Digital Teaching Pedagogy Among Primary School Teachers: A Systematic Literature Review

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Abstract
The omnipresence of digital teaching is becoming evident along with technological advancement. Hence, teachers' acquaintance with their pedagogical skills requires refinement to improve their professionalism and stay relevant. Yet, there is limited, profound research available that has discussed this issue and highlighted its shortcomings. This article aims to write a systematic literature review (SLR) on past studies related to primary school teachers' pedagogical skills in digital teaching. The SLR methodology conforms to PRISMA writing standards, including identification, screening, eligibility, evaluation, data extraction, and analysis. Three databases, namely Web of Science, Scopus, and ERIC, were used to source relevant articles. 25 out of 324 initial articles were selected for review with three overarching themes: (i) approaches, (ii) methods, and (iii) digital teaching techniques. Sub-themes under 'approaches' include general, 21st century learning, digital, and digital integration. Sub-themes under methods include thinking-oriented, physically oriented/kinaesthetic, digitally oriented, a combination of thinking and digital, grouping, and guidance-oriented. Sub-themes under 'techniques' include the development of digital resources, the application of digital resources, and digital-based activities. The study's implications serve as a guide for teachers in planning and implementing digital teaching with maximum impact on their students' learning experiences.
Keywords: *Digital Teaching, Pedagogy, Approaches, Methodology, Technique, Elementary Teacher*

Introduction

The rapid advancement of technology in today's world has brought about a significant transformation in the education system post-pandemic. This shift has had a profound impact on both teachers' instructional methods and students' learning experiences in schools (Giseli S. & Maria, 2017). Traditional face-to-face teaching methods are no longer the primary means of knowledge acquisition, with digital teaching now taking precedence, including its integration into face-to-face instruction and blended learning formats (Ina Blau et al., 2018).

Consequently, teachers must refine their teaching styles to ensure the effectiveness of digital teaching and learning processes, particularly in online instruction (Zawiah B, 2020). Enhancing teachers' competence in digital aspects—comprising knowledge, skills, and attitudes—is crucial for holistic student achievement (Ibrahim H. & Sukran U, 2017). Furthermore, teachers' motivation can positively influence their students' engagement in digital learning environments (Chung, T.Y & Chen, Y.L, 2018). Therefore, teachers must prepare for this transformation by integrating pedagogical skills and digital technology into their teaching practices to meet the demands of the contemporary education landscape.

The success of a lesson hinges significantly on teachers' mastery of pedagogy, encompassing both planning and implementation. Digital teaching requires additional skills in managing digital devices and educational applications. Moreover, assessing students' digital literacy is essential before planning and implementing instruction, particularly for primary school students, whose digital literacy may be influenced by factors such as age and socio-economic background. Given these foundational issues, this study will examine primary school teachers' pedagogical skills concerning their approaches, methods, and techniques in digital teaching.

Currently, numerous studies have been conducted on digital teaching, such as 'Readiness of Teaching Staff Through Online Teaching' by Eliza, N. et al. (2021); Fadzliyah et al. (2020); Nurbaizura, S & Nurfaradilla (2020);

Nurhazirah & Masayu (2020); and Syahfitri, R. et al. (2020), 'Digital Teaching of Teachers Using Digital Games and Gamification' by Ham, N et al. (2021) & Fathi & Khadijah (2021), 'Google Meet' by Nurfitri, S. & Khadijah (2022), 'Mobile Applications' by Sylviano & Hasmadi (2019), 'Learning Aids Via Multimedia' by Nurfatin Syamimi et al. (2021) and Zulazizi, M (2020), 'Google Workspace' by Riduan (2020), 'Digital Material Development' by Mookan, N et al. (2021), and 'Digital Assessment' by Suhaida et al. (2022). However, there remains a need for a systematic literature review to consolidate these findings and address the dearth of research specifically focusing on digital teaching pedagogy among primary school teachers.

Furthermore, while there is a wealth of research on digital teaching in higher education at the university level (Rezaei A. et al., 2022), secondary schools (Syefrinando B. et al., 2022 and Byhar H. et al., 2022), primary schools (Masullo G. et al., 2021), and pre-schools (Oakley G. et al., 2020), limited attention has been given to digital teaching in primary schools, where intensive exposure to digital learning is crucial for fostering students' interest and potential for the future. Therefore, an SLR focusing on primary school teachers' pedagogy in digital teaching is essential to support the advancement of digital education and fill existing research gaps. Therefore, an SLR focusing on primary school teachers' pedagogy in digital teaching is essential to support the advancement of digital education and fill existing research gaps.

Moreover, this SLR will contribute to improving transparency, minimizing author bias, recruitment bias, and publication bias inherent in traditional literature reviews. To achieve this, the authors adopted the ROSES (Reporting Standard for Systematic Evidence Syntheses) review protocol, known for its comprehensive, transparent, organized, and systematic approach (Haddaway et al., 2018). This SLR commenced with the formulation of research questions using the PICo mnemonic (Population/Problem, Interest, Content) and subsequently involved a systematic search strategy, quality assessment of articles, and data extraction and analysis.

Therefore, conducting a systematic literature review (SLR) on teachers' pedagogy in digital teaching in primary schools is imperative to advance the development of digital education. Importantly, this SLR will complement traditional literature reviews by addressing transparency issues, author bias, recruitment bias, and publication bias. Utilizing comprehensive, transparent, organized, and systematic literature highlighting techniques inherent to SLRs can effectively mitigate these weaknesses. To facilitate the formation of this SLR, the authors employed the ROSES (Reporting Standard for Systematic Evidence Syntheses) review protocol. ROSES offers methodological flexibility and can be adapted for various types of SLR analyses, irrespective of research designs (Haddaway et al., 2018).

This SLR began with the formation of research questions, followed by a systematic search strategy, performing the articles' quality assessment, and extracting and analysing data from the selected articles. To form the research questions, the authors had referred to the mnemonics RQDT (Research Question Development Tool), with one of the tools used to form research questions named PICo. PICo is based on three main concepts namely P (*Population/ Problem*), I (*Interest*) and Co (*Content*). Based on this concept, three research questions are formed: i) What is the digital teaching approach of primary school teachers? ii) What is the digital teaching method of primary school teachers? and, iii) What is the digital teaching technique of primary school teachers?

Based on these research questions, the authors aim to conduct a comprehensive, orderly, and systematic literature review on previous studies related to primary school teachers' digital teaching approaches, methods, and techniques. This study can provide an important contribution to the field of practice and knowledge in the digital education system. With this SLR, stakeholders, such as teachers in particular can use this article as a guide for planning and implementing digital teaching to provide maximum impact on their students' learning experience.

Methodology
PRISMA (Preferred Reporting things for Systematic Review and Meta-analysis) requires 27 things to be followed in the preparation of this SLR. According to Moher et al. (2009), PRISMA is a standard publication that can be used in the social science sector since it can aid in the formulation of research questions and create a picture that is accurate, dependable, systematic, and clear. Actually, one of PRISMA's benefits is that it can reduce a variety of biases and assist writers in successfully synthesizing their research (Howard et al., 2019). According to Mallet et al. (2012), an SLR can highlight the empirical evidence and promote transparency. Establishing relevant research topics is the foundation for creating SLR. The process of creating SLR using the PRISMA approach is broken down into the following steps: identification, screening, eligibility, article appraisal, data extraction, and analysis.

Identification
Identification is the first step and it uses various appropriate keywords in the process of sourcing for articles and references. Accurate keywords can help the search process and improve the accuracy of articles and references

needed. Based on the research questions stated before, the authors had used three main keywords namely; digital teaching approach, digital teaching methods, and digital teaching techniques. In order to diversify the keywords, words with the same meaning, related words and variations to the main keywords had been used as well. This search process was carried out through an online thesaurus, referencing for the keywords of previous studies in WoS, SCOPUS and ERIC database platforms, and also obtaining expert opinions. The results of the identification process can be referred to in the table below.

Table 1 The Search Strings

Database search string	
WoS (*n* = 48)	TS= (("teaching digital*" OR "digital approach*" OR "teaching online style*" OR "teaching digital style" OR "instructional digital*" OR "teaching 21st century") AND ("characteristic" OR "personality" OR "attribute" OR "digital pedagogy* style") AND ("primary teacher" OR "elementary teacher"))
Scopus (*n* = 257)	TITLE-ABS-KEY (("teaching digital*" OR "digital approach*" OR "teaching online style*" OR "teaching digital style" OR "instructional digital*" OR "teaching 21st century") AND ("characteristic" OR "personality" OR "attribute" OR "digital pedagog* style") AND ("primary teacher" OR "elementary teacher"))
ERIC (n=19)	(("teaching digital*" OR "digital approach*" OR "teaching online style*" OR "teaching digital style" OR "instructional digital*" OR "teaching 21st century") AND ("characteristic" OR "personality" OR "attribute" OR "digital pedagogy* style") AND ("primary teacher" OR "elementary teacher"))

Based on the selected keywords, the article/ reference search process was conducted through three main databases namely, WoS (Web of Science), Scopus and ERIC. These database platforms were chosen because they have the strength in terms of comprehensiveness, stability, more advanced search functions compared to other databases (Gusenbauer and Haddaway, 2020), quality control, and a systematic indexing system (Martin-martin et al., 2018), as well as searches covering various types of languages and fields of study.

The search technique used to source for articles/ references was advanced searching using basic functions such as Boolean Operator (AND, OR), phrase searching, truncation, wild card and field codes (Table 1). A manual search had also been conducted by using the handpicking method on Google Scholar and Science Direct, as well as the snowballing method in selecting the articles.

Based on the keywords, databases, and search techniques used, a total of 48 WoS articles, 257 Scopus articles and 19 ERIC articles were successfully obtained. All of these articles will go through the next stage in the systematic search strategy, which is the screening process.

Screening
There were 324 items were successfully acquired during the identification phase, and they will now go to the screening phase. The process of setting inclusion or exclusion criteria is called screening, and it is used to choose articles that meet the requirements of the SLR before it is produced (Shaffril et al., 2020). The year of publication is the first criterion applied in this SLR; works published in the recent four years (2020–2023) have been chosen. The justification for choosing this period is because it is in line with the study maturity concept as discussed by Kraus et al. (2020). The selection of years is limited to four years ago due to the rapid development of digital technology in the education system, as well as the fact that too many articles were published during this period, which emphasized the use of digital teaching and gained the attention of many scholars, especially in the post-pandemic period.

Next, this SLR selected the publications in the form of journal articles that are in English only. To identify the findings, only articles with empirical data were selected, and we removed those in the form of reviews to avoid confusion. Among other inclusion criteria were the empirical findings from articles that focused on primary school teachers' pedagogical skills, digital teaching approaches, methods, and techniques. If the findings are directed to other pedagogical skills or digital teaching at the university and high school level, then this article will be removed. This is important to enable all the selected articles to offer relevant findings to the SLR (refer to Table 2). After the screening process, a total of 273 articles were removed because they did not meet the set criteria, and this made the remaining articles available for the next process to be 51 articles.

Table 2 Inclusion Criteria Used

	Inclusion Criteria	Exclusion Criteria
Timeline	Studies conducted between 2020 and 2023 (4-year time span)	Studies conducted before 2020
Literature Type	Articles from journals	Conference proceedings, review articles, book chapters, reports
Data Type	Empirical	Review
Language	The text was written in English	Text not written in English
Subject Area	Related to approaches, methodology and, technique of digital teaching among primary school teachers.	Not related to approaches, methodology, and technique of digital teaching among primary school teachers.

Eligibility

All the remaining 51 selected articles will go through the screening process the second time, which is the eligibility process. This process is carried out to ensure that all the selected articles are accurate and can be used. This process was done by referring to the title of the article and the abstract. If the decisive factor fails to be determined, then the methodology section, findings, and discussion of the article will be referred to. After this process, a total of 25 articles were removed as the focus did not match with the study, as well as in the form of scoping reviews. Finally, only 26 articles were selected to go through the next process, which is quality assessment. The following table illustrates the article selection process based on the PRISMA method.
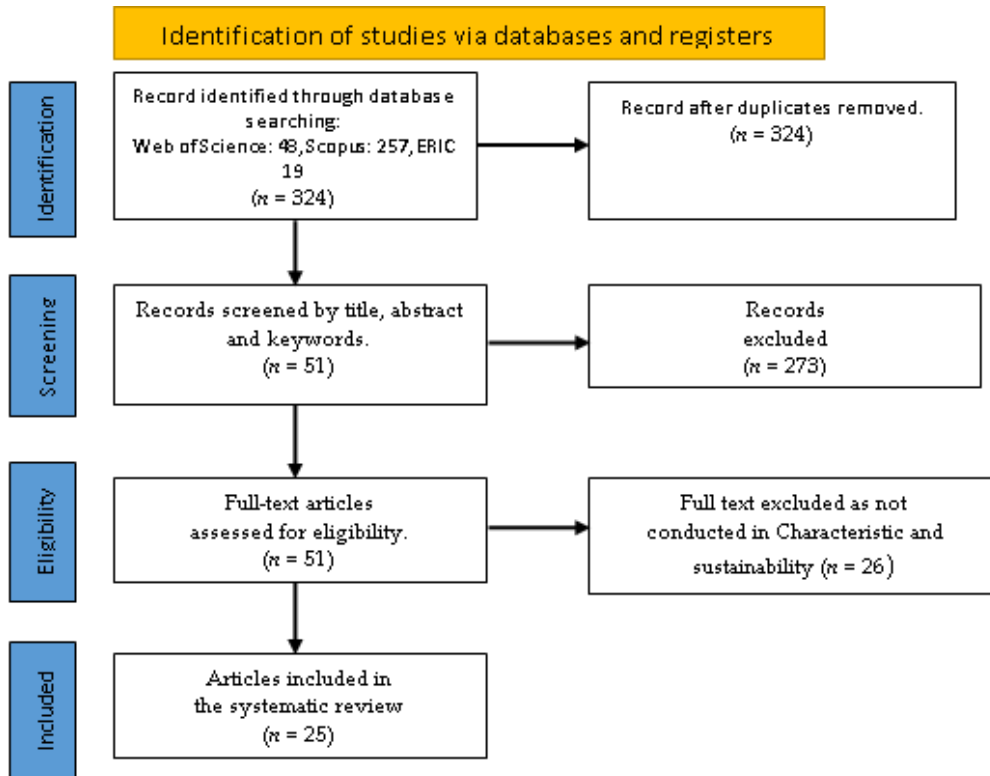

Figure 3. Flow chart of the research article selection process

Article Selected

Author	Database	Aim	Methodology/ Samples	Findings
1 Sumardi, L; Rohman, A; Wahyudiati, D	WoS	To ascertain whether the instructional strategies used in the elementary schools in East Lombok are representative of 21st-century learning.	Qualitative - Case study design purposive sampling/ 120 elementary school teachers of 40 primary schools in East Lombok, West Nusa Tenggara, Indonesia.	According to the research findings, more than half of primary school instructors do not incorporate 21st-century learning strategies into their lesson plans. The majority of the teaching is traditional in nature and focused on the teacher. Teachers do, however, use technology into their lessons and instructional strategies.
2 Kumala, FN; Ghufron, A; Pujiastuti, P	WoS	To ascertain how Indonesian elementary school teachers' TPACK and their work situation, gender, age, and teaching experience relate to each other).	Mixed method - Survey design/ 175 from 4180 elementary school teachers in Malang City, Indonesia. Interviewed 50 out of 175.	Overall, the results point to a relationship between teachers' Technological Pedagogical Content Knowledge (TPACK) and demographic characteristics such as gender, age, teaching experience, and work level.
3 Letzel, V; Pozas, M; Besa, KS	WoS	To ascertain whether parents' perceptions of instructors' qualities align with their judgments of their professional teaching skill in the areas of digital competence, digital differentiation instruction, and feedback.	Quantitative - Cross-survey design/ 721 parent and children in Germany who participated in an online survey.	Parental evaluations are primarily positive, according to the research. Parents whose kids attend primary schools had positive opinions and assessments of the digital competency and individualized instruction of teachers. Additionally, parents' evaluations of instructors' feedback and their views of the motivation, gratitude, and dedication of teachers were found to be positively correlated.
4 Bower, M; Stevenson, M; Forbes, A; Falloon, G; Hatzigianni, M	WoS	To investigate the barriers to and facilitators of learning in makerspace activities that use 3D printing and design.	Qualitative - Case-study Design/ 24 teachers in Melbourne, Australia.	Regarding pedagogy, task design, learner characteristics, technology features, the school environment, and teacher talents and beliefs, all participating teachers recognized 19 supportive variables and 11 restrictions.
5 María, G.F.I, Laura, M.L, Regalado, A. & Elizabeth, M.	ERIC	To examine the tactics used by primary school instructors in their fifth and sixth years in connection with the digitization of course materials.	Qualitative - Ethnographic methodology/ Fifth- and sixth-year primary education classrooms in Spain.	The results demonstrate that, because schools have access to technology resources, the addition of digital materials is a step forward in the centre's attention to diversity, boosting accessibility, and closing the digital gap.
6 Ján, Z; Hašková, A., Munk, M	ERIC	To determine what professional digital literacy abilities (i.e., didactic technology competences) practicing (in-service) teachers need to upgrade.	Quantitative Survey design/ 173 teachers in Slovakia.	To improve educational outcomes, the study assessed how effective it is to integrate digital tools and interactive learning activities into the teaching process. It looked at how different segmentation factors—namely, the subcategory of the teaching staff and the duration of the teacher's teaching practice—affect how digital resources are used in the teaching process.
7 Williams, Maloney, K	ERIC	To gauge teachers' opinions about how digitization affects literacy skills and to comprehend how Cuban primary school teachers use rote, analog, and digital technology in the classroom.	Mixed method - Group interview, questionnaire classroom observation, semi-structured interview protocols/ 20 Cuban primary school teachers.	a strong informatics-based curriculum, as well as a high degree of optimism and awareness regarding the use of technology, crowdsourcing, and information sharing. On the other hand, sustainable integration, ongoing scaffolding, and equitable skill development are impeded by limited resources and techno determinism.
8 Abdullah, S.& Özenç, Emine Gül	ERIC	To find out what instructors think about the instructional software used in the primary reading and writing instruction process.	Qualitative - Case study design/ 26 schoolteachers in the central district of Niğde, Turkey.	Students benefit from this educational software in several ways, including the concretization of instruction, differentiation of activities, minimization of individual differences between students, focus on the lesson, opportunity for application of knowledge, stimulation of multiple senses in students, and motivation and support.
9 Brečka P.; Valentová M.; Lančarič D.	Scopus	To investigate the problem of applying techniques to help primary school pupils enhance their critical thinking abilities in technical topics, with an emphasis on communication,	Quantitative - Survey design/ 397 teachers in Slovakia	This investigation found several important variables. The use of developmental techniques is influenced by a variety of factors, including the age, gender, length of teaching experience, degree, work position, establisher, location, and educational stage of the school. These

		interpersonal, technical, and cognitive skills.		factors also include personal and professional teacher qualities.
10 Sharipkhojayeva Z.; Amirova A.; Zhanar A.; Tursynay B.; Meirimgul Y.; Lyazzat K.	Scopus	To learn the thoughts of prospective elementary school teachers in order to prepare them to use educational technologies to foster a culture of communication.	Qualitative - Study group consisted of 40 pre-service teachers in Kazakhstan. 7 of the pre-service teachers participating in semi-structured interview form	The majority of aspiring primary school teachers who took part in the study said that educational technologies help foster a culture of communication. Candidates for primary school teachers said that universities ought to offer courses on educational technology and cultivating a culture of communication.
11 Avcı C.; Deniz M.N.	Scopus	To investigate the beliefs and self-efficacy of early childhood educators and aspiring educators around computational thinking.	Quantitative - Descriptive survey design 142 participants, 64 of whom were teachers and 78 were prospective teachers in Turkiye.	The results indicated that instructors' and aspiring teachers' preconceptions about CT were similar. They both most strongly connected CT with using logic, solving problems, utilizing algorithms, coding/programming, doing arithmetic, utilizing technology in the classroom, and utilizing computers. Additionally, teachers in CT had far greater opinions of their own efficacy.
12 Karacan C.G.; Polat M.	Scopus	To investigate the variables that influence pre-service English teachers' plans to include augmented reality into their language instruction going forward.	Quantitative - Correlational study/ 141 pre-service English teachers in Istanbul, Turkiye.	The attitude that had the greatest impact on perceived usefulness was shown to be the most important predictor of participants' intentions to utilize augmented reality, according to the results. Conversely, the least influential characteristics were the ease of use and the facilitating conditions.
13 Debbağ M.; Yıldız S.	Scopus	To look at the impact of the Flipped Classroom (FC) model on preservice teachers enrolled in the Teaching Principles and Methods (TPM) course in terms of their motivation levels and academic accomplishment.	Mixed method - Quasi experimental and descriptive survey design (interview)/ 78 pre-service teachers in Türkiye.	Preservice teachers in the experimental group demonstrated considerably higher levels of academic achievement and motivation compared to the control group. They said that the FC (Flipped Classroom) model improved their teaching abilities, let them put their knowledge into practice, and promoted student engagement in the classroom.
14 Masullo G.; Addeo F.; Paoli A.D.; Ruopolo A.	Scopus	To summarize the most recent developments in education with regard to the application of creative teaching techniques and to ascertain the views of educators and students on technology and its educational applications.	Qualitative - In-depth discussion/ 15 teachers and 15 pupils in Salerno, Italy.	In the direction of collaborative learning and demonstrate how, with full participation from both teachers and students, technology may support the learning process. We found that the best learning environments are those in which teachers collaborate with the students as co-explorers rather than acting as all-knowing activity controllers.
15 Hasanah U.; Astra I.M.; Sumantri M.S.	Scopus	To look into what Science Learning Multimedia (SLM) teachers require in order to help their elementary school pupils become more critical thinkers.	Mixed methods - Survey design 156 elementary teachers in Jakarta/ 10 teachers participate in semi-structured interviews.	The majority of educators concur that creating engaging and adaptable media to explore abstract science ideas will help students' critical thinking abilities grow. In conclusion, it is possible to develop and use interactive multimedia in science education that is grounded on scientific inquiry.
16 Li S.; Liu Y.; Su Y.-S.	Scopus	To assess the degree of TPACK proficiency among teachers and determine whether variations in this proficiency would be observed between teaching phases and teacher education levels.	Quantitative - Survey design/ 1,342 teachers in Nanjing, China.	The TPACK proficiency of teachers was generally quite high. Furthermore, there were notable variations in the TPACK competencies of teachers across educational levels and teaching phases. Furthermore, the findings indicated that there was a substantial difference in the seven TPACK sub-dimensions based on the educational levels of the teachers, with the higher the educational level, the better the teachers' TPACK abilities.
17 Svalina V.; Ristivojević A.	Scopus	To ascertain how instructors working at Serbian and Croatian music schools handled remote instruction during the COVID-19 epidemic.	Mixed method - Survey Design/ 589 teachers (369 from Croatia and 220 from Serbia).	Teachers in both nations handled the introduction of remote music instruction with success. The youngest teachers have the highest levels of confidence in their skills and expertise when it comes to using electronic devices for distant learning, according to the data. Furthermore, most educators said they will continue to use

				certain aspects of distance learning in their future employment.
18 Al-Shaye S.	Scopus	To investigate how online Digital Storytelling (DTS) affects the growth of aspiring Arabic teachers' critical reading, critical thinking, and self-regulated learning abilities.	Quantitative - Quasi-experimental/ 103 prospective teachers of Arabic (45 teachers in experimental group and another 58 teachers in control group).	Compared to the control group, the critical reading, critical thinking, and self-regulated skills all showed considerable improvement. Furthermore, it is important to exercise caution while using online learning to address community needs and close a genuine gap in outdoor practice for language acquisition to enhance multiliteracy abilities.
19 Bentri A.; Hidayati A.; Kristiawan M.	Scopus	To determine what components, through the development of particular products, motivate instructors in elementary schools to acquire digital pedagogical competency.	Quantitative - Descriptive approach/ 94 teachers from three locations, namely, Padang, Bukit Tinggi, and Solok, Indonesia.	The results showed that digital analysis, digital competency, digital evaluation, digital cognitive, and digital use are qualities that support teachers' abilities to create digital tools for analysis and assessment.
20 Lim F.V.; Toh W.	Scopus	To investigate the effects on learning and teaching in the formal educational setting of children's after-school digital multimodal composition practices.	Qualitative - Case study approach method Netnography research approach Content analysis of the videos produced by three children.	The kids' digital multimodal composition techniques show off their imagination, analytical skills, and grasp of semiotics. Additionally, by establishing a "third space" for learning inside schools, educators may address the literacy activities that kids engage in outside of the classroom.
21 Hsu C.-Y.; Liang J.-C.; Tsai M.-J.	Scopus	To verify the Game-based Learning Teaching Belief Scale (GTBS) and the Technological Pedagogical Content Knowledge-Games tools. It also looks at how the components of GTBS and TPACK-Games vary and relate to one another at various academic levels.	Quantitative - Survey Design/ 206 elementary school teachers in Taiwan, China.	The surveys conducted by GTBS and TPACK-Games were credible and valid tools. Furthermore, elementary school instructors tended to exhibit better levels of self-efficacy in terms of game pedagogical knowledge (GPK) and game pedagogical content knowledge (GPCK) as compared to junior high school teachers. The greatest predictor of teachers' GPCK was their GPK, and GPCK in turn positively predicted teachers' attitudes, self-assurance, and desire to use games in the classroom.
22 Ung L.-L.; Labadin J.; Mohamad F.S.	Scopus	To investigate the viability of creating a customized online learning program to teach educators computational thinking techniques.	Quantitative - Experimental design/ 369 teachers in Sabah, Malaysia.	It has been observed that teachers' computational thinking teaching-learning repertoire has significantly improved in a comparatively short amount of time. Additionally, educators showed greater assurance in their ability to teach classes centred on computational thinking in the future.
23 Assylzhanova D.; Seisenbek N.; Uzakbaeva S.; Kapalbek B.	Scopus	To compare the effectiveness of traditional teaching methods versus blended curriculum supplemented by ICT in elementary school English courses.	Quantitative - Quasi-experimental design/ 60 elementary school students in Kazakhstan (30 experiment and 30 control).	Compared to the control group, which received traditional instruction, the experimental group's computer-aided blended learning program helped the students attain better English proficiency, a more positive attitude, and learning permanence.
24 Kerkhoff S.N.; Makubuya T.	Scopus	To investigate culturally sustainable teaching strategies in keeping with the Kenyan government's desire for all pupils to acquire digital literacy and creative teaching practices.	Qualitative - Case study/ 91 preschool, primary, and secondary school teachers from Trans Nzoia County in Kenya.	Although educators welcomed learner-centred education in theory, they discovered that teaching digital literacy in a learner-centred manner was hampered by a shortage of technology tools. Rather than encouraging pupils to engage in digital literacy practices, the teachers reported primarily using technology for record-keeping and instructional preparation. Teachers talked about assigning students to work in groups and using smartphones to address technological problems.
25 Istiq'faroh N.; Suhardi; Mustadi A.	Scopus	To use digital comics to foster pupils' creativity and writing abilities.	Quantitative Quasi-experimental Design 56 fifth-grade students in Indonesian.	When compared to the control group, the experimental group's creativity and writing abilities are much enhanced by the digital comics. Thus, it can be said that primary school pupils' creativity and writing abilities are enhanced by digital comics.

Article Quality Assessment

The selected articles needed to be evaluated for their quality to minimise biases and detect any methodological weaknesses (Edward et al., 2019). Three evaluators consist of selected researchers were involved in this process. The authors had chosen MMAT (*Mixed Method Appraisal Tools*) to help the evaluation process since there were various research designs used in the selected articles (Hong et al., 2018). There are two basic criteria and five specific criteria (based on the study design of the article) to be evaluated in each of the selected article. The first evaluation process involves evaluating the quality of the article based on two basic criteria, namely: "*is the stated research question clear*?" and "*is the data obtained able to answer the stated research questions?*". This is a compulsory process to advance to the next level. Then, the articles will be screened according to the study design, either quantitatively, qualitatively, or a combination of the two before being evaluated in the next stage using the five specific criteria. To explain the evaluation results, the evaluators will be given three answer options, Yes, No or Uncertain for each criterion evaluated. All of the evaluators must come to a mutual agreement for each evaluation performed. In the case of disagreement, then a second opinion will be sought after. Only the articles that met at least three of the five criteria will be considered as of good quality and included in the SLR (see table 3). From 26 articles evaluated, only 25 articles met at least three criteria and were included in this SLR whereas an article by Kingsley T.; Grabner-Hagen M.M. (2022) was removed for failing to meet the minimum criteria set.

	Criteria	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Quantitative	Is the sampling strategy used relevant for the RQ?			Y		Y				Y		N	Y	Y				Y		Y	N		Y	Y	Y		Y
	Is the selected sample representing the studied population?			Y		Y				Y		N	Y	Y				Y		Y	Y		Y	Y	Y		Y
	Is the measurement used appropriately?			Y		Y				Y		N	Y	Y				Y		Y	Y		Y	Y	Y		Y
	Is the risk of non-response bias low?			Y		Y				Y		N	Y	Y				Y		Y	Y		Y	Y	Y		Y
	Is the statistical analysis used appropriately to answer RQ?			Y		Y				Y		N	Y	Y				Y		Y	Y		Y	Y	Y		Y
Qualitative	Is the qualitative approach used appropriately to answer the RQ?	Y				Y			Y		Y					Y						Y				Y	
	Is the qualitative data collection methodology used sufficiently to answer the RQ?	Y				Y			Y		Y					Y						Y				Y	
	Is the results of the study obtained from the data sufficient?	Y				Y			Y		Y					Y						Y				Y	
	Is the interpretation of the study results proven with the data?	Y				Y			Y		Y					Y						Y				Y	
	Is there a continuity between the source, collection, analysis and interpretation of qualitative data?	Y				Y			Y		Y					Y						Y				Y	
Mixed Method	Is the sampling strategy used relevant to answer the RQ?		Y		Y			Y							Y		Y		Y								
	Is the selected sample representing the studied population?		Y		Y			Y							Y		Y		Y								
	Is the measurement used appropriately?		Y		Y			Y							Y		Y		Y								
	Is the risk of non-response bias low?		Y		Y			Y							Y		Y		Y								
	Is the statistical analysis used appropriately to answer the RQ?		Y		Y			Y							Y		Y		Y								

Data Extraction and Analysis

The next step is the process of data extraction on the articles that have been assessed for quality. This process involves two researchers. Since the focus of this SLR is related to the review of previous research's findings related to teachers' digital teaching approaches, methods, and techniques, the data extraction process will focus on the three main parts of the article, namely the abstract, research results, and research discussion. If necessary, reading other parts of the article that offer related data will also be done. The data that has been extracted is placed in a table to facilitate the analysis process that will be carried out. Once the relevant data has been extracted, the next step is to analyze it. Since this SLR is in the form of an integrative review that combines various research designs (quantitative, qualitative, or a combination of both), qualitative synthesis is the best analysis (Whitemore and Knalfl, 2006). There are various types of analyses that can be used in qualitative synthesis, including thematic analysis, which, according to Flemming et al. (2018), is one of the best techniques to analyze the findings from various types of research designs. Thematic analysis seeks to identify the pattern of past studies in terms of their similarities or relevance based on the extracted research findings.

In order to obtain a suitable theme, the findings that had been extracted were examined one by one. If the findings are similar or related, then they will be placed in one data group. These groups will then be assigned to an appropriate theme. In this process, three themes were identified, which are: 1) digital teaching approach; 2) digital teaching methods; and 3) digital teaching techniques. Then, the findings were assigned to each of these themes. From the three main themes that had been formed, there were several other sub-themes that had been identified as well. The details of these sub-themes are illustrated in Table 4. The first theme is 'digital teaching approach' with four sub-themes, followed by the second theme, 'digital teaching methods' with six sub-themes, and finally, the third theme, 'digital teaching techniques' with two sub-themes. At the end of this process, the authors had added an additional sub-theme under 'digital teaching techniques', which made a total of three sub-themes. Next, all of the themes and sub-themes were re-examined, and at the end of this process, all three main themes and 13 sub-themes were retained. Discussion of the validity of these themes had been conducted with other researchers, and all of them had been thoroughly examined.

Next, all of these themes and sub-themes went through a validation process that was carried out by two experts, one in the field of SLR and the other in the field of content. The two experts were unanimous that all three main themes and 13 sub-themes formed were suitable and relevant to the set research questions (see table 4).

Table 4

Research Design	Article	Approach in Digital Teaching				Methodology in Digital Teaching						Technique in Digital Teaching		
	Subthemes	*General*	*21st Century*	*Digital*	*Integration*	*Thinking Oriented*	*Physically Oriented/ Kinesthetics*	*Digitally Oriented*	*Integration of thinking and digital*	*Grouping oriented*	*Guidance oriented*	*Development of Digital resources*	*Application of Digital resources*	*Digital-based Teaching Activities*
Quantitative	3													/
	6												/	/
	9		/		/	/	/				/			
	11					/	/		/					/
	12							/						
	16				/									
	18					/	/	/						
	19				/							/	/	/
	21						/							/
	22	/	/	/	/	/	/		/					
	23						/							
	25						/							/
Qualitative	1	/			/	/	/							
	4		/		/	/	/	/		/	/		/	
	5		/		/			/	/	/		/		
	8							/					/	
	10											/		/
	14		/	/	/	/	/	/		/	/			/
	20				/	/	/					/		/
	24	/	/		/	/	/	/		/			/	/
Mixed Method	2			/	/			/					/	
	7		/	/			/	/	/			/		/
	13	/										/		
	15				/	/			/				/	/
	17		/				/	/					/	/

Findings

Before commenting on the main findings, this section will focus on the background of the selected articles in the SLR. Among the 25 selected articles, one of them was published in 2023, nine articles were published in 2022, nine were published in 2021, five were published in 2020 and one article was published in 2019. In addition, there of them were published in the *International Journal of Instruction*, two of them in the *Cypriot Journal of Educational Sciences* and two were issued in *Educational and Information Technologies*. While 18 others were published separately in *Social Psychology of Education, Educational Media International, Digital Education Review, European Journal of Contemporary Education, Journal of Media Literacy Education, International Journal of Progressive Education, Teaching and Teacher Education, Journal of Digital Learning in Teaching Education, Italian Journal of Sociology of Education, Sustainability (Switzerland), Open Learning, Frontiers in Education, Learning, Media and Technology, Technology, Pedagogy and Education, Computers and Education, International Journal of Education in Mathematic, Sciences and Technology, Reading Research Quarterly* and *Elementary Education Online.*

From the articles analyzed, three primary themes emerged: approaches, methods, and digital teaching techniques. Under the digital teaching approach, four sub-themes were identified: general approach, 21st century learning, digital approach, and integration approach. In terms of digital teaching methods, six sub-themes were identified: thinking-oriented, physically oriented (kinaesthetic), digital-oriented, integration of thinking and digital, grouping-oriented, and guidance-oriented. Lastly, digital teaching techniques comprised three sub-themes: development of digital resources, application of digital resources, and digital-based teaching activities. These themes and sub-themes were derived through content analysis (Cohen, Manion, & Morrison, 2007), conducted by the authors, and reviewed by two experts.

There were five levels of content analysis that had been carried out. The first level was data extraction. At this stage, the authors had identified three keywords: approach, digital teaching methods, and techniques, as the main components of teaching pedagogy digitally. The authors' separate statements related to the three keywords were also determined. In the second stage, the statements that represented the keywords for approach, method, and digital teaching techniques were compiled. In the third stage, the statement according to the keywords and the frequency calculation were identified and listed. At this stage, three main themes were formed based on the keywords, including the details of the sub-themes in each of the main themes. The statements based on the keywords listed continued to the fourth stage, which was to create a category of the findings that had been collected by assigning a specific name to each theme and sub-theme. There were three main themes established in this SLR, namely the digital teaching approach, digital teaching methods, and digital teaching techniques. These three main themes were then followed by their respective sub-themes. The table below explains the details of the formation of themes and sub-themes:

Table 5: The main themes and sub-themes

Main Theme	Sub-Theme
Digital Teaching Approach	1. General 2. 21st Century Learning 3. Digital 4. Integration
Digital Teaching Methods	1. Oriented Thinking 2. Physically/ Kinaesthetically Oriented 3. Digitally Oriented 4. Integration of Thinking and Digital 5. Grouping Oriented 6. Guidance Oriented
Digital Teaching Techniques	1. Development of Digital Resources 2. Application of Digital Resources 3. Digitally Based Activities

The first major theme formed in this SLR is the digital teaching approach. The teaching approach is the main component of the pedagogical skills that must be acquired by teachers. It is also the main pillar in determining the teachers' teaching style to achieve the learning objectives. Through the SLR article, the authors can conclude that it is a continuation of the existing approach to improve the implementation of teaching. This statement is supported by the findings from the four sub-themes. Firstly, the categories under general approaches are: student-centered (Sumardi et al., 2021; Ung L.-L et al., 2022; Debbag M et al., 2021; Kerkhoff S.N & Makubuya T., 2021); teacher-centered (Sumardi et al., 2021; Ung L.-L et al., 2022; Debbag M et al., 2021; Kerkhoff S.N & Makubuya T., 2021); and material-centered (Ung L.-L et al., 2022; Kerkhoff S.N & Makubuya T., 2021).

Secondly, the categories under approaches that lead to 21st century learning are: project-based learning (Svalina V. & Ristivojevic A., 2022; Brecka et al., 2021; Gallardo et al., 2021; Kerkhoff S.N., Makubuya T., 2021; Bower et al., 2020; William Kate M., 2022); inquiry-based learning (Ung L.-L et al., 2022; Kerkhoff S.N. & Makubuya T., 2021); game-based learning (Gallardo et al., 2021; Bower et al., 2020); and pedagogical practice supporting autonomous learning (Masullo G et al., 2021).

Thirdly, the categories under approaches that focus on digital teaching are: web-based applications (William Kate M., 2022); used internet-based applications (Kumala et al., 2020); app-based version websites (William Kate M., 2022); ICT-based lessons (Ung L.-L. et al., 2022; Masullo G. et al., 2021); and digital-based technologies (Ung L.-L et al., 2022).

Finally, the categories under digital learning integration with other approaches are; student-centred, teacher-centred and material-centred (Sumardi et al., 2021), computer-assisted blended teaching application (Assylzhanova Det al., 2022), e-learning (Bentri et al., 2022; Ung L.-L et al.; 2022; Masullo Get al., 2021; Kumala et al., 2020), integrating a problem-based learning approach (Kerkhoff S.N, Makubuya T., 2021; Hasanah et al., 2023), the integration of technology (Masullo G et al., 2021; Gallardo et al., 2021; Kumala et al., 2020), integrated pedagogical innovations (Brecka et al, 2021) and integrated approach between pedagogy and technology (Bower et al., 2020; Lim F.V, Toh W., 2020; Hasanah et al., 2023; Kumala et al., 2020). Clearly, the digital component needs to be integrated to maximize the teachers' teaching, especially in primary schools, which aims at increasing the students' potential by encouraging interactive and fun teaching. A summary of the findings is explained in Table 6:

Table 6: Digital Teaching Approach Category.

Theme 1: Digital Teaching Approach	
Sub-Theme	Category
General	1. Student centred (Sumardi et al., 2021) (Ung L.-L et al.; 2022) (Debbag M et al., 2021) (Kerkhoff S.N & Makubuya T., 2021). 2. Teacher centred (Sumardi et al., 2021) (Ung L.-L et al.; 2022) (Debbag M et al., 2021) (Kerkhoff S.N & Makubuya T., 2021). 3. Material centred (Ung L.-L et al.; 2022) (Kerkhoff S.N & Makubuya T., 2021).
21st Century Learning	1. Project based learning (Svalina V & Ristivojevic A., 2022) (Brecka et al., 2021) (Gallardo et al., 2021) (Kerkhoff S.N & Makubuya T., 2021) (Bower et al., 2020) (William Kate M, 2022). 2. Inquiry-based learning (Ung L.-L.; Labadin J.; Mohamad F.S., 2022) (Kerkhoff S.N & Makubuya T., 2021). 3. Game-based teaching (Gallardo et al., 2021) (Bower et al., 2020). 4. Pedagogical practice supporting autonomous learning. (Masullo G et al., 2021).
Digital	1. Web-based applications (William Kate M, 2022). 2. Internet-based application. (Kumala et al., 2020). 3. App-based versions of websites (William Kate M, 2022). 4. ICT-based lesson (Ung L.-L et al.; 2022) (Masullo G et al., 2021). 5. Digital-based technologies (Ung L.-L et al.; 2022).
Integration	1. Student-centred and teacher-centred, and material-centred (Sumardi et al., 2021). 2. Computer-assisted blended teaching application (Assylzhanova D. et al., 2022). 3. e-learning. (Bentri et al., 2022) (Ung L.-L et al.; 2022) (Masullo G. et al., 2021) (Kumala et al., 2020). 4. Integrating a problem-based learning approach (Kerkhoff S.N & Makubuya T., 2021) (Hasanah et al., 2023). 5. Integration of technology (Masullo G. et al., 2021) (Gallardo et al., 2021) (Kumala et al., 2020). 6. Integrated pedagogical innovations (Brecka et al., 2021). 7. Integrated approach (pedagogy & technology) (Bower et al., 2020) (Lim F.V & Toh W., 2020) (Hasanah et al., 2023) (Kumala et al., 2020).

The second theme formed in this SLR is digital teaching methods. Digital teaching methods will guide teachers in choosing and implementing effective teaching to ease the process. The selection of the teaching method depends on the content of the teaching to be delivered, the teaching materials used during the session, as well as the objectives of the lesson. From the SLR, the authors had identified six sub-themes that can describe the teachers' digital teaching method.

The first sub-theme is thinking oriented and the categories are; critical thinking (Sumardi et al., 2021; Brecka et al., 2021) and (Al-Shaye S., 2021), high order thinking (Sumardi et al., 2021; Kerkhoff S.N & Makubuya T., 2021; Bower et al., 2020; Masullo G. et al., 2021) (Lim F.V&Toh W., 2020), problem-solving (Sumardi et al., 2021; Kerkhoff S.N & Makubuya T., 2021; Avci C, Deniz M.N., 2022; Hasanah et al., 2023; Bower et al., 2020; Masullo G. et al., 2021; Ung L.-L et al., 2022), contextualisation (Sumardi et al., 2021), open-ended inquiry (Ung L.-L et

al., 2022; Bower et al., 2020; Sumardi et al., 2021) and dialogue (Ung L.-L et al., 2022; Bower et al., 2020; Sumardi et al., 2021).

The second sub-theme is physically oriented or kinesthetic methods and the categories are; role playing (Masullo G. et al., 2021; Brecka et al., 2021; Lim F.V & Toh W., 2020), modeling (Hsu C.-Y et al.,2020; Bower et al., 2020), experiment (Sumardi et al., 2021; Ung L.-L et al., 2022; Bower et al., 2020; Hasanah et al., 2023; Al-Shaye S., 2021; Debbag M et al., 2021), simulation (Masullo G. et al., 2021), demonstration (Ung L.-L et al., 2022; Debbag M et al., 2021; William Kate M, 2022), hands-on (William Kate M, 2022; Kerkhoff S.N & Makubuya T., 2021; Bower et al., 2020), play (Avci C & Deniz M.N., 2022; Svalina V, Ristivojevic A., 2022; Hsu C.-Y et al.,2020; Istiq'faroh N.; Suhardi; Mustadi A., 2020), field-based work (Masullo G. et al., 2021) and exploration (Bower et al., 2020). Lessons that offer students to do learning activities themselves will stimulate their self-confidence.

Next the third sub theme digitally-oriented teaching methods and the categories are; hybrid methods (Bower et al., 2020), gamification (Bower et al., 2020; Gallardo et al., 2021), digital storytelling (Kerkhoff S. N & Makubuya T., 2021; Al-Shaye S., 2021), animation (Sahin et al., 2021), augmented reality (Karacan C.G. & Polat M., 2021), flipped classroom model (Debbag M et al., 2021), virtual reality (Masullo G. et al., 2021) and distance learning (Svalina V, Ristivojevic A., 2022). This teaching method focuses on the full use of digital in teacher teaching. The selection of this method can provide a fun and meaningful learning experience for students.

The fourth sub theme is a combination of the teaching methods that combine thinking and digital literacy. The categories are; computational thinking (Ung L.-L et al., 2022; Avci C & Deniz M.N., 2022), coding (Avci C, Deniz M.N., 2022; Hasanah et al., 2023) and programming (Ung L.-L et al., 2022; Gallardo et al., 2021; William Kate M, 2022). This teaching method requires a high level of thinking and is combined with digital literacy. Therefore, teachers need to have the expertise to apply this method in their teaching and learning process.

The fifth sub theme is grouping oriented that involve groups including; collaborative (Masullo G. et al., 2021; Kerkhoff S.N & Makubuya T., 2021; Gallardo et al., 2021), cooperative (Gallardo et al., 2021) and stations (Kerkhoff S.N & Makubuya T., 2021; Bower et al., 2020). This digital teaching strongly encourages an active involvement of students in groups so that the value of cooperation and sharing can be applied.

The final subtheme is guidance oriented and the categories are; scaffolds (Bower et al., 2020), peer mentoring (Bower et al., 2020), mentors (Bower et al., 2020) (Brecka et al., 2021) and facilitators (Masullo G. et al., 2021). This teaching method is important for primary school students who needed more attention and guidance from their teachers to ensure they could master the content, even if they need to master additional skills, such as operating devices and digital applications.

In conclusion, the use of digital teaching methods requires teachers to master general pedagogic methods effectively because they need to choose the methods that match with the students' learning objectives wisely. The table below contains the details of the themes and sub-themes related to digital teaching methods.

Table 7 Digital Teaching Methods Category

Theme 2: Digital Teaching Methods	
Sub-Theme	**Category**
Thinking Oriented	1. Critical thinking (Sumardi et al., 2021) (Brecka et al., 2021) and (Al-Shaye S., 2021)/ 2. high order thinking (Sumardi et al., 2021) (Kerkhoff S.N & Makubuya T., 2021) (Bower et al., 2020) (Masullo G. et al., 2021) (Lim F.V & Toh W., 2020). 3. Problem-solving (Sumardi et al., 2021) (Kerkhoff S.N & Makubuya T., 2021) (Avci C, Deniz M.N., 2022) (Hasanah et al., 2023) (Bower et al., 2020) (Masullo G. et al., 2021) (Ung L.-L et al., 2022). 4. Contextualisation (Sumardi et al., 2021). 5. Open-ended inquiry (Ung L.-L et al., 2022) (Bower et al., 2020) (Sumardi et al., 2021). 6. Dialogue (Ung L.-L et al., 2022) (Bower et al., 2020) (Sumardi et al., 2021).
Physically Oriented/ Kinesthetic	1. Role playing (Masullo G. et al., 2021) (Brecka et al., 2021) (Lim F.V, Toh W. 2020). 2. **Modelling (Hsu C.-Y et al.,2020) (Bower et al., 2020).** 3. Experiment (Sumardi et al., 2021) (Ung L.-L et al., 2022) (Bower et al., 2020) (Hasanah et al., 2023) (Al-Shaye S., 2021) (Debbag M et al., 2021). 4. Simulation (Masullo G. et al., 2021) 5. Demonstrated (Ung L.-L et al., 2022) (Debbag M et al., 2021) (William Kate M, 2022). 6. Hands-on (William Kate M, 2022) (Kerkhoff S.N, Makubuya T., 2021) (Bower et al., 2020). 7. Play (Avci C & Deniz M.N., 2022) (Svalina V, Ristivojevic A., 2022) (Hsu C.-Y et al.,2020) (Istiq'faroh N. et al., 2020). 8. Field-based work (Masullo G. et al., 2021) 9. Explore (Bower et al., 2020).

Digitally Oriented	1. Hybrid (online and offline) (Bower et al., 2020). 2. Gamification (Bower et al., 2020) (Gallardo et al., 2021). 3. Digital storytelling (Kerkhoff S.N & Makubuya T., 2021) (Al-Shaye S., 2021) 4. Animations (Sahin, Abdullah; Özenç, Emine Gül, 2021). 5. Augmented Reality (Karacan C.G.; Polat M., 2021). 6. Flipped classroom model (Debbag M et al., 2021). 7. Virtual reality (Masullo G. et al., 2021). 8. Distance learning (Svalina V & Ristivojevic A., 2022). 9. Virtual classroom (William Kate M, 2022) (Kumala et al., 2020). 10. Internet inquiry (William Kate M, 2022) (Bower et al., 2020) (Kerkhoff S.N & Makubuya T., 2021).
Combination of thinking and digital Oriented	1. Computational Thinking (Ung L.-L et al., 2022) (Avci C, Deniz M.N., 2022). 2. Coding (Avci C, Deniz M.N., 2022) (Hasanah et al., 2023). 3. Programming (Ung L.-L et al., 2022) (Gallardo et al., 2021) (William Kate M, 2022).
Grouping Oriented	1. Collaboration/ collaborative (Masullo G. et al., 2021) (Kerkhoff S.N & Makubuya T., 2021) (Gallardo et al., 2021). 2. Cooperative (Gallardo et al., 2021). 3. Stations (Kerkhoff S.N & Makubuya T., 2021) (Bower et al., 2020)
Guidance Oriented	1. Scaffolds (Bower et al., 2020). 2. Peer mentoring (Bower et al., 2020). 3. Mentor (Bower et al., 2020) (Brecka et al., 2021). 4. Facilitator (Masullo G. et al., 2021).

Next, the third main theme is digital teaching techniques. Teaching techniques are the details of teaching implementation that are selected based on certain teaching methods, including the steps therein such as the implementation of activities and the application of teaching resources with the integration of digital technology. There are three sub-themes in digital teaching techniques, namely the development of digital resources, the application of digital resources, and digital teaching activities. Teachers need to make appropriate planning by detailing the teaching steps as well as setting the learning aids to optimize the effects on the students' learning experience.

Firstly, the creation of digital resources stands as a key aspect of digital teaching. This involves crafting materials using Microsoft Office software, such as text, images, and audio, to convey lesson content. Additionally, teachers can develop teaching materials by creating pictures, videos, and short films as effective communication tools in instruction (William Kate M., 2022). Essential skills for this task include photo editing and video production techniques, including scriptwriting and camera operation to capture engaging narration. Furthermore, teachers can unleash their creativity by integrating musical elements into teaching materials, such as composing original lyrics and rhythm (Lim F.V., Toh W., 2020).

Moreover, teachers have the option to create their own digital teaching resources or utilize those shared by fellow educators (Gallardo et al., 2021; Bentri et al., 2022 & Hasanah et al., 2023). Regarding teaching aids, teachers can choose to develop their own materials or use existing ones that align with the learning objectives and students' proficiency levels. Currently, there are various platforms available for organizing these resources, such as Google Classroom, Moodle, and Bling Learning Platforms (Gallardo et al., 2021 & Debbag M et al., 2021). These platforms offer a systematic approach to managing digital teaching materials. Additionally, it's crucial to protect these materials from security threats by employing antivirus software and malware security measures (Bentri et al., 2022).

Secondly, the application of digital resources builds upon the previous sub-theme. To ensure effective and organized teaching, educators must align their teaching materials with planned activities. Teachers should possess proficiency in utilizing digital devices and the latest educational applications, which serve as primary tools for digital teaching (Kerkhoff S.N. & Makubuya T., 2021). Additionally, teachers should integrate both physical and digital materials as key resources for student learning (Bower et al., 2020). Commonly used digital mediums include explaining abstract concepts through YouTube videos (Hasanah et al., 2023) (Kumala et al., 2020), delivering effective presentations with PowerPoint (Svalina V & Ristivojevic A., 2022), utilizing 3D applications for engaging learning experiences (Bower et al., 2020), encouraging students to explore blogs and web pages for information (Bentri et al., 2022), employing screen broadcasting systems like Apple TV to capture students' interest (Bower et al., 2020), utilizing QR codes to streamline login processes (Bower et al., 2020), and fostering communication with students and parents through messaging platforms like WhatsApp (Kumala et al., 2020). Through these digital resources, teachers can conduct interactive and enjoyable learning activities, thereby enhancing student motivation and aiding in the achievement of learning objectives.

Lastly, there are teaching activities focused on digital literacy. As previously mentioned, these activities refer to the planned steps teachers take based on their chosen teaching method. Various activities can be implemented in digital teaching. In this SLR, the authors summarized some of these digital activities, including gamification

(William Kate M, 2022; Masullo G. et al., 2021; Hsu C.-Y et al., 2020; Avci C, Deniz M.N., 2022), programming (Ung L.-L et al., 2022; Masullo G. et al., 2021), Scratch (Ung L.-L et al., 2022), digital libraries (William Kate M, 2022), multimedia (Masullo G. et al., 2021), virtual classroom (Svalina V, Ristivojevic A., 2022), video recording (Svalina V, Ristivojevic A., 2022), internet inquiry (Kerkhoff S.N, Makubuya T., 2021), digital books (Istiq'faroh N. et al., 2020), and innovative activities such as organizing online forums, writing blogs, wikis, and so on (Masullo G. et al., 2021). All these activities involve the use of computers (Avci C, Deniz M.N., 2022; Kerkhoff S.N. & Makubuya T., 2021) and electronic devices (Svalina V & Ristivojevic A., 2022), as well as the internet network to facilitate sharing processes, including video transmission of teachers' lessons, distribution of handouts, assigning homework, and providing instructions via online platforms (William Kate M, 2022; Svalina V, Ristivojevic A., 2022).

Besides the mentioned activities, computers can also serve for tasks like typing, sending emails, printing, and conducting online research (Kerkhoff S.N, Makubuya T., 2021). Teachers can engage in interactive activities (Zahore et al., 2019) such as broadcasting videos on the smartboard or explaining lessons using tablets (Masullo G. et al., 2021). These digital activities indirectly offer authentic experiences for students to explore subjects realistically (Masullo G. et al., 2021). Through digital means, teachers communicate with students on social media (Bentri et al., 2022) to share information and stay connected, monitoring their activities via video calls on platforms like Google Meet, Zoom, and others (Svalina V & Ristivojevic A., 2022) (Sharipkhojayeva Z. et al., 2022). Table 8 presents the details in digital teaching techniques and the sub-themes.

Table 8 Digital Teaching Techniques Category

Theme 3: Digital Teaching Techniques	
Sub-Theme	Category
Development of Digital Resources	To use Microsoft Office programs to create digital text, documents, or presentations (William Kate M, 2022). It is necessary to generate material for communication and educational technology (Sharipkhojayeva Z. et al., 2022).
	Make use of teacher-created digital learning resources (Bentri et al., 2022 & Hasanah et al., 2023) and digital education materials (Gallardo et al., 2021). To organize the activities and tests, Google Classroom hosts the materials that are created using several publishers, such Moodle, Bling Learning Platform, and others (Gallardo et al., 2021 and Debbag M et al., 2021).
	Create images, videos, and short films to use as teaching aids that effectively communicate. According to Lim F.V. and Toh W. (2020), creating an engaging narrative requires using scriptwriting in addition to camera angles that are ideal for picture editing and video production.
	Remixes of popular music and dance moves, incorporating his own words, setting, and storyline into the original song to create a creative creation (Lim F.V & Toh W., 2020).
	Tools for managing references, content operation and storage, and virus and malware protection (Bentri et al., 2022).
Application of Digital Resources	Using digital tools and interactive learning activities (Zahore et al., 2019) or pre-made activities from educational software (Sahin et al., 2021).
	Employed software and more advanced educational materials (Kumala et al., 2020)/ Recognize digital content and produce multimedia instruction (Bentri et al., 2022)./ utilizing curriculum material search engines on the Internet and teacher record-keeping software (Kerkhoff S.N & Makubuya T., 2021).
	Resorted to using YouTube videos to clarify abstract science concepts (Hasanah et al., 2023) and to explain the materials (Kumala et al., 2020).
	Utilize PowerPoint presentations and electronic textbooks (Svalina V & Ristivojevic A., 2022) when teaching (Kerkhoff S.N & Makubuya T., 2021).
	communicated with parents using WhatsApp and an LMS (Kumala et al., 2020).
	Employing the 3D Design software/app (Bower et al., 2020).
	The application of a system for screen transmission, like Apple TV (Bower et al., 2020)
	They were able to expedite the login process by using QR codes (Bower et al., 2020).
	Assigned responsibilities, with one person making the slides, another looking for images on a smartphone, and two others drawing the storyboard (Kerkhoff S.N., Makubuya T., 2021).
	Utilization of digital and physical resources and other assistance (Bower et al., 2020).
	Make extensive use of a variety of platforms when learning remotely (Svalina V, Ristivojevic A., 2022).
	Had a blog, page references, and YouTube channels; studied educational materials and internet literature. have made use of several search tools (Bentri et al., 2022).
Digitally Based Activities	Watching a lesson and a practical explanation on a tablet through a game, or on a video on the whiteboard (Masullo G. et al., 2021). The pedagogical intervention of interactive educational activities and attractive electronic teaching materials (Zahore et al., 2019).
	Connected to computers and technology use in education (Avci C & Deniz M.N., 2022). (Kerkhoff S.N & Makubuya T., 2021).
	To operate electrical equipment (Svalina V, Ristivojevic A., 2022).
	An instructive game running on a basic software program (William Kate M, 2022). Playing online games (Avci C, Deniz M.N., 2022)/Educational games (Masullo G. et al., 2021)/Games questionnaire (Hsu C.-Y et al., 2020) Using games in the classroom (Hsu C.-Y et al., 2020) / Integrating games into learning, transcending the formal/informal setting for learning (Masullo G. et al., 2021).
	Utilizing online resources to send homework assignments and other instructional materials (Svalina V & Ristivojevic A., 2022).
	Education-based communication culture (Sharipkhojayeva Z. et al., 2022). / Using the Internet and online learning environments (such as Zoom, Google Meet, and Classroom) to communicate with pupils (Svalina V & Ristivojevic A.,

2022) Continue to communicate with students via video calls and virtual classrooms (Svalina V & Ristivojevic A., 2022). Pay attention to students during video calls, engage in online communication with parents and students, assign tasks, and conduct independent data searches.
Utilize social media platforms for online information sharing (Bentri et al., 2022).
Innovation in real-world applications, like game design, Web 2.0, wikis, and discussion forums (Masullo G. et al., 2021).
ICT usage in general, computer programming, and computer-like thinking (Ung L.-L et al., 2022)/ Acquiring ICTs through classroom learning (Masullo G. et al., 2021).
Software that is listed, including programming languages and Scratch (Ung L.-L et al., 2022).
Typing, printing, email and internet research (Kerkhoff S.N, Makubuya T., 2021).
Digital libraries that are decentralized (William Kate M, 2022).
A school's computer system stored and linked to each teacher's account a variety of materials, including photographs, videos, monographs, doctoral dissertations, reading lists, electronic presentations, blogs, handouts, activities, and lesson plans (William Kate M, 2022).
Multimedia communication, which combined spoken and visual components to enhance one another (Masullo G. et al., 2021).
Make word research easier by using computers rather than a physical dictionary or by researching particular subjects (Masullo G. et al., 2021).
Teachers can assign quizzes and different research projects to students in virtual classrooms, as well as provide recorded video lessons and audio and video recordings of individual works (Svalina V & Ristivojevic A., 2022).
should watch and listen to the student videos so that the teachers may get a more unbiased assessment of the students' development (Svalina V & Ristivojevic A., 2022).
Using the internet to gather and analyze data (Kerkhoff S.N & Makubuya T., 2021).
Multimodal digital composition techniques (Lim F.V.; Toh W., 2020).
The application included the ability to open digital books based on activities and with music effects (Istiq'faroh N. et al., 2020).
Digital encounters that replicate the intricacy of in-person encounters (Masullo G. et al., 2021).

After identifying the main themes and sub-themes for this SLR, the authors continued to the fifth level of content analysis, which is to interpret the categories that had been formed with other nouns to give meaning to the findings of this study, which are related to the teachers' digital teaching pedagogy. This level of interpretation will be explained in the discussion section.

Discussion

This study identified 25 articles concerning digital teaching pedagogy among primary school educators. These articles, published between 2019 and 2023, were sourced from reputable databases like WoS, Scopus, and ERIC. The findings revealed a range of perspectives on digital pedagogy, both locally and globally. While these studies align with technological advancements and educational goals, they often overlook the readiness of teachers and students, as well as the necessity of digital infrastructure to support effective digital education. Recent studies, however, have focused more on teachers' pedagogical skills in digital teaching and learning. Therefore, there's a need for systematic analysis to summarize primary school teachers' digital pedagogy. The significance of this study is important for understanding how digital technology can be used effectively in teaching and learning at the primary school level and how it can benefit the overall educational development of students. Thus, this study provides guidance to teachers on planning and implementing digital teaching that meets the needs of primary school students by referring to pedagogical skills appropriate to the selected technology.

From the findings, there are three main themes, namely, digital teaching approaches, digital teaching methods, and digital teaching techniques, followed by several sub-themes under the main themes as discussed in the previous section. The teachers' pedagogical skills are flexible; for instance, they are constantly changing according to the current situation and becoming more complex (Subahan & Ismail, 2017) to align with the latest technological developments. Teachers should provide quality education to produce balanced and highly valued human capital in society. Thus, teachers need to master the latest pedagogical skills, especially when carrying out the teaching and learning process that integrates digital technology.

The use of digital technology has dominated today's education system. Therefore, teachers need to be prepared to accept and realize the transformation of pedagogy towards digitalization. This transformation can be implemented with teachers tending toward technology-based approaches, methods, and teaching techniques. As mentioned by Lambert, J., and Cuper, P. (2008), the use of educational technology should be part of teachers' pedagogy education programs today. Critically, teachers need to master the basics of pedagogy first to increase their potential. This can be done by mastering technology to strengthen their professionalism. Importantly, this SLR's findings found four categories of teaching approaches, which are: general approaches, 21st century learning, digital, and digital integration with other approaches.

Basically, teachers must understand and choose approaches that are appropriate for student learning while integrating digital technology into their teaching. This aligns with the study by Abid Haleem et al. (2022), which

supports the presence of a digital environment, including the skills teachers need to select digital teaching methods suited to students' levels. Teachers must be creative in integrating teaching approaches to maximize student learning outcomes, as teachers' commitment to using technology can help accelerate student understanding and increase their motivation to learn (Nalini & Norazah, 2021). This aligns with the study's findings that teachers can choose a problem-based learning approach (21st century learning) for teaching a topic and ask students to make video presentations to showcase their work. This situation shows that teachers have integrated digital technology with 21st century learning to maximize students' potential in developing critical thinking and skills in using digital devices and applications. Teachers' skills in integrating digital teaching have a positive impact on student learning, consistent with the study by Halim et al. (2022), which emphasizes that using videos in teaching can promote student-centered and enjoyable learning strategies.

Conclusion

The latest literature related to digital teaching pedagogy has provided a comprehensive overview of the need for teachers' transformation to be better prepared to face the fast-paced world of technology. The purpose of SLR is systematic, comprehensive, organised and transparent literature highlighting past studies related to the ability to adapt teacher professionalism to future educational needs. There are three main components in today's pedagogy which are approaches, methods, and digital teaching techniques. Priority is also given to primary school teachers because they are more responsible in ensuring students to have the opportunity to learn using digital technology in a fun and exploring atmosphere even at the primary level. This SLR also has several limitations. The discussion on the scope of research related to pedagogy is limited to skills in planning and implementing teaching as well as skills in the use of teaching aids such as digital teaching approaches, methods, and techniques. As for classroom management skills and teaching assessment skills, they are not covered. For future studies, it is recommended to systematically analyse digital pedagogy skills related to classroom management skills and teaching evaluation. In conclusion, there are several sub-themes in digital teaching approaches, methods, and techniques that can be used as a guide for teachers, especially primary school teachers to prepare them to face complex and challenging education systems.

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