Aini Tengku Kasim et al. (2022)	Challenges In Applying a Student-Centred Approach To E-Learning for Islamic Education In Primary Schools During The Pandemic Covid-19: Preliminary Data Analysis	2022	Afkar	The study interviews Islamic Education teachers to understand challenges in adopting student-centered e-learning during COVID-19, highlighting the need for better understanding and creative implementation.	The study examines the COVID-19 pandemic's impact on Islamic Education, focusing on challenges like low student engagement and high dropout rates, utilizing in-depth interviews with teachers.
Izzat Syahir Mohd Ramli et al. (2022)	The Design of Game-Based Learning and Learning Analytics	2022	Cypriot Journal of Educational Sciences	This paper presents a learning app combining games and analytics to teach primary school mathematics, aiming to boost student motivation and achievement, aligning with effective teaching methods.	Video games and data analysis enhance primary school math learning, boosting motivation and confidence. Teachers benefit from technology tracking progress, adapting lessons based on student learning methods.
Khazali et al. (2023)	Smart Pictorial Dictionary Via Mobile Augmented Reality	2023	Bulletin of Electrical Engineering and Informatics	The study developed a mobile app combining augmented reality and a pictorial dictionary to enhance children's English language learning, following the ADDIE model.	The study proposes a 3D pictorial dictionary using AR technology in primary school, enhancing children's learning experiences and improving their memory skills, following the ADDIE model.
King et al. (2021)	Intelligent Tutoring System: Learning Math For 6th-Grade Primary School Students	2021	Education Research International	The paper proposes a web app for elementary students and parents to enhance online math learning during COVID-19, using UML, PHP, MySQL, and CTAT for system modelling.	The application simplifies online mathematics learning for elementary school students and parents, using UML, PHP, MySQL, and Intelligent Tutoring System for personalised support.

Baskaran et al. (2023)	Specific Gaming Features in An Interactive Powerpoint on The Enhancement of Grammar Skill	2023	World Journal of English Language	The study investigates the impact of interactive PowerPoint features on teaching grammar to primary students in Pulau Tikus, Malaysia, highlighting positive effects but challenges like resource shortages.	The study investigates the impact of interactive PowerPoint features on teaching grammar to primary students in Pulau Tikus, Malaysia, highlighting positive effects but challenges like resource shortages.
Nor Fatin Farzana Zainuddin et al. (2022)	The Effect of The Aesthetically Mobile Interfaces on Students' Learning Experience for Primary Education	2022	International Journal of Advanced Computer Science and Applications	The study investigates the impact of visually appealing mobile interfaces on the learnability, satisfaction, and efficiency of primary school students in Kelas Al-Quran and Fardu Ain.	This research explores the impact of mobile learning applications on learnability, satisfaction, and efficiency, emphasizing the importance of aesthetically pleasing interfaces for optimal student experience.
Ramalinga m et al. (2022)	Speaking Skills Enhancement Through Digital Storytelling Among Primary School Students in Malaysia	2022	International Journal of Learning, Teaching and Educational Research	The study utilised digital storytelling to improve Tamil speaking skills among secondary school students in Malaysia, using a mobile application and classroom training.	Digital storytelling in Malaysian National Primary schools significantly improved Tamil speaking skills, with mobile application modules enhancing comprehension, vocabulary, and fluency, according to a study.
Singh et al. (2021)	Card Game as a Pedagogical Tool for Numeracy Skills Development	2021	International Journal of Evaluation and Research in Education	The study evaluates Math Zap, a card game, as a tool for developing numeracy skills in primary school students, using a mixed-method approach.	Math Zap, a card game for numeracy skills, significantly improves students' abilities in fractions, percentages, and decimals, with a positive attitude and significant improvement in pre-post test scores.
Rahimah Ismail et al. (2022)	A Visual-Based Project Production Package for Design and Technology Subject Based on Computational Thinking Skills Across-Stem	2022	International Journal on Informatics Visualization	This study develops and evaluates a Visual-Based Project Production Package Model (KHP4) for primary school students, focusing on enhancing computational thinking skills through interactivity and fun learning.	The Visual-Based Project Production Package Model (KHP4) integrates Computational Thinking into primary education, enhancing students' problem-solving skills and cultivating critical, creative, and innovative thinking.
Abdullah et al. (2021)	Does The Use of Smart Board Increase Students' Higher Order Thinking Skills (Hots)?	2021	IEEE Access	The research uses the ADDIE model and a quasi-experimental design to assess the effectiveness of the ALuSB program on students' HOTS, using pre-tests and post-tests.	The study introduces an Active Learning instruction program, ALuSB, using smart boards to improve Higher Order Thinking Skills (HOTS) in Malaysian students, demonstrating its effectiveness.
Nadzri et al. (2023)	The Effect of Using Augmented Reality Module in Learning Geometry on Mathematics Performance Among Primary Students	2023	International Journal of Information and Education Technology	The study, involving 59 Year 4 students, found a significant difference in performance between the experimental and control groups, with the experimental group showing better results.	The educational module, GeomAR3, integrates Augmented Reality into Year 4 Geometry education, enhancing learning performance, visualizing abstract concepts, strengthening long-term memory, and improving conceptual understanding.
Catherine Hui Tiing Wong & Melor Md Yunus (2023)	Let "Flippity" Speak: Using Online Board Game to Improve Speaking Skills Among Elementary Pupils	2023	European Journal of Educational Research	The study uses a quasi-experimental mixed-method design, including a speaking pre-test, post-test, and interviews with 30 participants, to assess improvements in accuracy, fluency, and coherence.	"Flippity" enhances learning by enhancing interest and participation, promoting positive attitudes among students. It's potential for use in other language skills, highlighting its potential for further research.
Nur Syaheera Sulaiman et al. (2023)	MMZ: A Study on The Implementation of Mathematical Game-Based Learning Tool	2023	International Journal of Advanced Computer Science and Applications	This study evaluates Math Maze Zone, a game-based learning tool for primary school students, focusing on Chapter 8: Space and Shape, using design, development, testing, and adult feedback.	Math Maze Zone (MMZ) is a game-based learning tool designed to help primary school students prepare for exams by combining learning and play.

Global Education Challenges

Global education faces numerous challenges that hinder equitable access to quality learning opportunities. One major issue is the persistent disparity in educational resources and opportunities among countries, with marginalised communities often bearing the brunt of this inequality. Insufficient funding for education, inadequate infrastructure, and a shortage of qualified teachers further exacerbates these disparities. Additionally, the digital divide poses a significant challenge, as not all students have access to the technology necessary for remote learning, especially during the COVID-19 pandemic. Moreover, socio-cultural factors, gender-based discrimination, and conflicts in various regions contribute to the complexity of global education challenges. Addressing these issues requires collaborative efforts, innovative approaches, and a commitment to prioritizing education as a fundamental right for all. Table 5 indicates the summary of the global education challenges' theme.

Table 5 Summary of global education challenges.

Authors	Title	Year	Source Title	Methodology	Advantages
Ishak & Hussin (2022)	Predictive Validity Study of Sustainable Leadership for Learning Questionnaire	2022	International Journal of Instruction	The study evaluates the validity of the Sustainable Leadership for Learning Questionnaire (SLLQ) in predicting teacher satisfaction, focusing on its convergent and discriminant validity.	The Sustainable Leadership for Learning Questionnaire (SLLQ) is a reliable tool for assessing teacher satisfaction in teaching, according to a study of 190 teachers in Kedah, Malaysia.
Don et al. (2021)	Challenges for Using Organizational climate Tools for measuring Teacher Job Satisfaction	2021	International Journal of Evaluation and Research in Education	The study investigates the job satisfaction and school environment of primary school teachers in Kedah, Malaysia, using surveys and interviews to identify key themes.	The study explores factors influencing teacher satisfaction in Kedah, Malaysia, including learning resources, student relations, communication, decision-making, and instructional innovation, using surveys and interviews with 220 teachers.
Asep Sunandar et al. (2022)	Healthy School Management Model of Child-Friendly Schools: Children Nutrition Status and Learning Atmosphere	2022	Malaysian Online Journal of Educational Management	The study explores the impact of child-friendly schools, learning atmosphere, and comfort on children's nutritional status, emphasizing the importance of these factors in promoting children's health.	The study examines 33 primary school health programs, revealing that child-friendly environments, positive learning environments, and comfort are crucial for preventing childhood obesity and maintaining nutritional status.
Alam & Sulaiman (2022)	Supporting Youths to Continue Further Education in Emerging Nations: Food for Education Intervention or Education for Food Policy?	2022	British Food Journal	The study suggests a new policy called "education for food" to address food security issues in developing nations, aiming to sustainably support education and create a balanced society.	The study suggests a new policy called "education for food" to address food security issues in developing nations, aiming to sustainably support education and create a balanced society.
Mokhtar et al. (2023)	Teachers' Commitment, Self-efficacy and Job Satisfaction as Communicated by Trained Teachers	2023	Management in Education	The study reveals that self-efficacy significantly influences job satisfaction and commitment among primary school teachers in Malaysia, emphasizing the need to boost teachers' self-efficacy.	The study in Malaysia reveals that teachers' self-efficacy significantly influences their job satisfaction and commitment, suggesting that schools should enhance this to improve teacher well-being.
Namoco et al. (2023)	Satisfaction With School Life: Capturing Malaysian Pupils'	2023	Kajian Malaysia	The study investigates factors influencing Malaysian primary school students' satisfaction, identifying emotional contentment,	The study explores factors influencing Malaysian primary school students' satisfaction, revealing four key themes: emotional contentment,

	Voice from A Multiethnic Perspective			academic achievements, a safe learning environment, and 21st-century skill development.	curricular achievements, a safe learning environment, and 21st-century skill development.
Mohd Nazri Abdul Rahman & Lee Hui Ting (2022)	Exploring Before Transforming: A Phenomenological Study on Home Learning Culture of Indigenous Semai Primary School Students in Perak	2022	Malaysian Online Journal of Educational Management	This study investigates the home learning culture of Semai primary school students in Perak, Malaysia, identifying cultural norms, formal education values, and developmental/modernisation values as key factors.	The research explores home learning culture of six indigenous Semai students using a phenomenological design, utilizing photography, interviews, and naturalistic observations for data collection and interpretation.
Endot & Jamaluddin (2023)	Antecedent Factors Influencing Teacher's Readiness in Teaching Design and Technology Education	2023	Journal of Technical Education and Training	The study examines teacher readiness among 368 RBT teachers in Peninsular Malaysia, focusing on self-efficacy, intrinsic motivation, ICT skills, and support training.	Research on 368 teachers reveals high teacher readiness, particularly in School-Based Assessment skills, highlighting the importance of self-efficacy, intrinsic motivation, ICT skills, and support training.
Suhaila Che Noh & Abdul Malek Abdul Karim (2021)	Design Thinking Mindset to Enhance Education 4.0 Competitiveness in Malaysia	2021	International Journal of Evaluation and Research in Education	The paper emphasises the importance of preparing teachers for Education 4.0, focusing on developing students' skills in information processing, creative thinking, and problem-solving.	The paper advocates for early programming in primary schools and a holistic approach to skill development, emphasizing the importance of a design thinking mindset for teachers.

Discussion and Conclusion

The studies synthesised above offer a comprehensive look into the evolving landscape of education, particularly in primary schools. Collectively, they demonstrate how educational innovations are increasingly becoming diverse and interdisciplinary, addressing both academic challenges and pedagogical practices. For instance, Ishak and Hussin (2022) emphasise the importance of sustainable leadership for teacher satisfaction, while Aziz et al. (2021) focus on higher-order thinking skills, showcasing the critical need for educational leadership and cognitive frameworks that foster deeper learning. These studies, when viewed together, highlight the importance of both administrative and pedagogical tools in ensuring teacher and student success.

The research findings also underscore the growing significance of technology in education. The development of a gamified e-book for Chinese character learning (Chen et al., 2023), the integration of augmented reality for language teaching (Khazali et al., 2023), and the use of game-based learning for mathematics education (Ramli et al., 2022) illustrate the potential of digital tools to enhance engagement and effectiveness in learning. These studies align with global trends emphasizing the importance of incorporating digital innovations, particularly in a post-pandemic world where virtual learning has become increasingly relevant. This shift towards gamification and interactivity appears crucial for addressing the diverse needs of students, especially in subjects like mathematics and language.

Another key theme that emerges is the adaptive strategies educators have employed in response to the COVID-19 pandemic. The work of Kasim et al. (2022) and Don et al. (2021) highlights the organisational challenges and adaptive measures taken by Islamic Education teachers and primary school administrations during the pandemic. Furthermore, studies on the use of web-based applications for mathematics education and peer scaffolding for ESL learners (Setambah et al., 2021; Tinggie et al., 2023) show that digital resilience and collaborative strategies became vital for maintaining educational continuity. The resilience demonstrated by both educators and students during this period speaks to the importance of flexible, scalable educational frameworks that can withstand disruptions.

Beyond digital and pandemic-responsive innovations, the studies reveal broader socio-cultural and pedagogical trends. The development of a dyscalculia checklist (Yoong et al., 2023) and the introduction of the Robobug board game (Barghi et al., 2020) reflect the ongoing efforts to address learning disabilities and promote computational thinking. These studies emphasise a shift toward early detection of learning challenges and fostering critical thinking in younger learners. Additionally, research on service-learning-based AI modules, Tamil digital storytelling, and aesthetically pleasing mobile interfaces (Mokhtar et al., 2021; Song et al., 2021; Zainuddin et al., 2022) suggests that the role of culture and aesthetics is becoming more prominent in shaping effective learning environments.

In conclusion, the synthesis of these studies demonstrates the multifaceted approach to education in the modern world. From leveraging leadership strategies and technology to adapting to global disruptions like the COVID-19 pandemic, the field of primary education is undergoing significant transformation. Future educational research should continue to explore how these innovations can be scaled, ensuring that both teachers and students have access to resources that foster meaningful learning experiences. Furthermore, as programming, AI, and gamified tools become more ingrained in curricula (Noh & Karim, 2021; Sulaiman et al., 2023), educational frameworks must also adapt to prepare students for a rapidly evolving technological landscape.

Graphic design, teaching, and elementary schools could be very promising fields for future endeavours. Developing interactive digital learning materials and using graphic design principles to create captivating e-books, apps, and multimedia content for elementary school kids are examples of emerging prospects. Learning aids, educational posters, and visually attractive classrooms can also be used to improve in-person learning situations. Investigating how gamification concepts might be used into instructional graphic design could lead to interesting opportunities and fun, creative learning environments. Additionally, studies that concentrate on how graphic design enhances communication

between teachers, students, and parents are crucial because they open the door to more productive participation and teamwork within the educational environment.

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