A Systematic Review of the Intelligent Digital Storytelling Process in Disseminating Health Information

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Kawitsara Eambunnapong(✉), Prachyanun Nilsook, Panita Wannapiroon
King Mongkut's University of Technology North Bangkok, Bangkok, Thailand
kawitsara.kra@mahidol.edu

Abstract—Advances in multimedia technology have enabled digital storytelling to be used as a measure of health outcomes. Digital storytelling is a new concept in education that involves creating meaning as a tool with great potential. The main aim of the research is a systematic review of the intelligent digital storytelling process in the dissemination of health information. The investigators synthesized papers published between 2017 and 2022 that met the eligibility criteria and were obtained from systematically selected electronic databases. It was found that only 47 articles met the inclusion criteria. The data collected was sorted and synthesized using a summary tabular method. The proposed systematic review summarizes the findings with regard to the processes and components involved in intelligent digital storytelling, including the most appropriate length in terms of the video clips used. This leads to the development of a learning platform that has the potential to promote knowledge transfer in order to disseminate health information.

Keywords—intelligent digital storytelling, systematic literature review, information dissemination, health, PRISMA

1 Introduction

Digital storytelling is a combination of storytelling and digital elements including text, images, narration, recorded audio, music, and video [1–3]. Storytelling and learning are inextricably linked. It is a tool with the potential for achieving particular educational goals, especially in terms of critical thinking [1], and can act as a therapeutic process. It can promote personal reflection and emotional acceptance [4] and has also been used in community participatory research [5]. Social media is now a public media space where teenagers and adults connect to share and access tales of disease. Individuals can benefit from the learning experiences of others in order to engage in self-management behaviors [4]. Digital technology transforms storytelling into a modern form [6] which facilitates the widespread dissemination of narratives about illness [4] and has begun to play a huge role in the health education context. This review aims to analyze the scope of the empirical body of knowledge related to the intelligent digital storytelling process, with the aim of developing an intelligent digital storytelling platform as a means of disseminating health information that impacts health action.

2 Theoretical background

2.1 The meaning of intelligent digital storytelling

Digital storytelling involves a short video [4], [7] format which can be used to share scientific advances and discoveries [1]. It is a natural way of communicating and can be an excellent teaching tool that keeps learners engaged in terms of both material learning and self-reflection [4–5], [7]. In medicine, it can act as a therapeutic tool to provide insights to others about the pain pathway experience [4]. It does this by creating multimedia stories and developing social media platforms for storytelling as a means of sharing and accessing narratives about sickness [1], [4], [8]. In short, intelligent digital storytelling refers to the combination of digital storytelling with intelligent technology in order to disseminate information via social media platforms in a short form. Such an approach can promote digital literacy and facilitate learning. It is a therapeutic communication tool which can provide useful insights, allowing users to visualize different identities and experiences.

2.2 Definition of a systematic literature review

A systematic review of the literature is a structured process in which a thorough review of previous research is undertaken. This involves a statistical procedure relating to specific research questions in order to identify, select, synthesize, and assess high-quality evidence [9–11]. In this research a comparative review of all the evidence was conducted and clear outcomes were obtained. A reliable method with regard to the selection and evaluation of studies was used. In short, a systematic review is defined as a clear, high-level summary method for gathering current knowledge from multiple publications through a carefully planned review process relating to specific research questions in such a way as to permit accurate decision-making [12]. This requires a valid outcome that depends on the scope and quality of the publications considered. Throughout, the aim is to reduce bias through selection methods in such a way as to evaluate studies that are reliable, impartial, clear, and systematic.

2.3 The systematic literature review process

From the synthesis of the documents considered, it was found that there is a great deal of research documenting the process involved in undertaking a systematic review of the literature. What the researchers concluded is shown in Table 1.

Table 1. Synthesis of the literature regarding the systematic review process

List	Reference							
	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]
Identifying the review objectives	/	/	/		/		/	/
Review research questions	/		/	/	/	/	/	/
Determining inclusion criteria	/	/		/		/	/	
Finding relevant studies	/	/		/	/	/		/
Select documents		/			/	/	/	/
Data extraction	/	/			/	/		/
Arriving at a conclusion		/		/		/		
Document synthesis		/		/	/		/	/
Discussion of the results		/	/		/	/	/	/

From Table 1, from the synthesis of relevant documents the researchers summarized the process of reviewing the literature. There were 9 main steps which were as follows: 1) identifying the review objectives, 2) review research questions, 3) determining inclusion criteria, 4) finding relevant studies, 5) select documents, 6) data extraction, 7) arriving at a conclusion, 8) document synthesis, and 9) discussion of the results.

3 Research methodology and results

3.1 Identifying the review objectives

With regard to the first step, the focus was on planning and defining the scope of the problem in such a way as to screen titles, abstracts and keywords related to the intelligent digital narrative process for disseminating health information. In this study, the researchers searched for articles from the Science Direct database, PubMed, and Google Scholar, selecting articles published between 2017 and 2022. Specifically, the study was conducted to analyze the extent of empirical knowledge related to the intelligent digital storytelling process as a means of disseminating health information.

3.2 Reviewing research questions

The second step aimed to identify publications that addressed specific questions and to determine their importance when it comes to expanding knowledge through reading, discussing, surveying, and using the PICO-based educational design [14]. With regard to the latter, P stands for Patient/Population (Patients/Population), I for Intervention, C for Comparison, and O for Outcome [10], [14]. The question in this research is: What are the components of an intelligent digital storytelling process for disseminating health information.

3.3 Determining inclusion criteria

The third step is to set priorities in terms of the inclusion and exclusion criteria the identification and screening of studies that met the inclusion criteria were presented in this study [10], [14]. The inclusion criteria were: 1) research that discusses the intelligent digital storytelling process in disseminating health information 2) research peer-reviewed articles in both Thai and English 3) publications between 2017 and 2022 in reliable databases. The exclusion criteria were: 1) research articles with only abstracts inaccessible. 2) research articles that are not in English or Thai.

3.4 Finding relevant studies

The initial draft development led to the creation of a search strategy. "Keywords" were chosen identified and validated by analysis. For search purposes we used the Boolean search operators "AND" and "OR". For keywords, we searched by enclosing a group of words or phrases in quotation marks (" ") in order to help identify a more comprehensive topic. The key search terms used in this study were "digital storytelling" OR "oral storytelling" OR "narrative health promotion" OR "digital storytelling as health promotion" AND "health information dissemination" OR "health promotion tool" OR "community outreach". AND "narrative theory". At this stage, it was found that there were a total of 2,267 relevant research articles (as shown in Table 2).

Table 2. The results of the main search queries from the databases

Databases Searched	Results
Science Direct	627
PubMed	617
Google Scholar	1,023

3.5 Select documents

We selected articles to include in the review and set a time frame for publication [12], [14]. Data extraction is the most important and time-consuming process. In this study, single data extraction was performed by a single researcher with regard to the PRISMA Checklist. Two experienced advisors participated in the review of the selected articles, while another research expert double-checked them for accuracy. In this study, the researchers used a recording spreadsheet program to support team collaboration in order to reduce errors and quality control in terms of data extraction. Out of a total of 2,267 relevant research articles selected according to the criteria set out using the PRISMA assessment [17] form to be used for the full evaluation, only 47 items were left (as shown in Figure 1).

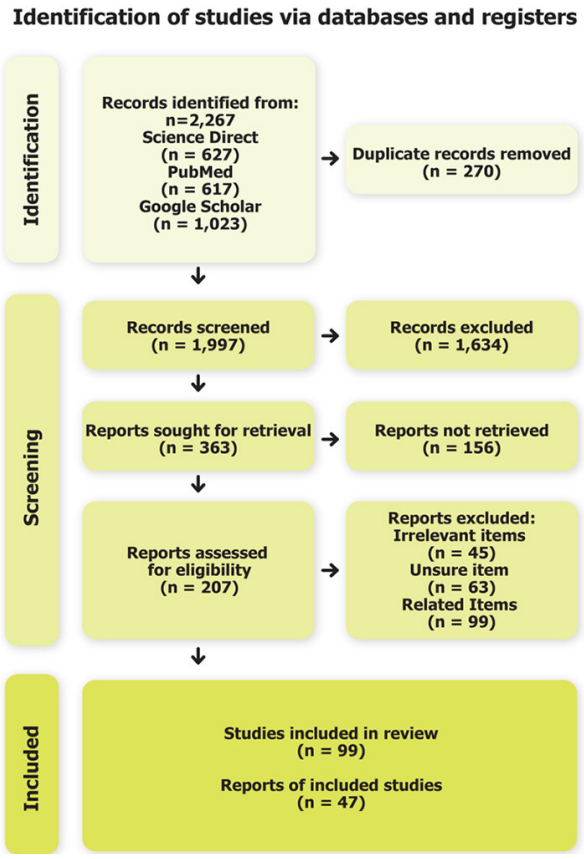

Fig. 1. Extracting and analyzing the data

3.6 Data extraction

An electronic form for the retrieved work was created for verification [13]. All the relevant articles were compiled. They were read to remove those that were irrelevant [14]. A spreadsheet was filled with the extracted data by including the title of each study and summarizing the results. The data extracted from the article included the research paper title, the author(s), the year of publication, keywords, the study design, the sample used, and the results (as shown in Table 3).

Table 3. The results of the main search queries from the databases

Reference Sources	Country	Educational Design	Sample Group	Result
Mojtahedzadeh et al. [1]	Iran	Systematic review	Narrative papers in health profession studies	A review of the use of storytelling in health profession education found 35 articles demonstrating a stake in health by digital story makers, with goals such as health promotion, nursing education, medical education, patient education, social work education and community health education to promote empathy, attitude and behavior, change, clinical thinking, and skill development.
Rios Rincon et al. [2]	Canada	Systematic literature review	Includes documents that report the use of digital storytelling for people over 50	Used to support the memory, identity, and self-confidence of the elderly. Possible benefits for people with dementia include an increased confidence connection with communication and the well-being of others. Using digital storytelling for people over 50, it was found that most of the digital stories created were related to past events. Most of them were personal experiences.
Stargatt et al. (a) [3]	Australia	Systematic review	Digital storytelling papers to improve health outcomes for seniors	The primary goal of the systematic review was to examine the health-related outcomes reported by older adults participating in digital storytelling. It was found that digital storytelling may be used with older adults as a tool to improve mood, enhance memory, enhance social connections, promote personal care among those in need, and promote learning between generations.
Devan et al. [4]	New Zealand	Behavioral analysis	Video on chronic pain published on YouTube and 6 global pain management websites	An analysis of 78 videos on chronic pain published on YouTube found that personal stories were used as a medium to share life experiences with regard to four main themes: 1) my pain path 2) healthcare navigation 3) pain and its effect on me 4) what works for me. Digital storytelling allows readers to connect with storytellers. Increases motivation and work productivity.
Hutson and Hankins [5]	United States	Qualitative descriptive design	Patients	Digital storytelling has relational benefits for patients and families. It has the potential to strengthen relationships. It is an accessible approach that simplifies the process.
Sheafer [6]	United States	Preliminary investigation	Students	It is an engaging learning experience essential to disseminating knowledge. There are two theories that support the creation of digital storytelling. There is an emphasis on the role of knowledge creation and storytelling paradigms. It supports the use of digital storytelling in education. The results showed that creating digital stories had a significant impact on digital storytelling programs in science courses taught at universities in Hong Kong.

Kim and Jia [7]	Turkey	Qualitative multiple-case methods	Middle school students	It is a teaching tool that allows learners to participate in learning and expressing their opinions. It can increase awareness of mental disorders and can provide knowledge about specific content.
Friedman et al. [8]	Canada	Mixed methods research	Women, transgender people, healthcare providers and policy makers	Aimed at telling stories about the stigma of obesity to reduce the difference Based on interviews with 17 participants, digital storytelling can be used to think more broadly about content. Demonstrates a profound way of thinking. It's the most important way to know the facts.
M. Park et al. [18]	South Korea	Pretest-posttest control group design	Staff nurses	Patient narratives were used to provide participants with experiences and problems they might face during the journey. It allows patients to develop an understanding of certain experiences and to promote problem-solving abilities using digital patient narratives on the part of nurses.
Beierwaltes et al. [19]	United States	Quasi-experimental design	Nurse	It helps nurses gain insights that can initiate a practical change with families experiencing illness. It is aimed at understanding the relationship of the profession with their patients. It is an innovation that integrates research results into practice.
Zarei et al. [20]	Iran	Non-equivalent control group design	Medical students	The critical thinking measurement for pre- and post-test in fifth-year medical students found that digital storytelling improved critical thinking, deep learning, communication skills, and teamwork. Digital storytelling encourages critical thinking to foster critical thinking.
Zare et al. [21]	Iran	A quasi-experimental study	Nursing students	It is effective in increasing the satisfaction of nursing students, keeping them motivated to learn through the use of more active activity. Makes it easier to understand and to remember information.
Delenardo et al. [22]	Canada	A quasi-experimental study	Nursing students	It is an effective way to visualize the illness from the patient's perspective. It is beneficial to the learning of nursing students. It is an effective way to visualize disease from the patient's perspective, and to engage students in self-study online.
Rieger et al. [23]	Canada	Systematic reviews	Includes study papers on the use of digital storytelling in health research from 1990–2018	A synthesis of evidence on the uses, effects, and ethical considerations of using digital storytelling in health research. It reveals that digital storytelling can evoke subtle meanings that may otherwise be inaccessible. Health researchers from diverse areas of expertise, such as mental health, cancer, and public health, are increasingly using digital storytelling for the improvement of healthcare education.

(Continued)

Table 3. The results of the main search queries from the databases *(Continued)*

Reference Sources	Country	Educational Design	Sample Group	Result
Laing et al. (a) [24]	Canada	Qualitative research	Patients	The process of creating digital stories helps relieve some stress. The impact helps patients who are unable to communicate with those close to them to let go. Acts as a medium to bridge gaps alongside advice and is a powerful medium.
Stargatt et al. (b) [25]	Australia	Systematic reviews	Includes study materials in which all participants were elderly people	To examine how to create digital stories for the elderly, a total of eight studies considered in the review found evidence of acceptance and the likelihood that older adults had better moods even without the comparison group. Reviewed evidence showed that, despite a variety of approaches, digital storytelling shows promise for effective approaches to promoting well-being in older adults. It allows them to understand the personal story more deeply.
Urstad et al. [26]	Norway	Qualitative study	Students	Student-generated digital narratives are a stimulus for engagement, deepening their understanding. Useful for reflection processes in the case of clinical placement studies in nursing education. Sharing multimedia technology messages with peers makes students feel more open.
Akinosun et al. [27]	Islands	Scoping review	A document that uses digital storytelling to try to modify health behaviors among populations with cardiovascular risk factors	It is used to modify harmful health behaviors in populations with cardiovascular risk factors. A total of 12 articles found that digital storytelling has the potential to alter behavioral defensive factors. It can be used as a method for clinical interventions and additional testing in clinical trials based on various risk factors.
Beck and Neil [28]	United States	Qualitative study	Nursing educators and nursing teachers	Helps teachers by pointing out issues that encourage reflection, making students more involved in promoting empathy and IT use. Digital stories help develop critical thinking in undergraduate nursing students.
Flórez-Aristizábal et al. [29]	Colombia	Case study	Deaf children	It has been proven to be a resource for working in various fields of knowledge. Technology can be used to improve storytelling strategies to teach children to engage with written language. Makes the literacy learning process more meaningful.

Moghimian et al. [30]	Iran	Quasi-experimental study	Patients	It is an effective way to reduce anxiety in patients undergoing open heart surgery. Proper design plays an important role in reducing the stress of many pre-operative patients. It has a good propensity for use in cardiac surgery departments.
Ofoegbu et al. [31]	Nigeria	Randomized controlled trial design	Cancer child	Oral or digital storytelling can reduce stress. It helps children with cancer to express their feelings and improve their emotional state. It is useful for optimizing the self-management of chronic disease and empowering traumatized patients to develop adaptive responses.
Lipsey et al. [32]	United States	Scoping review	First-person narrative papers on health education interventions	From 5 medical databases, 22 of 10,363 articles that met the eligibility criteria were selected. Topics found on cancer, diabetes, and high blood pressure. Research has shown that first-person storytelling can improve patient attitudes and health outcomes.
Petty et al. [33]	United Kingdom	Mixed methods	Neonatal nurses	Digital stories are an important part of a sensitive approach to care when it comes to connecting with patients by providing opportunities for experiential learning. It can liven up the patient's voice. It greatly stimulates the viewer's emotional perception. It is a strategy that can support a holistic approach to patient-centered care.
Alber et al. [34]	United States	Quasi-experimental study	Patients and family members	Storytelling is a positive, comforting, and emotional experience. It increases awareness of saving lives such as in terms of prevention, diagnosis, and access to appropriate medical management. It has the potential to increase awareness and promote empathy and understanding towards others with mental health problems.
De Vecchi et al. [35]	Australia	Case study approach	Consumers	It's an artistic research method. It is helpful in mental health to create mutual understanding. It is a space where energy differences are expressed between the safe expression of consumers and clinicians in conversation. The understanding of different life experiences can develop practical reflections.
W. Kim et al. [36]	United States	Case study approach	Caregivers	It is to understand patients' experiences with illness and cancer treatment. It involves participants creating and sharing short stories about life events and health issues in an environmental context.

(Continued)

Table 3. The results of the main search queries from the databases *(Continued)*

Reference Sources	Country	Educational Design	Sample Group	Result
Davis et al. [37]	United States	Qualitative thematic analysis	Living donors, kidney recipients, storytellers	The advice shared by donors and transplant recipients. It's a source of peer support that promotes independence. It is especially useful in conveying health information. Getting people to learn more can act as peer mentoring and sharing best practices.
Hammond et al. [38]	United Kingdom	Thematic analysis	Teenagers	It is one way to help schools and health agencies to cooperate more. It can help both formal and informal educators become more aware of, and respond to, the needs of each learner.
Paterno et al. [39]	United States	Pilot study	Five women who are recuperating who acts as mentors	It is a treatment for women during rehabilitation to promote joint health. It can also be used as a treatment that shows the effective use of technology to empower those who have not recovered. Peer-like mentoring is a mechanism of social support and camaraderie between workshop participants.
Limaye et al. [40]	Peru	Mixed-method study design	Women who have experienced pregnancy before the age of about 18–55 years	The storytelling workshop process helps mentors make connections between past substance abuse experiences and current recovery work and promotes deep social relationships. It is a treatment for women during the rehabilitation period. It is a way to promote collaborative health by using technology to effectively empower those who have not recovered, and to foster a sense of hope.
McDonough and Colucci [41]	Australia	Workshop	10 refugees who have experienced mental health or emotional problems	It is an effective participant visualization method to facilitate conversations about mental health. Has a unique ability to convey 'personality' and 'feeling structure'.
Wieland et al. [42]	United States	Feasibility study	25 immigrants and refugees with type 2 diabetes	Causing a health behavior change for type 2 diabetes (T2DM) patients among immigrant populations in primary care settings, resulting in a better social structure.
Kalkhoran et al. [43]	United States	Mixed methods	30 community health workers	It's a creative health messaging tool that is able to integrate web technology and social media. Promoting cancer awareness, it is a powerful tool that can be shared with more people for promoting health.
King et al. [44]	United Kingdom	Pilot trial	70 pregnant women who smoke	It is a common way to communicate more complex health information in an easy-to-understand format. It can capture the imagination of the audience and to help women quit smoking.

Ezegbe et al. [45]	Nigeria	Randomized trial	80 Nigerian students from the public and private sectors	Rational, emotionally-based digital storytelling can greatly improve knowledge. It can increase awareness of HIV risks among schoolchildren. The media can be used as a medium to support education. Increasing knowledge of HIV/AIDS risk perception among students.
Timpani et al. [46]	Australia	Integrative review	A narrative document that guides art-based learning during clinical placement.	An article published between 2010 and 2020 found a wide variety of papers in the clinical setting and identified four key issues relevant to nursing students in clinical placement: 1) art-based learning in nursing education; 2) student-patient communication, 3) registered nurse communication between students, and 4) student-educator communication.
Flicker et al. [47]	Canada	Workshop	18 patients	The process of sharing digital stories has a positive impact on youth and communities to inspire dialogue. Action and storytelling are used to build skills such as literacy and self-awareness. It's one way to create a new kind of conversation.
Tatli et al. [48]	Turkey	Mixed research design	30 first year nursing students	It is an alternative to traditional teaching methods. It does this by supporting learning, and dealing with changing learning styles. It helps create an environment in which students can share personal experiences. It makes the information gathering more fun and interesting. Digital storytelling is recommended for teaching in various subject areas.
E. Park et al. [49]	Canada	Scoping review	Papers on using patient digital storytelling to translate knowledge	Most of them are multimedia stories that are presented as videos for private or public viewing. They are used as a learning medium for healthcare professionals, patients, and families. In conclusion, digital storytelling can lead to shared decisions in healthcare, and increase awareness of experiences related to patients with health.
Laing et al. (b) [50]	Canada	Hermeneutic study	Papers	It is impressive in providing context, encouraging deep reflection, and potentially providing protective effects in terms of oncology burnout. There are four benefits: 1) education and quality improvement, 2) support and public health, 3) research, and 4) as a therapeutic intervention.

(Continued)

Table 3. The results of the main search queries from the databases *(Continued)*

Reference Sources	Country	Educational Design	Sample Group	Result
Tsui and Starecheski [51]	United States	Narrative review	Documentation on the use of digital storytelling in oral history	It is used for research and public health interventions for the following purposes: 1) to examine risks and health experiences; 2) to engage and educate the population; 3) to educate clinical experts and organizations and 4) to inform with regard to public health information and practices. These methods have great potential.
Collett et al. [52]	United States	Narrative research	20 high school students and five undergraduate students	It is a useful tool for understanding medical information. It can be used as a subjective tool in research. It is a technique often used to achieve qualitative results through the experience of the participants. Helping youth to better understand cancer in the community can explain the key health behaviors and social determinants of health that drive cancer inequality.
Botfield et al. [53]	Australia	Scoping review	Digital storytelling papers dealing with young people's sexual health	There are 28 documents that met the criteria. The results showed that using digital storytelling promotes sexual health and the welfare of young people from diverse cultural backgrounds. Self-expression is used in a variety of ways, both in practice and in research involving young people. It has been applied more effectively to community development practices.
Linz et al. [54]	United States	Quasi-experimental, mixed-methods, pilot study	Nursing students 18 years or older and participants with mental illnesses	It helps to work internally to create meaning from the experience. The results showed that nursing students benefited from participating in the activities.
Williams et al. [55]	Australia	Randomized controlled trial	477 participants at risk of diabetes	Story and text from video text accompanying the online diabetes risk assessment tool for people at high risk. They have a positive influence, causing a change in behavior.
Lang et al. [56]	Canada	Research projects	Only one participant	Able to tell stories across continents and cultures instantly. It's a way of telling stories from experiences. It provides both therapeutic benefits for the research participants and a deeper understanding of the research topic.

3.7 Arriving at a conclusion

From the synthesis of the document, it was found that there has been a great deal of comment about the genius narrative of spreading health information. The researchers outlined the components of intelligent digital storytelling in health information dissemination (as shown in Table 4).

Table 4. Synthesis of the components of intelligent digital storytelling

List	Reference Sources
Story information	
Objective	[1], [13], [52], [55]
Story screening	[3], [5], [13], [15], [17], [19], [20], [21], [22], [24], [25], [26], [27], [28], [30], [32], [34], [35], [37], [38], [51], [53]
Content analysis	[17], [22], [24], [33], [34], [37], [43], [52], [53]
Health information story	[1], [2], [3], [26], [27], [28], [30], [32], [33], [34], [35], [39], [40], [42], [43], [44], [46], [47], [48], [50], [53], [54], [55], [57]
New perspective	[24], [26], [31], [32], [35], [48], [55]
Characteristics of the speaker/listener	
How to tell a story	[1], [5], [18], [24], [27], [34], [37], [41], [44], [46], [51], [52], [53], [55]
Narrator/ listener/actor	[1], [5], [13], [19], [20], [22], [24], [25], [27], [28], [32], [37], [39], [41], [44], [46], [49], [50]
Narration	[2], [3], [13], [17], [22], [29], [37], [39], [50], [52], [53], [55]
Creative text	[1], [2], [3], [13], [26], [28], [31], [34], [37], [39], [40], [42], [43], [45], [47], [54]
Copyright and ethics	[24], [26], [33], [35], [37], [41], [53], [54]
Techniques/methods	
Amazing question	[13], [24], [37]
Scripts	[15], [20], [24], [27], [28], [34], [37], [39], [41], [46], [55], [52]
Voice	[1], [2], [3], [4], [5], [13], [15], [20], [21], [22], [25], [26], [28], [29], [31], [33], [34], [35], [37], [38], [40], [41], [43], [44], [45], [46], [47], [48], [49], [51], [53], [54], [55]
Short video	[1], [2], [4], [13], [15], [20], [21], [22], [24], [25], [26], [30], [32], [33], [34], [35], [37], [39], [40], [42], [43], [45], [47], [48], [49], [52], [53], [54], [55]
Images	[2], [3], [4], [15], [17], [20], [21], [22], [25], [26], [27], [28], [29], [31], [33], [34], [36], [37], [39], [41], [43], [44], [45], [46], [48], [51], [52], [53], [54], [55]
Intelligent technology	
Story sharing	[2], [3], [5], [19], [21], [22], [24], [30], [32], [33], [34], [35], [36], [37], [40], [41], [43], [45], [46], [47], [49], [52], [53], [55], [57], [58]
Audience link	[3], [19], [21], [22], [25], [32], [33], [34], [35], [36], [37], [40], [41], [47], [49], [52], [53]
Animation	[4], [22], [28], [39], [47]
Multimedia technology	[1], [2], [3], [13], [15], [21], [22], [24], [28], [33], [37], [39], [41], [45], [47], [49], [55], [57], [58]

From Table 4, the researchers synthesized documents and intelligently group elements of digital storytelling. It was found that intelligent digital storytelling consisted of 4 main components and 16 sub-components. These were as follows: 1) Story information consisting of 1.1 "Objectives". The aim is to define the objectives of the health stories to be published, and to select stories involving personal experience by creating a storyline, including determining the place in which the story is presented. 1.2 "Story screening". Teams should be created to screen the appropriate stories. 1.3 "Content analysis". Health data must be informative. Such data must be reviewed by relevant experts. 1.4 "Health Information Stories" and 1.5 "New Perspectives", Intelligent Narratives Affecting Health Information Dissemination. It is necessary to choose the correct health information and have a new perspective on the presentation of this new, correct information 2) Characteristics of the speaker/listener include: 2.1 "How to tell a story". Presentation techniques and appropriate narrative methods will attract audience attention. 2.2 "Narrator/listener/actor". There is a need to select the right person in terms of the possession of emotional communication skills. Actors should be trained to tell stories. They must be professional in order to communicate effectively with the audience. 2.3 "Narration". This refers to events that highlight scenes, places, times, events, and environments, by emphasizing the true voice of the participants. 2.4 "Creative text". The use of text is an emotional communication skill. It should include a thought-provoking message. 2.5 "Copyright and ethics". There should be an ethical review of each story presented to ensure that the sharing of health information is a protected matter. It is essential to prevent piracy and obtain consent, including permission to use all forms media for wider distribution. 3) Techniques/methods: 3.1 "Amazing questions". This opens interesting issues by creating questions. It should explore new, interesting, and unique presentations and stories. 3.2 "Scripts include narrative text". This needs dialogue, themes, and concisely written subheadings. 3.3 "Voice in storytelling". There are many types of sound used to accompany stories such as audio clips, sound, and music. 3.4 "Short video". The average suitable length is 2 to 5 minutes. 3.5 "Images". These are at the heart of digital storytelling. Consequently, they should have be well designed. 4) Intelligent technology, including a selection of software and video editing techniques produced by professionals that can combine photos, audio of the participants and music to connect communication, consists of 4.1 "Technology to share stories". In this way viewers can pass on their digital stories to others through different social media platforms to share information dealing with health. 4.2 "Technology to connect audiences". This involves an exchange of health information. It creates a safe and facilitated area to allow interaction. 4.3 "Animation". This is the creation of lines and shapes to create movement to add interest to the video clip storytelling. 4.4 "Multimedia technology". Multimedia involves technology that uses computer graphics to combine multiple types of media with an emphasis on interaction and interaction with the user.

The intelligent digital storytelling process: In health information dissemination, there is an intelligent digital storytelling process that differs from conventional storytelling. In particular, telling stories about personal health experiences and information is sensitive and unique. The presentation and review of information is therefore important. From the systematic review of the literature, the researchers have drawn conclusions from the relevant documents (as shown in Table 5).

Table 5. Synthesis of intelligent digital storytelling processes in health information dissemination

List	Reference Sources
Defining the overall purpose of the story	[1], [13], [52], [55]
Audience characterization	[2], [3], [14], [19], [21], [22], [34], [35]
Selection of interesting health stories	[2], [3], [13], [14], [17], [18], [24], [26], [27], [28], [30], [31], [32], [33], [34], [35], [37], [39], [40], [42], [43], [44], [46], [47], [48], [50], [53], [54], [55]
Creating open-ended questions	[13], [24], [37], [40]
Building a team to analyze content	[5], [13], [15], [17], [19], [20], [21], [22], [24], [25], [26], [27], [28], [30], [32], [33], [34], [35], [37], [39], [43], [51], [52], [53]
Writing scripts and creating storyboards	[1], [5], [15], [19], [20], [24], [27], [28], [32], [34], [37], [39], [41], [44], [46], [51], [52], [53], [55]
Selection of speakers/ actors	[2], [3], [13], [17], [19], [20], [22], [27], [29], [37], [39], [44], [46], [50], [52], [53], [55]
Execution of video production	[1], [2], [3], [4], [5], [13], [15], [17], [20], [21], [22], [24], [25], [26], [27], [28], [29], [30], [31], [32], [33], [35], [36], [37], [39], [40], [41], [42], [43], [44], [45], [46], [47], [49], [51], [52], [53], [54], [55]
Validity assessment by experts	[28], [33], [34], [46], [52]
Reviewing copyright and ethics	[24], [26], [33], [35], [37], [41], [53], [54]
Sharing stories for social connections	[2], [3], [5], [19], [21], [22], [24], [25], [30], [32], [33], [34], [35], [36], [37], [39], [40], [41], [43], [45], [46], [47], [49], [50], [53], [55]
Disseminating health information	[2], [3], [5], [19], [21], [22], [24], [25], [30], [32], [33], [34], [35], [36], [37], [39], [40], [41], [43], [45], [46], [47], [49], [50], [53], [55]

From Table 5 it can be concluded that the intelligent digital storytelling process in health information dissemination consists of 12 main steps: 1) "Defining the overall purpose of the story" to determine the structure the digital storytelling. 2) "Audience characterization" is the acquisition. For example, it can be an exchange of stories between patients and doctors, or an exchange between the patient and family. 3) "Selection of interesting health stories". It is necessary to select and create meaningful experiences. It should be the perspective of the story. This is done by writing down the situation, including medical history information, symptoms, and other related information. 4) "Creating open-ended questions" to motivate others to learn more about a disease, or who are experiencing similar problems. 5) "Building a team to analyze content". The story presented should use good grammar and language. There is a need to clearly define key concepts and sub-topics to promote a deeper understanding. 6) "Writing scripts and creating storyboards". This should consist of short and concise stories. 7) "Selection of speakers/actors" from real-life patients and using true stories. However, it can also involve role playing or actors who are not real patients. The clarity of the tone and rhythm of the lectures should be practiced. 8) "Execution of video production". The quality of images, videos, and other multimedia elements contributes to engaging storytelling, beautiful visuals, and the use of meaningful audio

soundtracks. Sound clarity is a key element. 9) "Validity assessment by experts". Content is assessed by medical and technical experts and is, in turn, assessed by media production specialists. 10) "Reviewing copyright and ethics". Where stories may have personal sensitivities through digital media, written permission from the participants is essential. 11) "Sharing stories using social connections" incorporating IT skills to display such stories on digital devices 12) "Disseminating health information". This is the delivery of digital stories to planned audiences through the use of smart tools such as social media platforms.

3.8 Document synthesis

In this study, the researchers present the results in a qualitative format. The results were qualitative in nature as a result of analyzing and summarizing critical data.

Table 6. Synthesis of published journal articles on intelligent digital storytelling in terms of health information dissemination

Name of the Published Journal	Reference Sources	Frequency (N = 47)
Nurse Education in Practice	[14], [19], [31], [44]	4
Patient Education and Counseling	[30], [32], [42]	3
Journal of Rational – Emotive and Cognitive – Behavior Therapy	[29], [43]	2
International Journal of Qualitative Methods	[33], [55]	2
Health Promotion Practice	[37], [45]	2
PLoS ONE	[38], [54]	2
Journal of Curriculum Studies Research	[13]	1
Canadian Journal of Pain	[4]	1
Journal of Hospice and Palliative Nursing	[5]	1
A Journal of Critical Studies in Culture and Politics	[15]	1
Journal of Family Nursing	[17]	1
Annals of Medicine and Surgery	[18]	1
Nurse Educator	[20]	1
Systematic Reviews	[21]	1
Oncology Nursing Forum	[22]	1
Journal of Medical Internet Research	[23]	1
Nurse Education Today	[24]	1
Journal of Applied Gerontology	[2]	1
International Journal of Health, Wellness, and Society	[25]	1
Computers Informatics Nursing	[26]	1
Telematics and Informatics	[27]	1
Journal of Cardiovascular Nursing	[28]	1
Biology of Blood and Marrow Transplantation	[34]	1

(Continued)

Table 6. Synthesis of published journal articles on intelligent digital storytelling in terms of health information dissemination *(Continued)*

Name of the Published Journal	Reference Sources	Frequency (N = 47)
Journal of Advances in Medical Education and Professionalism	[1]	1
JMIR Research Protocols	[3]	1
Kidney Medicine	[35]	1
Cambridge Journal of Education	[36]	1
Visual Communication	[39]	1
Diabetes Educator	[40]	1
HHS Public Access	[41]	1
Eurasia Journal of Mathematics, Science and Technology Education	[46]	1
Research Involvement and Engagement	[47]	1
Journal of Applied Hermeneutics	[48]	1
Public Health	[49]	1
Journal of Cancer Education	[50]	1
Health Education Journal	[51]	1
Psychology Learning and Teaching	[52]	1
Archives of Psychiatric Nursing	[53]	1

Table 6 offers a summary of journal articles published with regard to intelligent digital storytelling in health information dissemination. From the data extraction and analysis using the PRISMA method as shown in Figure 1 above, there were 47 articles published relating to the intelligent digital narrative in health information dissemination. The results of the summary of these journal articles revealed that out of the 47 articles, the highest number of articles published was in the journal, Nurse Education in Practice. There were 4 such articles, followed by the Journal of Patient Education and Counseling with 3 articles published. This was followed by the Journal of Rational-Emotive and Cognitive Behavior Therapy, the International Journal of Qualitative Methods, Health Promotion Practice, and PLoS ONE. Each had 2 articles published, and the other journals listed in Table 6 each had only 1 article published.

Table 7. Analysis of the length of the video clip used

Reference Sources	Video Clip Length (Minutes)
[33], [49]	2–5
[20]	5–9
[22], [32], [34]	2–3
[28]	2–10
[29]	10–15
[35]	2–15
[37]	1–3

(Continued)

Table 7. Analysis of the length of the video clip used *(Continued)*

Reference Sources	Video Clip Length (Minutes)
[2], [3], [21], [23], [38], [53]	3–5
[39], [55]	3–4
[40]	12
[54]	1–2
[4]	4.93
[1]	3–8
[48]	3
[52]	10–15
[5], [6], [7], [8], [18], [19], [24], [25], [26], [27], [30], [31], [36], [41], [42], [43], [44], [45], [46], [47], [50], [51], [56]	Not mentioned

From Table 7, a total of 47 relevant articles were analyzed with regard to video clip length. Twenty-three articles did not mention video length while the remaining 24 articles addressed the importance of video clip length. From synthetic analysis it was found that each article had different keywords based on different video clip lengths. Therefore, the frequency of video clip length must be analyzed. Details are as follows: a 3-minute video clip was included in 18 articles. A 4-minute video clip was included in 13 articles. A 5-minute video clip was included in 13 articles. A 2-minute video clip was included in 9 articles. The remainder are as shown in Table 7. Based on this analysis, it was concluded that the optimal length of a video clip in the form of a smart digital story when distributing appropriate health information was 2–5 minutes, but the average time was 3 minutes.

3.9 Discussion of the results

The purpose of this study was to analyze the components and processes of intelligent digital storytelling in order to develop an intelligent digital storytelling platform for health information dissemination. In a systematic review of the intelligent digital storytelling process in terms of disseminating health information, the first step was to review the literature used to synthesize the document. A review of the literature found that there were nine steps involved in data extraction in terms of analyzing data and synthesizing information of the requisite quality (see Table 1). The research paper uses these 9 steps to analyze data on the intelligent digital storytelling process when it comes to disseminating health information. The study of articles published between 2017 and 2022 was based on a search for relevant articles in the Science Direct, Pub-Med, and Google Scholar databases. Overall, 2,267 related articles were found in total. PRISMA was used in order to select full research articles related to intelligent digital storytelling aimed at disseminating health information. From the PRISMA data extraction process, only 47 articles were left for final analysis. A summary of these 47 articles found that in 2017–2022, Nurse Education in Practice published a small number of articles on the narrative approach. Digital intelligence in health information dissemination made up the majority, with four articles published in this journal. This was followed by the

Patient Education and Counseling journal with 3 articles published (see Table 6). The further summary can be summarized as follows: 1) An analysis of the components of intelligent digital storytelling. In a nutshell, there are four main components and 16 sub-elements relating to intelligent digital storytelling. The data is shown in Table 4. There are 12 steps in the analysis of the intelligent digital storytelling process in health information dissemination. Data is as shown in Table 5. The research also analyzed the length of the video clips used, as this aspect helps in remembering the story easily, and affects the assimilation of health data. This is as shown in Table 7. In addition, smart digital storytelling is applied in education to foster critical thinking attitudes. One study showed that it is a powerful tool for historians to develop their own understanding and to enhance their ability to communicate. In marketing, intelligent digital storytelling is used to inform and to persuade, and to engage in buyer-seller interactions. And for this important discovery was found. The optimal video clip length of a smart digital narrative in terms of health information dissemination is 2–5 minutes in length. This is the optimal length of time for effective health information memory retention Additionally, in educational research, it has been found that using digital storytelling to encourage student participation is an effective teaching model in terms of digital literacy enhancement [59].

4 Conclusion

From the review of the intelligent digital storytelling process in health information dissemination, it was revealed that there are four key components: story information, speaker or listener characteristics, presentation techniques. and intelligent technology, in which each parent element has a sub-element associated with it. By knowing the processes and the important elements, it can be used to develop a platform to disseminate health information to interested parties in such a way as to ensure improved quality. In addition, from the data synthesized by the researchers from the relevant papers, conventional intelligent digital storytelling processes are different from those found in the health context. This is because health information is important in that it can have a profound effect on the individual's lifestyle. It can involve sensitive information that, if disseminated, can have a wide impact. Consequently, those involved must be careful when presenting such information. The researchers involved in presenting this paper sincerely hope that, as a result of the synthesis of the intelligent digital storytelling process in disseminating health information, the outcome will greatly benefit medical personnel.

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7 Authors

Kawitsara Eambunnapong is a Ph.D. candidate, Division of Information and Communication Technology for Education, Faculty of Technical Education, King Mongkut's University of Technology North Bangkok (KMUTNB). She researches interests include production of medical instructional materials, medical drawing, patient imaging and technology for education. (e-mail: kawitsara.kra@mahidol.edu)

Prachyanun Nilsook currently a professor at Division of Information and Communication Technology for Education, Faculty of Technical Education, King Mongkut's University of Technology North Bangkok (KMUTNB), Thailand. His research interests include e-Learning, e-Training, e-Education, e-Agriculture, Knowledge Management in Higher Education Human Performance Technology, Instructional Design ICT in Education, and Imagineering in Education. (e-mail: prachyanun.n@fte.kmutnb.ac.th)

Panita Wannapiroon is an associate professor in the Division of Information and Communication Technology for Education (DICT), Faculty of Technical Education, and Director of Innovation and Technology Management Research Center (ITMRC), Science and Technology Research Institute (STRI), King Mongkut's University of Technology North Bangkok, Bangkok, Thailand. (e-mail: panita.w@fte.kmutnb.ac.th)

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