

Identifying Core Elements of Digital Storytelling for Museum Exhibitions: A Qualitative Study on Educational and Curatorial Applications

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Abstract

Digital storytelling (DST) has gained prominence as an educational tool that fosters self-reflection and engagement with personal and cultural narratives. While its application is expanding globally in cultural and heritage research, most studies, particularly in Malaysia, have concentrated on its educational use, with limited attention to museum contexts. The purpose of this study was to identify the fundamental elements of digital storytelling (DST) that are most applicable to cultural and heritage contexts, with particular emphasis on museum exhibitions. Adopting qualitative research design, the study employed content analysis to derive a set of core DST components, drawing insights from experts and international scholars. The analysis identified ten key elements that form a foundational framework for developing digital stories in museums. The findings underscore the value of refining DST practices based on expert feedback, offering practical guidance for curators and informing future research. Although the study focuses primarily on non-interactive elements, it provides a starting point for broader investigations into DST applications across various domains.

1. Introduction

Digital storytelling (DST) holds significant educational promise, fostering self-reflection and immersing individuals in personal and cultural narratives. As DST continues to gain global traction within cultural and heritage studies, its potential within museum exhibitions remains underexplored. Leveraging DST to enhance educational impact in museums requires a deeper understanding of effective integration strategies that promote visitor engagement and sustained learning. Stories, as a timeless form of communication, connect individuals across generations and cultures, offering profound insights into human experiences (Grisham & James, 2006). Although storytelling has the capacity to evoke emotion, foster empathy, and promote active participation, it remains underutilized in numerous institutional contexts, where it is frequently overlooked as a critical mode of communication (Bedford, 2001). While storytelling constitutes a fundamental dimension of human experience, unstructured narratives are susceptible to being diminished or forgotten over time. Museums, traditionally

regarded as custodians of historical artifacts, are increasingly acknowledging the value of storytelling in enhancing the interpretive depth of exhibitions. However, researchers and practitioners continue to struggle with developing a comprehensive understanding of how to integrate DST effectively into these environments. As technological advancements continue to reshape visitor expectations and interaction with cultural content, museums face increasing pressure to adapt. Giannini and Bowen (2022) emphasize the necessity of presenting collections through both physical and digital means, reflecting the influence of digital and social media in modern society.

Digital storytelling (DST), which integrates traditional narrative techniques with multimedia elements, provides a means of addressing recent shifts and enhancing museum experiences (Porter, 2004; Robin, 2008). While DST has been implemented in fields such as education and cultural tourism (Kittachai, 2017), its strategic use in museum exhibitions, especially within the Malaysian context, remains underexplored. Although previous studies have introduced various DST guidelines, these are based on diverse foundational elements that are not consistently synthesised or contextualised for museum settings. A comprehensive understanding of the core DST elements that recur throughout the international literature and are most pertinent to the design of cultural and educational narratives in museums is still lacking. Therefore, this study does not seek to develop a complete set of museum guidelines, but rather to identify and consolidate the principal DST elements that could inform such guidelines in the future. The primary objective of this research is to synthesize the DST elements most frequently emphasized by international scholars and experts, and to determine which are most appropriate for application in museum exhibitions. This objective is addressed through the following research question: RQ1: Which elements of digital storytelling (DST), as established in the international literature, are most frequently used and are suitable for museum exhibitions?

2. Literature Review

The transformation of digital storytelling (DST) from a traditional to a digital form was initiated by Dana Atchley, a media artist and stage performer. Atchley experimented with combining oral storytelling and digital media in the late 1980s. In one of his early performances, he sat on stage projecting homemade videos and family photographs while narrating his personal experiences (Bull & Kajder, 2004; Chung, 2007; McLellan, 2007; Wales, 2012). Joe Lambert, a theatre producer, was inspired by Atchley's work and subsequently developed DST as an emerging art form. DST thus evolved as a fusion of theatre, digital art, storytelling and design, with the intention of encouraging ordinary people to share their own stories through contemporary media (McLellan, 2006; Wales, 2012). In general, DST refers to the practice of combining a concise narrative with digital media such as still images, video, audio, music and text to create a short, compelling story. It emphasizes personal voice, authenticity and meaning making, rather than technical sophistication (Lambert, 2006; Robin, 2008; Ohler, 2008). The affordances of DST include multimodality, emotional engagement and accessibility for non-experts, which have led to its application in diverse settings such as education, cultural tourism, community projects, journalism and interactive entertainment. Across these contexts, DST is used not only as a tool for communication, but also as a medium for reflection, identity construction and participatory knowledge sharing.

The Centre for Digital Storytelling (CDS), established in the early 1990s, has served as a central reference for both practitioners and researchers. Observations of Lambert's Digital Storytelling (DST) workshops led to the proposal of seven foundational elements: point of view, dramatic question, emotional content, the gift of voice, the power of the soundtrack, economy, and pacing (Lambert, 2006). Robin (2008) subsequently expanded these elements to ten, highlighting the CDS model's frequent use as a foundational guide for DST practices. As DST's potential has been increasingly recognised across various domains, additional elements and a broader body of research have emerged. This study synthesises and re-contextualises these developments for application in museum exhibition design. DST originated with Dana Atchley and was further popularised by Joe Lambert through the DST movement. Initially conceived as linear, personal, computer-mediated storytelling, DST has evolved to attract a diverse group of scholars and practitioners. These individuals are referred to as "experts" due to their significant contributions to the conceptualisation and refinement of DST as a medium for information dissemination. Although each expert offers a distinct perspective on DST, many remain grounded in the foundational principles established by Atchley and Lambert. For this research, the analysis is limited to ten DST experts: Kittachai (2017), Tenh (2013), Lambert (2006), Miller (2019), Ohler (2008), Paul and Fiebich (2005), Robin (2008), Salpeter (2005), Schäfer (2008), and Porter (2004), as summarised in Table 1. Each expert proposes a set of elements that inform the design and implementation of DST. The study compiles these elements, examines them for commonalities, and clusters those with similar definitions or functions. Elements lacking clear commonality are excluded from the core set for museum exhibition guidelines. This comparative synthesis underpins the identification of recommended DST elements and the development of a focused framework tailored to cultural heritage and museum contexts.

Table 1 List of experts and their elements of DST

Expert	Key Elements of Digital Storytelling
Kasemsarn (2017)	Storyteller's point of view, key question, purpose, emotional content, story structure, economy, rhythm, voice/soundtrack, media quality, background & characters
Kuan (2013)	Perspective, intention, personal, dramatic question, engagement, articulation, soundtrack, minimal/tempo, story map, expression, significant content
Lambert (2006)	Point of view, dramatic question, emotional content, gift of voice, soundtrack power, economy, pacing
Handler Miller (2019)	Premise & purpose, audience & market, platform/genre, narrative/gaming elements, role of characters, structure & interface, setting, user engagement, sound/look
Ohler (2008)	Point of view, emotional engagement, tone, spoken narrative, soundtrack, video/performance, creativity/originality, time & economy
Fiebich (2005)	Media, action, relationship, context, communication
Ross Robin (2008)	Purpose, point of view, dramatic question, content choice, clarity of voice, pacing, soundtrack, quality visuals, multimedia, economy, grammar & language
Salpeter (2005)	Personal, script-based, concise, accessible sources, universal elements, and collaboration
Schafer (2008)	Concreteness, user contribution, coherence, continuity, structure, stage, virtuality, spatiality, control, interactivity, collaboration, immersion
Porter (2004)	Living in story, unfolding lessons, creative tension, economy, showing not telling, craftsmanship

2.1 Establish Digital Storytelling Guidelines

A review of digital storytelling (DST) literature reveals that guidelines have been established across several domains, including cultural tourism, education, personal narrative, interactive entertainment, and journalism. Each domain prioritizes distinct combinations of DST elements based on its objectives, target audiences, and media platforms. The following subsections summarize these domain-specific guidelines, which collectively inform the derivation of DST elements suitable for museum exhibitions in the present study.

2.1.1 Cultural Tourism Digital Storytelling (DST) Elements

Kittachai (2017) identified a set of digital storytelling (DST) cultural tourism features that can be used to support sustainable tourism in Thailand. Miller (2019) adapted the DST elements from studies by Lambert (2010), Ohler (2013), Robin (2016), Schäfer (2008), and Tenh *et al.* (2012). Each of the eight guidelines is classified according to its purpose. These guidelines outline specific features intended to assist storytellers in developing DST for various reasons.

2.1.2 Educational Digital Storytelling (DST) Elements

Within the educational context, Tenh (2013) analyzed the overlapping elements proposed by various experts to minimize redundancy (Lambert *et al.*, 2018; Miller, 2019; Ohler, 2013; Robin, 2016; Schäfer, 2008). Through this synthesis, Tenh identified core elements of digital storytelling (DST) that encompass both interactive and non-interactive forms, presenting them as a conceptual model. The primary contribution of this work is the provision of DST elements that serve as guidance for educators and students in creating effective digital stories for learning, reflection, and assessment. Although the first-person perspective is often regarded as significant, Ohler places less emphasis on it than Lambert, indicating that educational DST can incorporate various narrative perspectives provided that learning objectives are achieved.

2.1.3 General digital storytelling (DST) elements

Several authors have outlined DST elements for general or personal storytelling, without restriction to a specific domain (Lambert, 2010; Porter, 2004; Salpeter, 2005). These guidelines typically focus on non-interactive, personal narratives. Salpeter's essay "Telling Stories with Technology" (2005) offers a step-by-step approach to designing DST, based on her experience with earlier projects. She proposes six design criteria that emphasise personal experience, clarity of message and thoughtful integration of media. Similarly, Lambert and Salpeter priorities narratives grounded in the storyteller's lived experiences rather than abstract or impersonal storylines. In *DigiTales: The Art of Telling Digital Stories*, Salpeter elaborates six elements that structure her approach to DST, while Porter, drawing inspiration from Lambert's rules, underscores the value of telling stories from the storyteller's perspective.

2.1.4 Interactive Entertainment Digital Storytelling (DST) Elements

In the field of interactive entertainment, Schäfer introduced the “dimension star model” in her PhD dissertation, *“Investigations on Digital Storytelling: The Development of a Reference Model.”* This model consists of twelve elements that focus on interactive digital storytelling (DST), including video games and interactive media installations. Miller (2012), in *Digital Storytelling: A Creator’s Guide to Interactive Entertainment*, presents a ten-element checklist for designing interactive DST. Her guidelines emphasize interactive media platforms such as video games, websites, television, and mobile devices, and explore how traditional storytelling tools can be adapted for these formats. Together, Schäfer and Miller illustrate how fundamental DST principles can be applied to interactive contexts, which is particularly relevant for museums that incorporate interactive exhibits and digital installations.

2.1.5 Journalism digital storytelling (DST) elements

DST has also been adopted within journalism and mass communication. Initiatives such as the Digital Storytelling projects at the School of Journalism and Mass Communication, University of Minnesota, and The Media Center have explored how journalistic content can be re-imagined through DST. This line of work identifies five key elements necessary for crafting journalistic digital stories, emphasising clarity, accuracy, narrative coherence and ethical use of digital media. A significant development is the recognition that news and feature stories are now frequently produced and consumed on digital platforms such as smartphones, tablets, interactive systems, laptops and computers. Consequently, DST in journalism must consider not only narrative and visual elements, but also platform affordances, user attention and modes of digital distribution.

3. Research Methodology

The research used a qualitative method and an inductive data analysis approach. It began with collecting real-life observations and then looked for patterns to develop predictions and define the process. The inductive approach involves starting with specific observations and moving towards broader generalizations and theories (Allen *et al.*, 2010). The first step is gathering relevant data. Once enough data is collected, the researcher looks for patterns and moves from specific instances to general insights or from data to theory. In the inductive approach, the initial step involves gathering pertinent data, which aligns with the qualitative case study method's emphasis on collecting information from various sources to thoroughly understand the context. Once sufficient data has been collected, the researcher objectively analyses the information, seeking patterns and overarching insights that align with the case study method's goal of deriving themes and generating theories from empirical observations. The study began with real-life observations within a specific context, aligning with the case study approach of examining real-life phenomena. Identifying patterns from the gathered data is consistent with the qualitative case study method, which aims to unveil themes and insights through thorough analysis. The transition from specific observations to general theories aligns with the case study approach, which often aims to develop theory from detailed, context-rich data (Baxter & Jack, 2008).

This study focused on the digital storytelling (DST) elements recommended by international scholars for museum exhibitions. The first stage of a research investigation is a literature analysis to identify the knowledge gap of the study through contextual document analysis. The approach is a procedure for collecting the entire literature review. Next is the second data collection stage, which aims to answer the research question by identifying the elements of DST suitable for museum exhibitions among established experts and scholars through content analysis. Content analysis is a systematic method for analysing and interpreting results from text and other forms of qualitative data, such as interviews, focus groups, open-ended survey questions, documents, and videos. Various analytic strategies are employed to categorize, compare, and contrast data collection. Systematically coding the data identifies key trends and themes. To ensure the essential validity and reliability, the categorization steps will be carried out using the necessary documentation from the previously established literature. The data can be generalized beyond direct data. Inter-rater reliability is the extent of agreement between two or more raters, such as observers, coders, or examiners. The steps involved in content analysis are i) identifying data sources, ii) developing categories, iii) coding data, iv) assessing reliability, and v) analysing results. The MAXQDA data analysis software will adapt the workflow process to this study.

4. Data Analysis and Findings

This section presents the derivation and analysis of the core Digital Storytelling (DST) elements. The findings are organised into two parts: (i) the methodological derivation of the core elements through contextual document and content analysis, and (ii) a discussion of the ten core non-interactive DST elements that emerged from the analysis.

4.1 Derivation of the Core DST Elements

The initial phase of the research focused on identifying and selecting documentary materials pertinent to the central theme of the study. Contextual document analysis was conducted on established DST elements proposed by ten experts, as documented in books, journal articles, and dissertations. The selection criteria for documents included the validity and reliability of the information, the authority of the authors, and the clarity of definitions and units of analysis.

All ten expert documents were imported and organized using MAXQDA data analysis software. DST elements and their descriptions were color-coded based on similar meanings and characteristics. This process resulted in the identification of eighty-two sub-elements of DST from ten guideline documents, which were subsequently categorized into six fields: culture, tourism, education, interactive entertainment, journalism, and general purpose. These categories established an initial framework for analysing the application of DST elements across various domains. In total, twenty-three DST elements were identified across the sources, encompassing both interactive and non-interactive features, in addition to the eighty-two sub-elements previously mentioned. The interactive elements identified included:

- Collaboration,
- Communication,
- User contribution,
- Virtuality,
- Spatiality,
- Concreteness, and
- Immersion.

In contrast, several non-interactive elements appeared with relatively low frequency (fewer than three occurrences across the ten expert sources), namely:

- Key question,
- Background and character,
- Beginning with the story or script,
- Stage,
- Control, and
- Audience and market.

Given the focus of this study, low-frequency non-interactive elements were not prioritised in the final framework. This constitutes one limitation of the study, as the analysis emphasises high-frequency or commonly used non-interactive elements. Following the coding system, DST elements with overlapping or identical meanings and which exclusively emphasised non-interactivity were merged and treated as a single element. By concentrating on the highest-frequency non-interactive elements (appearing four or more times across the expert sources), the set of DST elements was reduced to ten core non-interactive elements:

- Point of view,
- Purpose,
- Story structure,
- Overall look and sound,
- Emotional content,
- Economy,
- Soundtrack,
- Quality of media,
- Rhythm of the story, and
- Storyteller's voice.

As summarised in Table 2 below, these ten elements represent the most consistently emphasised non-interactive components of DST in the reviewed literature and form the basis of the subsequent discussion and interpretation.

Table 2: *Recommended digital storytelling (DST) elements established from the literature review*

No.	DST Elements	Author and Year
1	Point of View	Lambert (2006), Ohler (2008), Robin (2008), Miller (2012), Hock Kuan (2013), Kasesmarn (2017)
2	Purpose	Porter (2005), Robin (2008), Miller (2012), Kasesmarn (2017), Hock Kuan (2013)
3	Story Structure	Schäfer (2008), Miller (2012), Hock Kuan (2013), Salpeter (2005), Kasesmarn (2017)
4	Overall Look and Sound	Miller (2012), Ohler (2008), Porter (2005), Paul and Fiebich (2005)
5	Emotional	Lambert (2006), Porter (2005), Salpeter (2005), Ohler (2008), Schäfer (2008), Kasesmarn (2017)
6	Economy	Porter (2005), Lambert (2006), K. Kasesmarn (2017), Robin (2008), Ohler (2008), Hock Kuan (2013), Salpeter (2005)
7	Soundtrack	K. Kasesmarn (2017), Ohler (2008), Lambert (2006), Robin (2008)
8	Quality of Media	Hock Kuan (2013), Paul and Fiebich (2005), Miller (2012), Kasesmarn (2017), Ohler (2008), Salpeter (2005), Porter (2005), Robin (2008)
9	The Rhythm of the Story	K. Kasesmarn (2017), Hock Kuan (2013), Robin (2008), Lambert (2006), Porter (2005), Ohler (2008)
10	The Storyteller's Voice	Hock Kuan (2013), Salpeter (2005), Robin (2008), Porter (2005), Ohler (2008), Lambert (2006), Kasesmarn (2017)

4.2 Discussion of Core Non-Interactive DST Elements

4.2.1 Point of View

Lambert (2006), Ohler (2008), Robin (2008), Miller (2012), Hock Kuan (2013), and Kasesmarn (2017) collectively identify point of view, particularly the first-person perspective, as a fundamental component of digital storytelling. First-person narration enables storytellers to convey personal experiences and journeys, and Lambert regards it as the most straightforward and effective method for constructing a compelling character. Although Ohler (2006) raises concerns about an uncritical reliance on first-person narration, both he and Lambert concur that a clearly defined perspective is essential for audience immersion. Employing a first-person perspective allows the audience to adopt the role of the storyteller or protagonist, thereby increasing engagement with the narrative, even when the storyteller's personal life is not the primary focus. Within museum exhibitions, in-person interviews with individuals connected to historical events are considered crucial. Lambert (2008) asserts that presenting authentic stories through interviews is essential for conveying the "true story" behind historical artefacts and events (Misorelli, 2020). Therefore, point of view is especially significant for museum-based digital storytelling, where authenticity and personal testimony enhance the visitor experience.

4.2.2 Purpose

The second core element is purpose. Robin (2008) defines purpose as the "overall aim of the story" and identifies it as the guiding principle throughout the narrative. Establishing a clear point of view is essential before applying purpose as the thematic thread that unifies all narrative components. Hock Kuan (2013) further emphasises intention as the storyteller's or author's objective, whether to inform, educate, entertain, or evoke fear. Similarly, Kittachai (2017), Miller (2019), Porter (2004), Robin (2016), and Tenh (2013) underscore the necessity of a clearly articulated purpose to ensure narrative coherence. In the context of cultural tourism, Kasesmarn (2017) demonstrates how purpose can highlight and communicate the significance of cultural tourism to audiences unfamiliar with the subject. Thus, the purpose of a digital story can be understood as the central point, concept, or premise that conveys value or meaning. The narrative trajectory should remain consistent with the initial purpose established at the outset of the digital storytelling process.

4.2.3 Story Structure

Story structure represents the third key element, focusing on the organisation and delivery of the narrative. Miller (2012) characterises digital storytelling structure as "the invisible but significant method of organising digital storytelling," and contends that narrative structure holds equal importance to content. Typically, an effective story structure follows a dramatic arc, beginning with an engaging introduction, progressing through rising tension and complications, and concluding with resolution or closure. The mechanics of narrative construction share notable similarities with game design, particularly in the formulation of goals and obstacles that maintain audience interest and emotional engagement. Hock Kuan (2013) introduces the concept of the "story map," which consists of an introduction, body, and conclusion, and functions as a non-interactive element that enhances comprehension. Kasesmarn (2017) notes that diverse audiences, including older adults, people with disabilities,

and cultural tourists, often prefer simple and straightforward story structures. Consequently, a well-designed structure should foster emotional involvement and relief, while remaining accessible and appropriate for various audience groups.

4.2.4 Overall Look and Sound

The fourth element, overall look and sound, encompasses the visual and auditory presentation of the story. Miller (2012) defines overall look and sound as the combination of visual elements such as animation, video, graphics, and on-screen text with audio elements to create a coherent aesthetic. There are no strict limitations on the type of footage or media used; however, the selection should support curatorial creativity and align with the narrative purpose. Context is also an important consideration. The inclusion of links or references to external materials can provide additional background and depth to the story. According to Robin, digital stories are often concise, personal narratives delivered “from the heart,” and the visual-aural design should reinforce this quality. Paul and Fiebich (2005) argue that context is central to engagement and meaning making in DST, while Porter (2005) associates “developing craftsmanship” with the creative integration of media elements into a meaningful and aesthetically coherent work. Ohler (2008) emphasises the educational potential of DST and the need for teachers to guide learners in selecting and combining visual and audio media effectively.

4.2.5 Emotional Content

Emotional content constitutes the fifth element in effective storytelling. Lambert identifies emotional content as a key component of powerful narratives. In contrast, Ohler (2008) argues that digital storytelling (DST) can remain effective with a strong story core, even in the absence of explicit emotional emphasis. Salpeter (2005) and Schäfer (2008) both acknowledge that emotional impact is closely linked to a well-developed narrative framework. Schäfer (2008) introduces coherence as a critical dimension, referring to the internal consistency of story materials. Coherence is enhanced when a narrative follows a clearly planned storyline rather than relying predominantly on user interaction. Tyng *et al.* (2017) demonstrate that emotions significantly influence cognitive processes, including perception, attention, learning, and memory. Schäfer (2008) further notes that the cognitive effort required to construct a mental representation of a story can evoke emotional responses. Young audiences are especially attracted to narratives that are exciting, joyful, and emotionally rich, particularly those incorporating conflict and transformation. In the Thai context, humour is recognized as a highly effective means of audience engagement. Traditional storytelling forms across cultures frequently embed conflict, transformation, and closure, while many audiences, including older adults, tend to value narratives that promote positive thinking and optimism.

4.2.6 Economy

Economy, the sixth element, involves the deliberate selection and reduction of information to ensure that only essential content is presented. Scholars consistently assert that “less is more” in the context of digital storytelling (DST). Porter (2005) contends that an effective DST communicates its message with a limited number of words and images. Ohler (2008) observes that longer DSTs demand greater time and resources for development, and recommends that digital stories remain brief. Robin (2008) similarly highlights the importance of specificity throughout an effective story. Lambert (2006), the originator of DST, also maintains that brevity and focus are fundamental to high-quality DST. Both Salpeter (2005) and Lambert (2006) emphasize the need for conciseness and simplicity, cautioning against unnecessary elaboration. Kittachai (2017) argues that short stories compel storytellers to be economical and eliminate non-essential content. Consequently, experts including Kittachai (2017), Lambert (2010), Ohler (2013), Porter (2004), Salpeter (2005), and Tenh (2013) advocate for the active removal of redundant media and information to preserve clarity and impact.

4.2.7 Soundtrack

The seventh element is the soundtrack. Numerous scholars (e.g., Kittachai, 2017; Lambert, 2010; Ohler, 2013; Robin, 2016) contend that music and sound design enhance narrative depth and emotional engagement. Although a digital storytelling text (DST) can be comprehended without a soundtrack, the inclusion of carefully chosen music or sound effects can reinforce the message and intensify emotional responses when applied appropriately and in moderation. Within DST, the soundtrack should remain subordinate to the narrative, as excessively loud or intrusive music may distract from the story and obscure the storyteller’s voice. When used judiciously, music can direct audience attention, shape mood, and provide cues regarding the narrative’s emotional progression. From a cultural tourism perspective, Kittachai concurs with Lambert (2010) that music enriches the narrative experience, particularly when it incorporates local or culturally relevant soundscapes.

4.3 Soundtrack Quality of Media

The eighth element concerns the quality of media. Porter (2005) characterizes this as a “showing, not telling” approach, in which visual and audio media communicate messages without exclusive reliance on spoken or written language. Paul and Fiebich (2002) and Robin (2016) further subdivide this element into configuration, currentness, time-based aspects, and space-based aspects, each influencing the effectiveness of media in supporting the narrative. Hock Kuan (2013) differentiates between “expression” and “significant content.” Expression involves the indirect use of visual and sound media to convey meaning, whereas significant content pertains to the inclusion of meaningful objects and scenes that advance the storyline. These distinctions closely correspond to the sub-elements identified by Tenh (2013). Paul and Fiebich (2005) also observe that interactive technologies, including the internet, smartphones, video game consoles, and other multimedia platforms, can enhance digital storytelling (DST) when applied appropriately. Miller (2012) and Kasemsarn (2017) associate media quality with the selection of medium and platform, indicating that different platforms provide distinct affordances for storytelling. Salpeter (2005) recommends that DST remain simple and focused, with technology employed selectively to support rather than overshadow the narrative. Robin and Miller emphasize that images and multimedia elements should establish a specific ambience or tone consistent with each segment of the story.

4.3.1 Rhythm of the Story

The ninth element is the rhythm of the story, commonly referred to as pacing. Lambert (2006) asserts that pacing determines whether a story feels natural or mechanical. In modern storytelling, rhythm is influenced by both language and delivery. Ohler (2008), within an educational context, defines tone as the timbre of the storyteller’s voice and recommends that instructors guide students in selecting a consistent tone that supports the intended message. Robin (2008) and Porter (2005) contend that narrative speed, rhythm, and vocal punctuation play a critical role in audience engagement. For specific audiences, such as older adults or individuals with disabilities, a slower rhythm may be preferable, particularly when they are less accustomed to rapid, Hollywood-style editing. Given the diversity of impairments and age-related needs, rhythm and pacing should be tailored to the characteristics of each audience group.

4.3.2 Storyteller’s Voice

The tenth element is the storyteller’s voice, which encompasses the quality, style, and clarity of the narrator’s delivery. This element is closely related to the comprehensibility and coherence of the narrative and, more broadly, to the overall quality of the message. Lambert (2006) advocates for first-person storytelling, whereas Salpeter (2005) presents a somewhat different perspective. Robin (2008) uses the term “clarity of voice” to emphasise that the narrator’s voice must remain audible, distinct, and consistent throughout the story. Tenh (2013) characterises storyteller’s voice as “articulation,” highlighting its effectiveness in conveying messages and meanings. In interactive storytelling, narratives may be delivered from a first-person perspective, while in other forms of presentation, a third-person perspective may be more suitable. Research indicates that audiences learn better when words are pronounced in a natural human voice rather than a computer-generated or heavily accented voice. Kittachai (2017) further describes the storyteller’s voice as needing to be pleasant, engaging, and, where appropriate, humorous. Across the literature, there is broad agreement that the storyteller’s voice is a critical element of DST (Lambert, 2013; Robin, 2006; Ohler, 2006; Porter, 2005). For museum exhibitions, a clear and authentic storyteller’s voice can significantly enhance visitors’ understanding and emotional connection to the stories associated with artefacts and heritage objects.

5. Conclusion

In conclusion, based on the review of the entire ten elements of DST identified in established literature reviews. Only ten (10) elements are the most commonly used among the experts and scholars, based on the frequency of eighty-two (82) elements. The present research aimed to identify the core elements of DST, as established by experts and international scholars, suitable for museum exhibitions. This study aimed to gain a deeper understanding of DST elements suitable for cultural heritage, with a focus on museum exhibitions. The findings suggest that refining a set of comprehensive elements based on feedback from DST experts is beneficial. The results of this study indicate that all experts introduced to the DST elements have their own definitions. Among these elements, the most significant ones can be utilized in various settings, such as museum exhibitions, and developing comprehensive guidelines for DST elements that aid museum curators in designing digital museum exhibitions.

The study contributes to understanding DST elements commonly used to develop digital stories. A limitation of this study is that it focuses solely on the non-interactive element of DST. These findings provide the following insights for future research to focus on investigating the DST elements in relation to practitioners across various fields.

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Conflict of Interest

The authors declare that they have no conflict of interest regarding the publication of this paper.

Author Contribution

The authors confirm contribution to the paper as follows: **study conception and design:** Hafizah Rosli; **data collection:** Hafizah Rosli; **analysis and interpretation of results:** Hafizah Rosli; **draft manuscript preparation:** Hafizah Rosli, Norfadilah Kamaruddin and Badrul Isa. All authors reviewed the results and approved the final version of the manuscript.

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