

## TALES IN TECH: UNDERSTANDING EDUCATIONAL IMPACT AND CHALLENGES OF DIGITAL STORYTELLING

*TALES IN TECH: COMPREENDENDO O IMPACTO EDUCACIONAL E OS DESAFIOS DA NARRATIVA DIGITAL*

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### **ABSTRACT**

Integration of digital storytelling in education has transformed traditional teaching methods to foster active student participation in classroom settings. With the increasing use of digital storytelling, there is a necessity to delve deeper into its effective implementation, effects, and the changing learning environment. The lack of a comprehensive understanding has emphasized the need to fully leverage digital storytelling to enrich students' learning experiences. Therefore, this scoping review aims to investigate the effectiveness of digital storytelling in different educational settings and explore the challenges related to digital literacy skills met by teachers and students, impacting the efficient implementation of digital storytelling. Using the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA), a total of 51 articles from 2019 to 2023 were selected from Scopus in order to illustrate the current state. The articles were analyzed based on their similarities, and the results were tabulated in the following tables. The findings concluded that digital storytelling is an excellent method for improving literacy abilities, enhancing computational thinking and developing digital knowledge and intelligence among students. The findings also implied that longitudinal studies should be conducted more in the future to figure out how digital storytelling affects students' academic and career growth over time.

**Keywords:** digital storytelling, Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA), improving literacy abilities, enhancing computational thinking.

### **RESUMO**

A integração da narrativa digital na educação transformou os métodos tradicionais de ensino para promover a participação ativa dos alunos nas salas de aula. Com o uso crescente da narrativa digital, é necessário aprofundar-se na sua implementação eficaz, nos seus efeitos e nas mudanças no ambiente de aprendizagem. A falta de uma compreensão abrangente enfatizou a necessidade de aproveitar plenamente a narrativa digital para enriquecer as experiências de aprendizagem dos alunos. Portanto, esta revisão de escopo visa investigar a eficácia da narrativa digital em diferentes ambientes educacionais e explorar os desafios relacionados às competências de alfabetização digital enfrentadas por professores e alunos, impactando a implementação eficiente da narrativa digital. Utilizando o Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA), um total de 51 artigos de 2019 a 2023 foram selecionados do Scopus para ilustrar o estado atual. Os artigos foram analisados com base em suas semelhanças e os resultados foram tabulados nas tabelas a seguir. As descobertas concluíram que a narrativa digital é um excelente método para melhorar as capacidades de alfabetização, melhorar o pensamento computacional e desenvolver o conhecimento e a inteligência digital entre os alunos. As descobertas também implicaram que estudos longitudinais deveriam ser realizados mais no futuro para descobrir como a narrativa digital afeta o crescimento acadêmico e profissional dos alunos ao longo do tempo.

**Palavras-chave:** narrativa digital, itens de relatório preferenciais para revisão sistemática e meta-análise (PRISMA), melhorando as habilidades de alfabetização, aprimorando o pensamento computacional.

### **Introduction**

As education is always changing, the addition of technology has changed the way traditional lessons are taught, making the classroom a better place for new ideas and more engaged students. One innovation that has become popular is digital storytelling, which is a dynamic combination of creative stories and cutting-edge technology. Bringing technology into the classroom has become one of the most important ways that traditional ways of teaching are being changed. Digital storytelling is one of the best examples of how teachers are using technology to get students more involved in the learning process in creative ways (Rahiem, 2021; Yang et al., 2022). This scoping review is the first step in a much deeper look into the wide range of ways that digital stories can be used in different settings. Our goal is to investigate the diverse implementation, impacts, and changing educational landscapes caused by combining digital storytelling with other studies by putting it all together. Using digital media and telling stories together has created more

immersive and involved learning experiences, which has completely changed the way we teach and learn.

This review looks into the wide scope of digital stories in different settings so that educators can understand how important technology is in changing the way we learn. As technology grows into an important part of today's classrooms, digital storytelling becomes a strong tool for teachers looking for creative ways to get and keep students interested in learning (Choo et al., 2020; Saripudin et al., 2021). This scoping review looks at existing research in a planned way to show the different aspects of digital storytelling, including how it is used, what affects it has, and how it changes the way we teach and learn. In a nutshell, this review's main goal is to point educational partners in new directions that make the most of the dynamic potential of digital storytelling.

### ***Background of the Study***

Education is a fluid process that involves the transfer of knowledge and the acquisition of skills. Over time, the conventional arrangement of classrooms has experienced significant changes in order to adapt to the changing requirements of students and the expectations of a society driven by technology. The incorporation of digital tools in education has played a crucial role in driving this transformation, creating a setting where students can utilize technology to improve their learning (Haleem et al., 2022; Mohamed Hashim et al., 2021). At its core, digital storytelling represents the fusion of story and technology. It includes making and sharing stories with digital tools that include different types of media like pictures, videos, sounds, and interactive parts. This new way of telling stories has made its way into different settings, giving teachers a fresh way to keep students' attention, encourage creativity, and encourage them to think critically (Ng et al., 2022; Pavlou, 2020).

Beginnings of digital stories in education can be traced back to the early 2000s, when the emergence in technology, especially the widespread use of personal computers and the internet, opened up new ways to teach and learn (Rahiem, 2021; Haleem et al., 2022). As being able to use technology efficiently became more important, teachers saw that digital storytelling could be a great way

to teach knowledge and improve students' digital communication skills. It is not limited to a certain grade level or subject; digital storytelling can be used in a wide range of fields and with people of all ages. Digital storytelling has become popular among teachers in all levels of education, from primary schools to universities (Wu & Chen, 2020; Cetin, 2021). It is used to explain complicated ideas, build empathy, learn about past events, and even make learning a language easier. Digital storytelling is a useful tool that fits with the ideas of differentiated teaching because it can be changed to fit the different learning styles and preferences of students.

Likewise, Web 2.0 technologies and the rise of user-generated content sites have made it easier for anyone to make and share digital stories. Not only do students read and understand information, they also add values to the digital story. This interactive part gives them a stronger sense of control and responsibility over their own learning, which makes the classroom more interesting and creative (Miller, 2019; Rizvic et al., 2019; Saripudin et al., 2021). Even though digital storytelling is becoming more and more popular in education, all of the current research needs to be looked at in order to make a map of this changing field. This scoping review aims to give educators, researchers, and policymakers a more complete picture of the different ways digital storytelling can be used and what it means in educational settings by organising the available literature in a structured way.

As we continue to explore the vast field of digital storytelling in education, it becomes clear that this cutting-edge technology has the ability to completely change the way we teach and learn (Yang et al., 2022; Rong & Noor, 2019). Teachers can motivate, interest, and empower students in ways that haven't been tried before by combining the art of language skills with the power of digital media. The goal of this scoping review is to provide ideas that can help guide future studies and the use of digital storytelling in the classroom. With the increasing use of digital storytelling, the incorporation of technology in education represents a significant change in traditional teaching approaches. This new way of teaching and learning gets students more involved and creative (Rong & Noor, 2019; Smyrniou et al., 2020). However, there is a lack of systematic comprehension of the various ways digital

storytelling is implemented, its effects, and the changing educational environments that arise from its integration with other studies. Thus, there is a need to delve deeper in order to map the evolving field of digital stories and help educators in utilise digital storytelling to its fullest potential. As technology becomes more common in schools, it is crucial to figure out how teachers can use digital stories to change the way they teach and make the classroom a more interesting and active place to learn.

## **Materials and Methods**

In order to map out the existing research comprehensively, a scoping review framework was used to provide an overview of the available research on a wide range of ways that digital stories can be used in different settings. It also helped to identify key concepts and themes related to effectiveness in using digital storytelling in different settings. The five steps of the framework were followed which include the following: (1) identifying the research questions; (2) identifying relevant studies; (3) study selection; (4) charting the data; and (5) collating, summarising and reporting the results.

### ***2.1 Identifying the research questions***

Review question 1: To investigate the effectiveness of digital storytelling in different settings such as schools, universities and professional training programs.

In this scoping review framework, two research questions were identified. One of the aims was to examine the potential size and scope of the existing research activity to give a clear overview of the current state of digital storytelling. The main goal of this study was to investigate the effectiveness of digital storytelling in different settings such as schools, universities and professional training programs. It is important to identify the research question to identify implications to fully utilise the dynamic potential of digital storytelling. In order to minimise the missing relevant articles being included in the scoping review, a broad perspective of articles selection was taken into account.

Review question 2: To explore the challenges related to digital literacy skills met by teachers and students that impact the efficient implementation of digital storytelling.

Another study question is to look into the challenges that are faced by teachers and students concerning digital literacy skills in using digital storytelling. Digital literacy encompasses the proficient use of digital technologies, including skills such as proficiently navigating online platforms, critically appraising digital information, and generating digital material. By looking into these problems, the study hopes to highlight possible challenges that need to be overcome in order for digital stories to work better as a teaching tool. The results can provide insights for enhancing digital literacy skills among educators and students become more tech-savvy, which would make it easier to use digital stories in different settings.

## ***2.2 Identifying Relevant Studies***

As the aim of scoping review focusing on the potential size and scope of current research, it has to include a wide selection of articles to map out the comprehensive goal of the study. All the relevant collected articles were searched from particularly one database which was Scopus. It comes from a strategic consideration of its broad coverage, cross-disciplinary nature, easy-to-use interface, global viewpoint, and up-to-date publication information. Its wide scope makes it easy to get a full picture of the research that has already been done, which fits well with the goal of the scoping review to make a plan of the range of knowledge on digital storytelling. The international papers in Scopus give the database a global view, which is very important for scoping reviews that have an international or cross-cultural focus. To increase the breadth of the findings, several broad search terms were used to narrow down the findings. In this scoping review, precise search word phrases were [digital storytelling]; and [digital storytelling in education] as shown in Table 1.

Table 1 – Search strings from Scopus database

Scopus	TITLE-ABS-KEY ( digital AND storytelling ) AND PUBYEAR > 2018 AND PUBYEAR < 2023 AND ( LIMIT-TO ( DOCTYPE , "ar" ) ) AND ( LIMIT-TO ( PUBSTAGE , "final" ) ) AND ( LIMIT-TO ( EXACTKEYWORD , "Digital Storytelling" ) ) AND ( LIMIT-TO ( SRCTYPE , "j" ) ) AND ( LIMIT-TO ( LANGUAGE , "English" ) ) AND ( LIMIT-TO ( OA , "all" ) )	196 results
	TITLE-ABS-KEY ( digital AND storytelling AND in AND education ) AND PUBYEAR > 2018 AND PUBYEAR < 2023 AND ( LIMIT-TO ( DOCTYPE , "ar" ) ) AND ( LIMIT-TO ( PUBSTAGE , "final" ) ) AND ( LIMIT-TO ( EXACTKEYWORD , "Digital Storytelling" ) ) AND ( LIMIT-TO ( SRCTYPE , "j" ) ) AND ( LIMIT-TO ( LANGUAGE , "English" ) ) AND ( LIMIT-TO ( OA , "all" ) )	79 results

### 2.3 Study Selection

It is very important to check the quality of studies to make sure that research results are reliable and accurate. In order to make sure the quality of a study is high, the process of selected articles searched were re-assessed based on the framework criteria, as well as the inclusion and exclusion criteria. The criteria were used to sort the articles that should be included in the scoping review. The inclusion and exclusion criteria were strictly followed to ensure the relevance of the obtained information for the research questions.

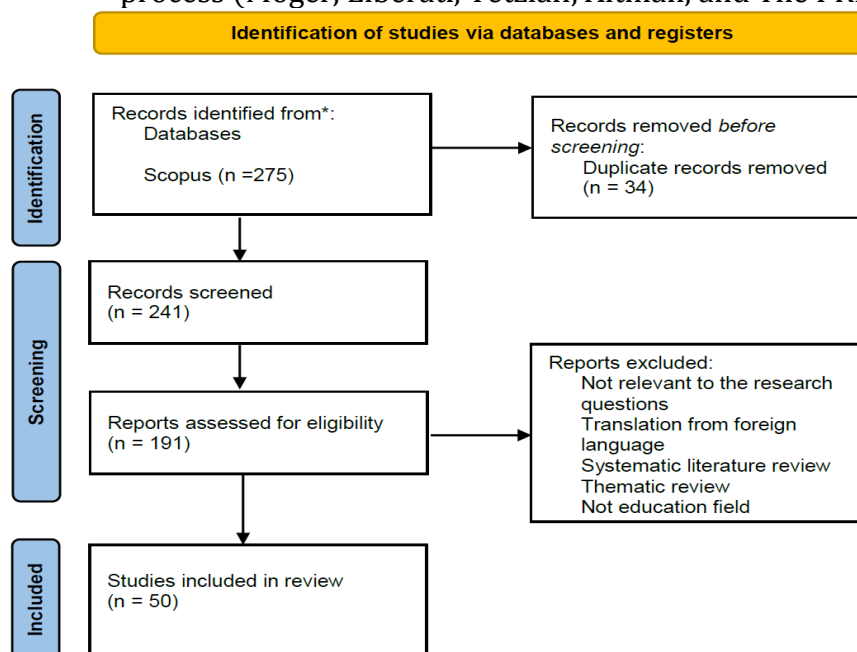
### 2.4 Charting the Data

A table was designed to systematically tabulate the extracted information from each article. It included fields such as author names, publication years, title, location, sample, research design and findings to provide clarity and completeness. The charted data would enable a thorough comprehension of utilising the digital storytelling in different settings and help in determining common themes, trends and patterns. It also helped in discovering and identifying research gaps, and potential future work for further exploration which further highlight new insights on the effectiveness of digital storytelling in different settings as well as challenges related to digital literacy skills in using digital storytelling.

## 2.5 Collating, Summarising and Reporting the Results

In order to ensure that literature was up-to-date, articles that were released between 2019 to 2023 were selected. Based on the inclusion and exclusion criteria, the articles were sorted, and fifty-one articles were finally selected to be relevant for this scoping review, as illustrated in Figure 1. These studies were all conducted from different countries around the world. Among the selected fifty-one articles, a total of 26 articles focused on schools, 15 centered about universities, 4 only exclusively about professional training programs and 5 articles that its institutional level were not clearly identified. It was also found that not much study has been done on digital storytelling with international collaboration from different countries.

Figure 1 – PRISMA flow diagram of the articles searches and study selection process (Moger, Liberati, Tetzlaff, Altman, and The PRISMA Group)



## Results

Table 1 showed a summary of information retrieved and a clear systematic overview for the selected articles.



Table 1 – Review of the selected articles

No	Authors (Years), Titles	Country	Sample (N)	Methodology	Findings
1	Cheung, A. (2021). Digitizing the story-writing process for EFL primary learners: An exploratory study. <i>Language Teaching Research</i> , 13621688211027772.	Hong Kong	264 students (148 boys and 116 girls) from two primary schools	Mixed methods	Use of digital storytelling and digital story-writing engaged young EFL learners and resulted in fewer grammatical mistakes in their writings.
2	Liu, C. C., Yang, C. Y., & Chao, P. Y. (2019). A longitudinal analysis of student participation in a digital collaborative storytelling activity. <i>Educational Technology Research and Development</i> , 67, 907-929.	Taiwan	26 elementary students (13 males and 13 females)	Mixed methods	Students considered multiple literacies, including multimedia processing, language, and collaboration, to be important criteria for successful partnerships.
3	Vu, V., Warschauer, M., & Yim, S. (2019). Digital storytelling: a district initiative for academic literacy improvement. <i>Journal of Adolescent &amp; Adult Literacy</i> , 63(3), 257-267.	United States	42 participants (2 district administrators, 4 DIGICOM employees, 2 community members, 11 PSUSD teachers, 23 students)	Mixed methods	Students who created digital stories were able to discuss the book more fluidly and retained information about their reading longer compared to those who wrote essays.
4	Chen, Z. H., & Liu, W. Y. (2021). A six-stage story structure approach for elementary students' story production: quality, interest, and attitude. <i>Computer Assisted Language Learning</i> , 34(1-2), 184-207.	Taiwan	49 fifth-grade students	Quasi-experimental	Students using the 4S approach: Shared Vision, Scientific Invention Task, Storytelling through Digital Media, and Social Interaction and Reflection manifested higher affection and helpfulness in their writing attitude.
5	Joana, K. Y., Chan, S. W., & Chu, S. K. (2021). Quality assessment for digital stories by young authors. <i>Data and Information Management</i> , 5(1), 174-183.	Hong Kong	30 Chinese Grades 3-7 students, aged 8-11	Mixed methods	Digital stories created by young authors in the study were found to have good quality overall, with high scores in areas such as story content and language, as well as the use of multimedia elements.
6	Kristiawan, D., Ferdiansyah, S., & Picard, M. (2022). Promoting vocabulary building, learning motivation, and cultural identity representation through digital storytelling for young Indonesian learners of English as a foreign language. <i>Iranian Journal of Language Teaching Research</i> , 10(1), 19-36.	Indonesia	30 junior-school students (aged 12-14)	Case study	Local culture-based narrative project helped express students' identity, increasing motivation, and enhancing engagement and achievement by conveying their emotions and identity.
7	Stavrou, S., Charalambous, C., & Macleroy, V. (2021). Translanguaging through the lens of drama and digital storytelling: Shaping new language pedagogies in the classroom. <i>Pedagogy, Culture &amp; Society</i> , 29(1), 99-118.	Cyprus	14 students, aged 7	Critical ethnography and action research	For bidialectal learners, translanguaging practices encourage them to move beyond traditional pedagogic ideologies and think more independently and creatively (become meaning makers and reflect the creative linguistic practices they experience).
8	Murad, T., Assadi, J., & Badarni, H. (2023). Digital Storytelling and EFL Speaking Skill Improvement. <i>Journal of Language Teaching and Research</i> , 14(5), 1189-1198.	Israel	49 Junior high school students, tenth grade	Quasi-experimental	Experimental group outperformed the control group in post-treatment assessments of speaking skills in fluency, pronunciation, vocabulary, grammar, and ability to provide details in their speaking. Teachers' qualifications in integrating technology were not fully qualified or trained on how to effectively integrate technology.
9	Chaisriya, K., Kaeophanuek, S., & Gilbert, L. (2023). The effects of integrating digital storytelling with metacognition strategies (DSTMC) learning model to enhance communication abilities. <i>Contemporary Educational Technology</i> , 15(2), ep416.	Thailand	30 undergraduate students	Quasi-experimental research	Integrating digital storytelling with metacognition strategies (DSTMC) learning model significantly improved participants' communication skills in listening, speaking, reading, writing, and presentation.
10	Maqueda, C. H. (2022). Digital Synesthesia in Heritage and Second Language Writing during Collaborative and Individual Digital Storytelling. <i>Languages</i> , 7(3), 222.	United States	14 university students in Spanish class	Mixed methods	Spanish heritage language learners (SHLs) demonstrated improvement through task repetition in the integration of multimodal elements and collaborative texts tended to be of greater quality which possessed potential benefits of collaborative writing.
11	Palioura, M., & Dimoulas, C. (2022). Digital Storytelling in Education: A Transmedia Integration Approach for the Non-Developers. <i>Education Sciences</i> , 12(8), 559.	Not mentioned	102 audience analysis survey, 103 assessment survey (students, teachers, parents, and other graduates, aged 10-18)	Mixed methods	Transmedia storytelling approach was found to be effective in enhancing content comprehension and knowledge assimilation among students. Assessment procedures and audience analysis showed that the majority agreed that multimedia-assisted learning successfully engaged students and improved their understanding of the content. Students experience fear and hesitation for the use of technology in education.

12	Phurikultong, N., & Kantathanawat, T. (2022). Flipping the undergraduate classroom to develop student analytical thinking skills. <i>Emerging Science Journal</i> , 6 (4), 739-757.	Thailand	560 undergraduate students	Mixed methods	Learning in Flipped Classroom, Inquiry-based Learning, and Digital Storytelling (LIFD) effectively promotes analytical thinking skills (ATS) and academic achievement. Students showed significant improvement in post-test ATS abilities which its learning effectiveness index (EI) for learners and ATS was higher than the established criteria.
13	Syam, A. T. (2022). Promoting the development of learners' traditional literacies through digital storytelling. <i>LLT Journal: A Journal on Language and Language Teaching</i> , 25(1), 263-276.	Indonesia	80 learners, aged 19-20	Quasi-experimental	Digital storytelling improved learners' writing components, such as ideas, organization, word choice, sentence fluency, and conventions. It also enhances learners' understanding of the generic structure in narrative text and their technological literacy and competency.
14	Poonsawad, A., Srisomphan, J., & Sanrach, C. (2022). Synthesis of problem-based interactive digital storytelling learning model under gamification environment promotes students' problem-solving skills. <i>International Journal of Emerging Technologies in Learning</i> , 17(5), 103-119.	Thailand	9 participants in educational institutions	Mixed methods	Problem-based interactive digital storytelling learning model helped help improve analytical thinking skills, critical thinking, and problem-solving skills among students. Overall suitability assessment of the developed learning model was very suitable, with high ratings for each component and the problem-solving skills evaluated.
15	Lin, C. H., & Chang, Y. Y. (2021). A progressive digital narrative teaching method to improve learning motivation as a lifelong learning skill. <i>Sustainability</i> , 13(23), 12991.	Not mentioned	100 freshman from the college business	Mixed methods	Three-stage progressive teaching method cultivates computational thinking and deep knowledge understanding which found students increased understanding and enjoyment, leading to improved learning motivation and effectiveness.
16	Kim, D., Coenraad, M., & Park, H. R. (2021). Digital storytelling as a tool for reflection in virtual reality projects. <i>Journal of Curriculum Studies Research</i> , 3(1), 101-121.	United States	5 female middle school students, aged 12-13	Qualitative multiple case study design	Students believed that using technology such as virtual reality and multimodal resources for digital storytelling facilitated their engagement and mediate reflective learning during their teaching experiences.
17	Addone, A., De Donato, R., Palmieri, G., Pellegrino, M. A., Petta, A., Scarano, V., & Serra, L. (2021). Novelette, a usable visual storytelling digital learning environment. <i>IEEE Access</i> , 9, 168850-168868.	Italy	49 children	Qualitative	Students participated felt supported and encouraged to improve their creativity via Novelette.

18	Sarnok, K., Wannapiroon, P., & Nilsook, P. (2020). DTL-eco system by digital storytelling to develop knowledge and digital intelligence for teacher profession students. <i>International Journal of Information and Education Technology</i> , 10(12), 865-872.	Not mentioned	6 instructional design experts, 6 ICT for education experts (all with at least 5 years of experience in their respective fields)	Mixed methods	DTL-Eco System by digital storytelling effectively promotes digital knowledge and intelligence in teacher profession students. Efficiency evaluation results show that the use of digital tools in searching and information processes has the highest assessment result becomes the most suitable for the development of emotional intelligence and skills in using tools and digital media.
19	Kaeophanuek, S., Na-Songkhla, J., & Nilsook, P. (2019). A learning process model to enhance digital literacy using critical inquiry through digital storytelling (CIDST). <i>International Journal of Emerging Technologies in Learning (Online)</i> , 14(3), 22.	Not mentioned	7 doctoral degrees experts (universities lecturers, have at least 10 years of relevant experience)	Qualitative	Critical inquiry through digital storytelling (CIDST) consists of phases such as getting the idea, creating a story, and publishing the digital story which experts strongly agree that these steps can enhance digital literacy.
20	Tatli, Z., Saylan, E., & Kokoç, M. (2022). Digital Storytelling in an Online EFL Course: Influences on Speaking, Vocabulary, and Cognitive Load. <i>Participatory Educational Research</i> , 9(6), 89-112.	Turkey	33 freshman Finance students (enrolled in CEFR course)	Mixed methods case study design	Students create their own stories within interesting contexts and improve their speaking skills in terms of spoken grammar, vocabulary, fluency, coherence, and pronunciation.
21	Oakley, G., Pegrum, M., Lander, B., Tomei, J., Sonobe, N., & deBoer, M. (2023). „Free rein“to learn about language, culture & technology: a multimodal digital text exchange project between school students in Australia and Japan. <i>Research and Practice in Technology Enhanced Learning</i> , 18, 034-034.	Australia and Japan	Case 1: 13-36 secondary students, aged 14-16 Case 2: 9-17 secondary students, aged 14-18 Case 3: 19-21 primary students, aged 9-12	Multiple case study design	Multimodal digital text exchange project has benefited students from the aspects of choice and autonomy, personalization and inclusivity, collaboration and peer learning, language practice, learning about different cultures, and developing 21st century skills and digital literacies.
22	Kahanurak, S., Dibyamandala, J., & Mangkhang, C. (2023). Digital storytelling and intercultural communicative competence through english as a foreign language for multilingual learners. <i>Journal of Curriculum and Teaching</i> , 12(1), 14-26.	Thailand	Not mentioned	Not mentioned	Byram's Model of Intercultural Communicative Competence (ICC) improves English teaching curricula, develop versatile skills in multilingual language learners, and promote cultural inclusivity in language education. It is essential for language learners to avoid miscommunication and develop an understanding of individuals from diverse ethnicities and beliefs.
23	Paulauskas, L., Paulauskas, A., Blažauskas, T., Damaševičius, R., & Maskeliūnas, R. (2023). Reconstruction of Industrial and Historical Heritage for Cultural Enrichment Using Virtual and Augmented Reality. <i>Technologies</i> , 11(2), 36.	Not mentioned	Not mentioned, conducted in a university premise	Not mentioned	Virtual Reality (VR) is less effective compared to visual or textual learning materials as test results in the virtual environment depended on the respondents' experience with VR. Generally is evaluated positively, but the presentation of learning materials needs improvement.
24	Srichailard, P. (2023). The development learning model of flipped classroom with digital storytelling for department of computer education. <i>Kasetsart Journal of Social Sciences</i> , 44(3), 929-938.	Thailand	26 4th year undergraduate students	Quasi-experimental	Flipped classroom learning model with online digital storytelling meet the required standard criteria and found significant improvement in learning outcomes from pre-test scores to post- test scores among students.
25	Gkoutsioukosta, Z., & Apostolidou, V. (2023). Building Learning Communities through Digital Storytelling. <i>Social Sciences</i> , 12(10), 541.	Greece	900 students from 50 schools, 50 primary and secondary teachers	Action research	Collaboration with peers was the most enjoyable and creative element for students. It also empowers students, particularly those from unprivileged backgrounds, by increasing their confidence and changing their image in school.
26	Shemy, N.S. (2023). The power of digital storytelling: Students' perceptions about its utilization in developing practical understanding in an instructional technology context. <i>International Journal of Information and Education Technology</i> , 13(9), 1439-1444.	Oman	67 university master's degree level students, aged 26-38	Mixed methods	Students had a generally positive perception of DST and fix what they had learned and remember practical concepts for a longer period (interact and analyze, contributed to effective understanding).

27	Aumgri, C., & Apirating, K. (2023). Model Component Analysis of Online Storytelling Media via International Journal of Information and Education Technology, 13(7).	Thailand	9 experts (educators/ university lecturers)	Mixed methods	Test of digital literacy skills revealed that students' knowledge and skills in online digital storytelling and gamification improved through the learning model (gamification positively influenced students' motivation and learning progress). Digital storytelling media via gamification (DSLML) learning model was highly appropriate in various aspects, including learning management, contents and learning sources, objectives, and problem-solving practice of digital literacy skills.
28	Chen, Y. T., Liu, M. J., & Cheng, Y. Y. (2023). Discovering Scientific Creativity with Digital Storytelling. Journal of Creativity, 33(1), 100041.	Taiwan	39 elementary students, aged 9-12	Qualitative	Integration of short term project based learning with digital storytelling using platform Edvisto reported positive levels of satisfaction towards their teamwork and social skill development. It's also highlighting the students' ability to create novel, useful, and surprising products.
29	Demirbaş, İ., & Şahin, A. (2022). The Effect of Digital Stories on Primary School Students' Listening Comprehension Skills. Participatory Educational Research, 9(6), 380-397.	Turkey	52 students, 4th grade	Quasi-experimental	Experimental group effectively improve the students' listening comprehension skills.
30	Cruz González, C., Mula Falcón, J., Domingo Segovia, J., & Lucena Rodríguez, C. (2022). "And though our dreams may be shattered to pieces, I will resist": digital storytelling to analyze emotional impact of the pandemic on university students. Revista Complutense de Educación.	Spain	6 university students	Qualitative	There is a need for emotional education plans, optimized online educational resources, and increased teacher training in digital issues and emotional support as feelings of fear, sadness, confusion, boredom, anxiety, and anger were commonly expressed.
31	Ramalingam, K., Jiar, Y. K., & Mathiyazhagan, S. (2022). Speaking skills enhancement through digital storytelling among primary school students in Malaysia. International Journal of Learning, Teaching and Educational Research, 21(3), 22-35.	Malaysia	13 students, 2nd grade	Collaborative action research	Mobile application resulted in increased engagement and motivation. Students showed a higher level of improvement in fluency compared to comprehension and vocabulary skills due to repetition of stories, and creative expressions, leading to improved speaking skills.
32	Abdel-Aziz, S., Galal, Y. S., Al Hanafy, S. H., Ghamrawy, M., & Shaheen, D. S. M. (2022). Digital Storytelling: A Video-based Approach for Engaging University Students in Health Education. Open Access Macedonian Journal of Medical Sciences, 10(E), 33-39.	Egypt	120 medical students from 12 universities	Cross-sectional design	Video-based approached enhanced students' understanding of diversity in the community and pushed them to explore difficult topics, Pre- and post-test assessments showed an improvement in students' knowledge levels.
33	Dike, I. C., Ebizie, E. N., Njoku, O. C., Oraelosi, C. A., Egbe, C. I., Nnamani, A. P., ... & Onwuegbuchulam, A. C. (2021). Improving knowledge and perception of HIV/AIDS among English language speaking children in rural areas through educational digital storytelling. Medicine, 100(50).	Nigeria	84 children	Randomised controlled design	Digital storytelling effectively improved knowledge and perception, students appreciably improved knowledge and perception of English language children in rural areas compared with no-intervention control group.
34	Rahiem, M. D. (2021). Storytelling in early childhood education: Time to go digital. International Journal of Child Care and Education Policy, 15(1), 1-20.	Indonesia	4 teachers	Single case study	Digital storytelling in early childhood education improves language acquisition, oral language skills, reading comprehension, basic mathematics understanding, science comprehension, cross-cultural communication, and moral and social development.
35	Lazareva, A., & Cruz-Martinez, G. (2021). Digital storytelling project as a way to engage students in twenty-first century skills learning. International Studies Perspectives, 22(4), 383-406.	Sweden	40 university students	Mixed methods	Collaboration and computer-assisted collaborative learning had a positive impact on students' cognitive, emotional, and behavioral engagement in higher education (have positive emotional experiences and express themselves more freely and confidently).
36	Limone, P., Toto, G. A., & Cafarelli, B. (2021). The decision-making process and the construction of online sociality through the digital storytelling methodology. Electronics, 10(20), 2465.	Italy	813 teachers	Mixed methods	Standardized planning of activities promoted participation and emotional involvement resulted in the creation of strong group thinking.
37	Castillo-Cuesta, L., Quinonez-Beltran, A., Cabrera-Solano, P., Ochoa-Cueva, C., & Gonzalez-Torres, P. (2021). Using Digital Storytelling as a Strategy for Enhancing EFL Writing Skills. International Journal of Emerging Technologies in Learning, 16(13).	Ecuador	101 pre-service EFL teachers	Quasi-experimental	Storybird led to a significant improvement in the students' writing skills, particularly in grammar and vocabulary. It also improved students' ideas, organization, word choice, sentence fluency, and conventions in writing.

38	Sunderland, N., Robinson, K., & Burgess, A. (2021). Overcoming future professionals' fear of digital storytelling. <i>Australian Social Work</i> , 74(1), 13-28.	Australia	93 university students	Mixed methods	Students experienced fear initially but rapidly gained confidence (overcome their fears and develops knowledge, confidence, and applicable professional skills). Students also expressed interest in doing more digital story assessments in the future and indicated a preference for digital story assessments over essay assessments.
39	Austen, L., Pickering, N., & Judge, M. (2021). Student reflections on the pedagogy of transitions into higher education, through digital storytelling. <i>Journal of Further and Higher Education</i> , 45(3), 337-348.	United Kingdom	not mentioned, 16 digital stories	Exploratory qualitative research design	Digital storytelling is an effective medium to express students' diverse and complex experiences. It could be a more effective approach to reflection compared to written accounts.
40	Smyrmaiou, Z., Georgakopoulou, E., & Sotiriou, S. (2020). Promoting a mixed-design model of scientific creativity through digital storytelling—the CCQ model for creativity. <i>International Journal of STEM Education</i> , 7, 1-22.	Not mentioned	12 students	Mixed methods	Digital storytelling proven in enhancing scientific creativity among students. Experts' stories follow a top-down approach, while students' creative process is characterized by a bottom-up approach.
41	Tzima, S., Styliaras, G., Bassounas, A., & Tzima, M. (2020). Harnessing the potential of storytelling and mobile technology in intangible cultural heritage: A case study in early childhood education in sustainability. <i>Sustainability</i> , 12(22), 9416.	Greece	12 children, 3 teachers	Qualitative	Using digital storytelling and mobile technology, students showed creativity, interest, dedication, and enjoyment in participating in the activities, creating their own stories, and exploring the watermill model, indicating their high degree of acceptance.
42	Radaideh, E., Al-Jamal, D., & Sa'di, I. (2020). Digital storytelling: Time to be considered in reading comprehension. <i>Universal Journal of Educational Research</i> , 8(6), 2621- 2633.	Jordan	34 students, 4th grade	Quasi-experimental	Using digital storytelling as an instructional technique had a statistically significant effect on students' reading comprehension skills as experimental group outperformed the control group in overall reading comprehension as well as applied and analytic comprehension.
43	Tanrikulu, F. (2020). The effect of L2 listening texts adapted to the digital story on the listening lesson. <i>Turkish Online Journal of Distance Education</i> , 21(1), 1-18.	Turkey	49 undergraduate foreign students,	Action research	Digital storytelling positively affects the development of listening skills in foreign language education and increases student motivation and helps to develop storytelling skills through technology.
44	Khalid, F., & El-Maliki, T. (2020). Teachers' experiences in the development of digital storytelling for cyber risk awareness. <i>International Journal of Advanced Computer Science and Applications</i> , 11(2).	Malaysia	28 in-service teachers	Single case study design	Digital storytelling had a positive impact on students' affective domain (effective tool for behavior change and raising awareness about cyber risks).
45	Özüdoğru, G., & Çakır, H. (2020). An investigation into the opinions of pre-service teachers toward uses of digital storytelling in literacy education. <i>Participatory Educational Research</i> , 7(1), 242-256.	Turkey	32 sophomore pre-service teachers	Qualitative, case study	Users believe that digital storytelling is a more convenient method for verbal courses like literacy education, and contributes to personal development, including improving communication skills and self-confidence in writing and technology usage.
46	Moradi, H., & Chen, H. (2019). Digital storytelling in language education. <i>Behavioral Sciences</i> , 9(12), 147.	Turkey	22 elementary students, 4th grade	Action research	Integration of technology in writing activities improved the students' computer literacy as well as their attitudes and motivation towards writing.
47	Kallinikou, E., & Nicolaidou, I. (2019). Digital storytelling to enhance adults' speaking skills in learning foreign languages: A case study. <i>Multimodal Technologies and Interaction</i> , 3(3), 59.	Cyprus	40 Russian, EFL	Case study	Intervention group demonstrated a significant increase in motivation compared to the control group (expressed increased interest, perceived importance, usefulness, and self-efficacy in speaking).
48	Kaminskienė, L., & Khetsuriani, N. (2019). Personalisation of learning through digital storytelling. <i>Management: journal of contemporary management issues</i> , 24(1), 153-166.	Lithuanian	Not mentioned, 8th grade pupils from lower-secondary school	Case study	Students found value in using the English language in practice and improving their communication skills, and showed a positive attitude towards personalized learning through digital storytelling.
49	Girimen, P., & Kaya, M. F. (2019). Using the Flipped Classroom Model in the Development of Basic Language Skills and Enriching Activities: Digital Stories and Games. <i>International Journal of Instruction</i> , 12(1), 555-572.	Turkey	23 4th grade students	Action research	In Flipped Classroom learning model with online digital storytelling, game-based activities improved students' skills on the main idea, the topic, and 5W&1H (Who, What, Why, When, Where, and How) that form the basis of sentences, paragraphs, and text comprehension.
50	Douglas, K., Carless, D., Milnes, K., Turner-Moore, T., Tan, J., & Laredo, E. (2019). New technologies of representation, collaborative autoethnographies, and "taking it public": an example from "facilitating communication on sexual topics in education". <i>Qualitative Inquiry</i> , 25(6), 535-538.	United Kingdom	Not mentioned	Collaborative autoethnography	Digital storytelling has an impact beyond personal interactions, even those inexperienced, to present their work- sensitive topics to a global audience.

## Discussion

Review question 1: To investigate the effectiveness of digital storytelling in different settings such as schools, universities and professional training programs.

Review question 2: To explore the challenges related to digital literacy skills met by teachers and students that impact the efficient implementation of digital storytelling.

## Schools

Digital storytelling has become a versatile instructional tool that engages students in several subjects and has proven to be an excellent method for improving literacy abilities. First, using storytelling effectively enhances students' language development and engagement in the teaching and learning process (Liu et al., 2019; Joana et al., 2021; Demirbas & Sahin, 2022; Kim et al., 2021; Ramalingam et al., 2022; Radaideh et al., 2020). A study showed that incorporating digital storytelling into the curriculum has shown significant advantages for young English as a Foreign Language (EFL) learners (Murad et al., 2023). This is consistent with the findings that students made fewer grammar mistakes in their writing which shows that this medium has the ability to engage students in a way that not only improves their language skills but also cultivates a deeper comprehension of linguistics (Cheung, 2021). It is also observed that the students who produced digital stories were able to recall information quickly and had longer retention of information (Vu et al., 2019). In other words, it suggested that using digital storytelling helps students connect more deeply with the learning content as compared to traditional essay writing (Palioura & Dimoulas, 2022). Besides that, various research emphasize novel strategies such as the 4S method, which integrates Shared Vision, Scientific Invention Task, Storytelling through Digital Media, and Social Interaction and Reflection in using digital storytelling (Chen & Liu, 2021). Positive outcomes like increasing student's affection and assistance have shown that the structured 4S method used was able to accelerate learning (Chen & Liu, 2021). By emphasizing

key elements such as plot development, language usage, and multimedia elements, students' creative imagination were stimulated and thus led to better outputs in their digital stories (Addone et al., 2021; Moradi & Chen, 2019; Smyrniou et al., 2020).

In addition, the integration of digital storytelling promotes cultural identity and inclusivity among students (Oakley et al., 2023). Findings from local culture-based narrative projects demonstrated that students experienced positive impacts when expressing their unique identity, and also enhanced their intrinsic motivation and active engagement (Kristiawan et al., 2022; Limone et al., 2021). This, in turn fostered a sense of belonging among the students and facilitated especially those who come from diverse cultural backgrounds to embrace different cultural perspectives (Dike et al., 2021; Tzima et al., 2020; Rahiem, 2021). This enhanced students' confidence in expressing their thoughts freely without having the fear of judgment and building close relationships among students (Gkoutsioukosta & Apostolidou, 2023). Similarly, the practice of translanguaging proven in helping multilingual students to think independently and creatively, thereby their cognitive processes (Stavrou et al., 2021). However, to successfully implement digital storytelling in schools, it is essential for teachers and students to effectively utilise the digital tools so that digital stories can be used to their fullest potential in learning.

### **Universities**

With the integration of digital storytelling into several learning models such as the Digital Storytelling Media via Gamification (DSLGM), Inquiry-based Learning and Digital Storytelling (LIFD), and Critical Inquiry Through Digital Storytelling (CIDST), the students saw improvements in academic achievements (Aumgri & Apirating, 2023; Phurikultong & Kantathanawat, 2022; Kaeophanuek et al., 2019). Other than improving their communication skills, analytical thinking abilities, and academic performance, digital storytelling also benefits them in computational thinking, developing deep knowledge and encouraging high emotional engagement (Lin & Chang, 2021; Shemy, 2023, Cruz Gonzalez et al., 2022). Overall, students'

cognitive, emotional, and behavioural engagement in higher education were all improved by collaboration and using computers to help them work together (Maqueda, 2022; Lazareva & Cruz-Martinez, 2021; Tanrikulu, 2020). Students mentioned that they felt better emotionally and had more confidence, and they liked digital story assessments more than traditional essay evaluation (Sunderland et al., 2021).

Several studies have shown that digital storytelling has become an effective way to meet a wide range of learning goals (Chaisriya et al., 2023; Abdel-Aziz et al., 2022; Tat et al., 2022). For example, the three-stage progressive teaching method and the flipped classroom learning model showed that students were better at thinking computationally, understanding, being motivated, and being successful (Lin & Chang, 2021). Combining Flipped Classroom with inquiry-based learning has effectively increased student learning achievement, innovation, and ICT skills (Phurikultong & Kantathanawat, 2022). Likewise, a study further supported that students not only met the standard criteria in a Flipped Classroom learning model with online digital storytelling, but their learning results also showed big improvements from the pre-test to the post-test scores (Srichailard, 2023). As for DSLM study, students are more motivated to learn and help them get better at using technology (Aumgri & Apirating, 2023). It improved their digital literacy skills in many areas such as managing their learning, finding material and learning sources, setting goals, and solving problems (Poonsawad et al., 2022; Aumgri & Apirating, 2023). On the other hand, CIDST was found to be a useful learning model, and experts strongly agreed that all of its steps—generating ideas, writing stories, and sharing them online—in improving digital literacy (Kaeophanuek et al., 2019). However, in dealing with the digital literacy skills challenge, it showed a need for plans for training teachers in navigating digital issues and being able to offer support to students from preventing them in frustration, fear, hesitation when facing the digital issues (Cruz Gonzalez et al., 2022).



### ***Professional training programs***

Digital storytelling has been shown to be very useful in professional training programs, especially for helping teacher profession students in developing digital knowledge and intelligence. The Digital Learning Ecosystem has been shown to be an effective way to teach skills like emotional intelligence and how to use digital tools and media well (Sarnok et al., 2020). The evaluation results also show that digital tools are useful for searching and gathering information, and they are also good for improving emotional intelligence and digital skills ((Sarnok et al., 2020). Likewise, using digital storytelling within the Storybird platform has led to a significant improvement in the students' writing skills, especially when it comes to improving their language and vocabulary (Castillo-Cuesta et al., 2021). Storybird also had a positive effect on many areas of writing such as ideas, organization, word choice, sentence fluency, and conventions in writing (Castillo-Cuesta et al., 2021). This clearly shows how Storybird can help improve many areas of professional writing abilities with the use of digital storytelling.

Other than that, digital storytelling has also helped them with students' emotions, changing their behaviour and making them more aware of online risks (Khalid & El-Maliki, 2020). This shows that digital storytelling can be a very important part of changing students' thoughts and actions about cybersecurity in professional settings (Khalid & El-Maliki, 2020). Despite its effective usage, teachers and students may have trouble getting used to and maximise its potential. Nevertheless, teachers and students could overcome the obstacles with thorough training in digital literacy so that they could use digital storytelling effectively (Ozudogru & Cakir, 2020). The need for ongoing help and training programmes to improve digital literacy are imperative. This is to ensure them to continuously adapt and refine their digital literacy skills in utilizing digital storytelling effectively.

## Future Work

In the future, digital storytelling research should look into longitudinal studies that are very important for figuring out how digital storytelling affects students' academic and career growth over time. It is important to look into how digital storytelling can be used in teacher training programmes so that teachers are ready to use these methods successfully in a variety of school settings. In addition, we need to learn more about inclusive education and look into how digital storytelling can be changed to meet the needs of students from all cultures, including those with disabilities. Cross-cultural studies will help us understand how cultural factors affect how digital stories are received and how they affect people. Researchers should also look into new ways to grade projects, since digital storytelling projects use a lot of different media and involve teamwork. As technology changes, it will be important to look into how digital storytelling can be combined with new technologies like virtual reality and augmented reality. This will make educational storytelling more involved and interactive. Ethical issues, like privacy and data security, need to be carefully looked at in order to set rules for responsible execution. Finally, it's important to know how digital stories give students autonomy and keep them interested in learning in order to shape the way we teach in the future. Taking these things into account will help educators get a fuller and more detailed picture of the pros and cons of using digital storytelling in institutions.

## Conclusion

In summary, this scoping review has conducted an extensive investigation into the aspects of digital stories used in different kinds of settings such as schools, universities and professional training programs. Researchers who looked into how well digital storytelling works in schools, universities, and professional training programmes learned a lot about how it can improve students' engagement, understanding, and skill development. Digital storytelling can be changed to fit different learning styles, which is in line with how education is changing. It shows promise as a way to encourage creativity, critical thinking, and real-world application of information. By looking more closely at the problems that lack of digital literacy skills can cause when using digital stories effectively, we've gained a deeper understanding of the problems that teachers and students face. These problems include different levels of technology access and the need for ongoing professional development. They show the complex web of factors that affect how well digital stories can be brought into educational practices.

The overall findings show how important it is to understand the unique aspects of each learning environment. The impacts of digital storytelling are wide-ranging and deep. In schools, it creates immersive and interesting experiences. In universities, it encourages critical thinking and creativity. And in professional training programmes, it helps students learn useful skills. But this good effect doesn't come without problems. To solve them, we need to use different strategies and methods depending on the situation. In the future, researchers should try to learn more about specific learning outcomes, student views, and new technologies. To get a better sense of digital storytelling's long-term effects, longitudinal studies that track its ongoing usefulness, especially in developing important skills, would be very helpful. Some other important things that need to be looked into further are how to use new technologies and how institutional rules can help digital storytelling projects.

In an education system that is always changing, the use of digital storytelling emerges as a good way to keep students engaged, help them learn new skills, and

help them understand what they are learning better. This scoping review is a starting point for teachers, policymakers, and researchers who want to use evidence-based ideas to help them carefully add digital storytelling to a range of learning settings. As we move further into the digital realm of education, the insights of this research would give us a way to use digital storytelling to its fullest potential, which will help both students and teachers.

### **Limitations of the Study**

It is important to acknowledge numerous limitations. The first thing to note is that It is hard to do a quantitative meta-analysis because the studies included in the review used a lot of different methods and approaches. Due to different studies using different methods, the included literature isn't all the same. This makes it hard to come to firm conclusions about how digital storytelling affects schools, universities, and professional training programmes as a whole. The review might not fully cover the full range of educational practises and challenges related to digital storytelling around the world because of geographical and cultural biases. There are big differences in the educational settings around the world, so the results may vary. Also, the focus on challenges related to digital literacy skills might not fully look into the different ways that each school teaches computer literacy. The lack of a comprehensive analysis of the components of instructional design could make it harder to get a deep understanding that contributes to the effectiveness or difficulties encountered during the implementation of digital storytelling. All of these challenges make it clear that more research needs to be done to look into new emerging trends, improve methodological consistency, take into account global perspectives, and explore the complex pedagogical strategies that are shaping the future of digital storytelling in education.

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