A SYSTEMATIC REVIEW OF DIGITAL STORYTELLING AS PSYCHOTHERAPY FOR PEOPLE WITH MENTAL HEALTH NEEDS

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Abstract

Storytelling is used in many cultures as an important way to communicate historical messages of lived experiences intergenerationally. Past studies indicated that storytelling is an effective tool in education and mental health, but evidence of the therapeutic use of digital storytelling is scarce. This review therefore explored available literature evidence of the use of digital storytelling media as mental health therapy to identify knowledge gaps for a further Secret Story Network role-playing game intervention study. Based on some key search terms and a set of inclusion and exclusion criteria, 14 full-text articles were systematically selected through searches of mainly EBSCO*host* that connected seven databases, including AMED, BNI, CINAHL, EMBASE, EMCARE, Medline, and PsycINFO. The studies reviewed suggested a tactical focus on adolescents and adults older than 18 years and more females than men. 10 digital storytelling media interventions were found in 11 sources, but only two studies on older adults with dementia had a therapeutic intervention framework. Qualitative and mixed-methods reported in nine sources were shown to be the common study methodologies. The evidence extracted also revealed six criteria for classifying storytelling types, and the purposes, effects, benefits, and uses of digital storytelling indicated a general assumption that digital storytelling interventions have therapeutic, educational, social, and psychological effects. However, evidence suggests that while digital storytelling may significantly reduce symptoms of depression ($p<0.05$), its effects on other mental health symptoms are inconclusive. Thus, further research into the psychotherapeutic effect of digital storytelling is necessary. Five implications for future research are discussed.

Key words:
Digital storytelling; Game role-playing; Psychotherapy; Mental Health; Systematic Review

Public Health Significance Statement
The use of storytelling as a means of sharing important experiences of individuals and communities is inherent in human culture. Hence it is widely used for educational, promotional, social, and mental healing purposes. This systematic review finds there is literature evidence that using digital media to communicate personal experiences of mental illness significantly reduces mental health symptoms in the storytellers and could reduce stigma of mental illness in the audience.

Telling stories is a time-tested method of creatively narrating, translating, and communicating lived experiences of individual people or communities in various human contexts (Davis & Restrepo, 2003; Grove, 2015; Lin et al., 2020, McNett, 2016;). Indeed, storytelling is a popular form of art by which cultural messages and myths are recreated and transmitted intergenerationally (Davis & Restrepo 2003; Sawyer & Willis 2011). According to Gersie and King (1989), stories are narratives of important life experiences that creatively interweave fiction and reality. More recently, storytelling has been adapted and adopted for therapeutic purposes in different healthcare delivery contexts, including mental health services (Carrick-Sen 2019). Digital mental health stories are biographical narratives of those who have experienced a mental illness, and which are presentable in oral, written, pictorial, dramatized, filmed or art forms using electronic media and explorable through different perspectives (educational, community, social, health, and therapeutic; Donohue-Smith 2011, Holmwood, Jennings & Jacksites 2022; Moreau et al. 2018). According to Basset and Stickley (2010), most mental health stories are written by previous mental health patients to illustrate how they strived and thrived through their difficult experiences. Psychotherapeutic digital storytelling therefore enables a more participatory approach to treating patients than the conventional top-down medical professional approach (Madigan, 2011)

The important place of storytelling in mental health practice has been celebrated by many authors in the sector. De Souza et al. (2021) maintained that storytelling enabled therapists and other audiences to understand the narratives of vulnerable women and the meanings they gave to their routine life experiences. Grove (2015) asserted that storytelling whether personal or fictional, helps the tellers to foster a sense of self, friendship, community, and self-advocacy. Ferrari et al. (2022) extolled the communicative power of storytelling to encourage awareness and understanding of mental health issues. In creating digital stories about their life histories, Hausknecht, Vanchu-Orosco and Kaufman (2019), claimed that older adults are given a chance to engage with others

through stories as digital producers. In fact, Lin et al. 2020 proposed that such creative re-telling of past life events have the capability to improve older people's physical and mental health, and slow down their intellectual deterioration. Hence, storytelling is now a standard psychotherapeutic intervention that has become a vital tool in the arsenal of mental health recovery services (Nurser et al. 2018).

Accordingly, storytelling is used in mental health recovery services to enhance the social and emotional skills and the cognitive behaviour of young people, including children experiencing domestic violence (Anderson & Wallace, 2015; Beaudoin, Moersch & Evare, 2016; Burns, 2005). It is also used to treat older people suffering from dementia (Rincon et al. 2022). Storytelling aids development of a collaborative and productive relationship between mental health service providers and their service users (Cangelosi & Sorrell, 2008; Madigan 2011; O'Hagan, 2017; Wightman et al. 2010). Cangelosi and Sorrell (2008) asserted that service providers understand the chronic illnesses affecting old people better by listening to their health stories. In their toolkit titled, *Portrait of a life - a multimedia toolkit for life story work,* Wightman et al. (2010) affirmed that for those who may be losing their sense of self due to memory loss or a diagnosis of dementia, creating a life story is crucial for them, their family, and the carers. A life story also inspires others to look past memory issues and respect and value the individual in the present. In agreement, Weg (2011) reported that combining storytelling and metaphor is one of the best and most practical ways therapists can better relate to their patients, explain a problem to family members, and present treatment alternatives. Therefore, according to King 2012, the possibility that patients can develop self-understanding by incorporating events, feelings, and thoughts that had been discarded portrays the power of narrative psychotherapy. Moreover, studies that examined the effectiveness of narrative exposure therapy as a form of storytelling intervention in different countries reported a significant positive effect on patients' recovery from trauma spectrum disorders, especially post-traumatic stress disorder (Kaltenbach et al. 2020; Raghuraman, Stuttard, & Hunt, 2021; Lely et al. 2022; Ellis, & Jones, 2022)

Thus, previous studies on digital storytelling in mental health support its use as a best practice psychotherapeutic method to depict patients' actual experiences and promote wellbeing (De Vecchi et al., 2016; Stargatt et al., 2022), narratively reconstruct and forecast causal paths over time (Currie & Sterelny, 2017) and share research evidence with a secular audience (Ilic-Garcia et al., 2022). However, the study of the mental health effects of digital storytelling using role-playing game media is rare. We are interested in studying the development of a Secret Story Network application in this context. Evidence obtained from various iterations of Secret Story Network suggests that using game role-playing within digital storytelling will benefit people of all ages and backgrounds. The latter involves choosing or being assigned characters to play roles of different identities in digital stories and scenarios related to the lived experiences of players. To investigate the veracity of this claim, a review of available current literature evidence of the efficacy of the use of digital storytelling in mental health therapy was conducted to identify existing knowledge gaps and develop theoretical frameworks for further research on digital storytelling using role playing games.

Method

This literature review was done as groundwork for an empirical study that will test the hypothesis that storytelling using digital role-playing game media developed by Secret Story Network will have a therapeutic effect on people with mental health needs. A systematic review method was used as a rigorous and robust search strategy that involved a systematic multi-staged selection of key literature sources with evidence for review and critical analysis. The search was based on inclusion criteria that sources selected for review should be recent (2012-2022), published, peer-reviewed or academic research on digital storytelling in a mental health context. Also included were full-text, universal sources, but accessible locally. Sources in non-English texts, outside mental health sector or non-digital stories were excluded.

The literature search for relevant and eligible literature sources for review followed 5 stages similar to PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines:

searched available databases for literature sources using broad search themes, identified relevant sources from the results generated, screened the quality of sources for their suitability, selected eligible sources based on inclusion and exclusion criteria, and included locally accessible, full-text sources that contained the desired literature evidence for review.

This process is illustrated by the flow chart in Figure 1. The chart shows the several routes employed for searching available online databases and library facilities of South West Yorkshire Partnership NHS Foundation Trust (SWYPFT). Library catalogue was searched using the search themes 'life stories, modelling' and 'mental health'. This yielded 33 results for stories. Only 3 books were selected as relevant. Another search with the theme 'storytelling models' through the NICE (National Institute for Health and Care Excellence) online search, accessed through SWYPFT online library, yielded 180 results. Only 5 sources were selected as relevant. A further search on NICE using the theme 'digital story telling' yielded 163 results and 27 were selected. Another search was done through the Library's HDAS (Healthcare Databases Advanced Search) using the terms 'story models'. It generated 50 results and 14 were selected. The library staff also aided the search with the terms 'story?tell*' AND 'mental health' through EBSCO*host* that connected seven databases, including AMED, BNI, CINAHL, EMBASE, EMCARE, Medline, and PsycINFO. Their search yielded 54 results and all 54 were selected. Another 17 titles of literature – 5 books and 12 articles were received through referrals from Jessica Kelly of the Creative Minds Project UK. All 17 were selected for review of their summaries or abstracts.

In total, 497 literature sources were identified from all routes of search, and 122 of them were then screened for quality by examining their abstracts or book summaries. 64 of them were selected on the criterion of year of publication. On this basis, any source older than 2012 was excluded. A further selection was done using the criterion of online access to, or availability of, full-text version of the sources. This reduced the selected number to 31. Another selection was based on an eligibility criterion of having evidence of digital storytelling and/or gaming intervention in mental

health. This involved a further examination with the themes of ‘storytelling’, ‘digital’, ‘mental health’, and ‘use of storytelling’. 14 sources were selected as eligible for a more detailed review and critique of their literature evidence of the use of digital storytelling as intervention in mental health. These included eight research articles, three review articles, two research protocols and one dissertation. Excluded from review at this last stage were nine materials with non-digital storytelling in mental health and eight non-mental health storytelling literature. Figure 1 shows the 14 literature sources included in this review reported the use of seven research methods or designs and two literature review methods (systematic and scoping reviews). All 14 eligible literature sources were subjected to a robust examination for contents and evidence relating to the review purpose using a literature review grid designed based on the main components of a conventional research framework (table 1). The evidence extracted was analysed descriptively, either by simple arithmetic analysis of quantitative data or thematic analysis of qualitative data.

Results

Basic Details of Literature Sources

Out of the 14 eligible sources, the specific country of study was identified in 11. These were seven countries: five for USA and one each for Canada, Nigeria, Sweden, UK, Germany, and Korea. The three exceptions were review articles. Of these, two provided a list of the countries of the total 29 studies they reviewed. These were nine countries in total: including USA (9), Canada (7), UK (7), and one each of Australia, UAE (Dubai), Sweden, Italy, Germany and Taiwan. The majority (30/40 or 75%) of the studies was conducted in only three countries, USA, Canada, and UK and more than one-third of studies originated from USA alone. The years of publication indicated in the sources included six years (2012, 2016, 2017, 2020, 2021 and 2022). Nine of the 14 sources (63%) were published recently, from 2020 to 2022. Three were published in 2017 and one each in 2012 and 2016. All sources reviewed are academic literature. Table 2 shows that while the majority (13/14) of the

sources are peer-reviewed journal articles, only half (7/14) are primary research studies. Two of the peer-reviewed articles are research protocols and they provided evidence of only research methods.

The study populations in table 2 show the studies mostly targeted adolescents, youths, or older adults. While gender differentiation of the study participants is unreported in some studies, four out of the six studies that reported, used either only females or mostly females as study participants (Heilemann et al., 2017; Moon & Park, 2020; Rincon et al., 2022; Soderlund et al., 2021). Table 2 shows that, where specified, the population groups included immigrant Latinas dealing with anxiety and depression, university students, company workers, dementia patients, military veterans suffering post-traumatic stress disorder (PTSD), grieving youths dealing with parental suicide, and youths in social care with mental health needs.

Definitions and Classification of Digital Storytelling

Definitions of digital storytelling were found in nine of the 14 sources reviewed. There were three categories that described digital storytelling as short two to five minutes multimedia film productions, digital narratives, and internet-media communication. While the commoner categories suggested digital stories are multimedia films with digital narratives, overall, the integration of all definitions found rendered storytelling as a participatory process of creating personal narratives with combination of photographic or art-based images, videos, sounds, and texts using electronic or internet-based media to communicate messages about the lived experiences of the creators to a wider targeted audience.

Five sources reported different forms of digital storytelling (Bunnel et al. 2017; Giliam et al., 2012; Jamerson, 2017; Moon & Park, 2020; Park, Forham & Jones 2021). However, none of these specifically discussed digital storytelling typologies or any basis for the classification. The categorisation of the different examples of digital storytelling in literature suggested they could be classified into six broad types, according to the model, media, story, content, method, and software.

On storytelling models, Moon & Park (2020) and Jamerson (2017) reported therapeutic models, including digital reminiscence therapy (Moon & Park, 2020), narrative therapy, expressive remix therapy, and expressive arts therapy (Jamerson 2017). Bunnell et al (2017) discussed two educational models including instruction-based and student-driven. On storytelling media, Gilliam et al. (2012) listed different websites or digital media, including text messaging, social networking sites, shareable video sites, : Really Simple Syndication (RSS) feeds, and wikis. On the type of stories, Park, Forham and Jones (2021) reported two categories of digital stories, including personal multi-media patient stories with a knowledge translation component and multiple resources with embedded stories such as health-related websites with patient stories. This is supported by Rincon et al. (2022) who stated that, “Messages and topics can range from personal experiences of a condition to major biographical events of a person’s life” (p. 867). According to them, most digital stories are about past events (64%) and the majority were about personal experiences (79%). In the view of Ferrari et al. (2022), they could be “Stories of human distress and struggle that are shared using digital formats, including videos, digital narratives and video testimonies” (the introductory part).

Six of the 14 sources reviewed specified different digital storytelling contents (Bunnell et al., 2017; Heilemann et al., 2017; Park, Forhan & Jones, 2021; Rincon et al., 2022; Ferrari et al., 2022; Stargatt et al., 2022). According to Bunnell et al. (2017), digital storytelling is the use of audio, video, graphics, and text that have been captured and sent electronically (through the internet) to a target audience for a specific purpose. Stargatt et al. (2022) reported that all digital stories included images that could be both personal and generic. In six of the eight studies they reviewed, a voiceover was also provided by participants. Among the eight studies, music was included in five studies, moving images in three studies, and sound effects in one. Heilemann et al., (2017) presented a digital media storytelling app called ‘fotonovela’ created by Cabassa, Molina and Baron (2012) that depicted a comic book-style story with pictures and subtitles about an imaginary Latina mother in depression.

On the storytelling method, Park, Forhan and Jones (2021) reported that patients frequently shared their experiences with others orally or in writing. These could be presented in the form of either interactive storytelling such as shared blog postings within online communities, or audio-visual presentations such as YouTube videos or published documentaries with video recordings of patient stories, or digital educational resource for parents based on collective patient experiences such as an e-book. On the type of software, only Rincon et al. (2022) reported the software used by the digital storytelling media in the studies they reviewed. They included: Final Cut Pro, WeVideo, Windows Movie Maker, iMovie, Sony Movie Studio, and Adobe Premiere.

Purposes of Digital Storytelling

Only four sources stated at least one purpose for digital storytelling in their literature (Ferrari et al., 2022; Jamerson 2017; Park, Forhan & Jones, 2021; Stargatt et al. 2022). Six purposes of digital storytelling were obtained from these sources. In the words of the authors, these purposes included, to shape attitudes by communicating emotions and thoughts and stimulating empathy, compassion and good citizenship among listeners (Ferrari et al., 2022); destigmatize sensitive and marginalizing personal issues such the fear of mental illness (Ferrari et al., 2022); encourage and bring hope to others (Ferrari et al., 2022); educate others to deepen listeners' knowledge and understanding of patients' personal stories (Park, Forhan & Jones, 2021; Stargatt et al. 2022), engage the community (Stargatt et al. 2022) and externalize a problem, usually as a story, and then to find ways to express that problem differently (Jamerson 2017).

Benefits of Digital Storytelling

The benefits found in the six of the 14 reviewed sources are mostly the potential effects of storytelling in general, and where indicated, digital storytelling specifically. Three major categories of benefits: mental healing, empowerment, and resilience (Ferrari et al., 2022; Moon & Park, 2020; Stargatt et al., 2022); awareness, knowledge, and learning (Bunnell et al. 2017; Ferrari et al. 2022) and social relationships, connections, and engagement (Ferrari et al. 2022; Hammond et al. 2021;

Rincon et al. 2022). The most common benefits of storytelling reported were related to the positive therapeutic effects on people with mental health needs. It also included educational implications as well as good social and personal psychological effects on the tellers, listeners and caregivers of the stories generated.

Uses of Digital Storytelling

The different uses of digital storytelling were obtained from 7 sources. These were organised under 4 headings that included: sharing and promoting personal experiential stories (Ferrari et al. 2022; Park, Forhan and Jones, 2021), engaging study participants and students in research and learning respectively (Heilemann et al., 2017; Park, Forhan and Jones, 2021; Stargatt et al., 2022), creating and enhancing social connections or relationships (Bunnel et al., 2017; Park, Forhan and Jones, 2021; Rincon et al., 2022) and therapy for people with mental health needs (Bunnel et al., 2017; Moon & Park 2020). It appeared that despite the popularity of the therapeutic benefits of digital storytelling, the commonest use was for educational and research purposes. Thus, relatively less evidence of its therapeutic use in mental health medicine was found in reviewed literature.

Rationales and Purposes of Reviewed Study

All 14 sources stated the specific problems and/or the rationales that necessitated the digital storytelling studies reported. The summarisation of these rationales produced four categories, including: limited research on Impact of digital storytelling ([5/14]; Bunnell et al., 2017; Ferrari et al., 2022; Heilemann et al., 2017; Moon & Park, 2020; Litvin et al., 2020), high use of online and digital social networking by target population ([5/14]; Gilliam et al., 2012, Hammond et al., 2021; Rincon et al. 2022; Park, Forhan & Jones., 2021; Stargatt et al., 2022), effects of mental health experience ([2/14]; Hagstrom 2017, Jamerson 2017); and need to explore and describe a digital storytelling game or app ([2/14]; Consalvo & Phelps, 2020; Soderlund et al., 2021). With 10 out of the 14 reviewed, most sources reported that studies were undertaken because of either limited research on the impact or high use of online and digital social networking for storytelling.

All 14 sources reported the objectives, questions or, if missing, the hypotheses of their studies. However, only three studies had aims to investigate or explore the effectiveness of digital storytelling as a mental health intervention (Heilemann et al., 2017; Litvin et al., 2020; Moon & Park, 2020). Additional study questions or hypotheses were found in six sources (Ferrari et al., 2022; Gilliam et al., 2012; Jamerson, 2017; Park, Forhan, & Jones, 2021; Rincon et al., 2022; Stargatt et al., 2022). Only two of these six (Gilliam et al., 2012; Jamerson, 2017) were primary research articles, and one (Gilliam et al, 2012) was published as a peer-reviewed journal article.

Digital Storytelling Media Studied

Table 3 shows the three categories of the 10 digital media associated with 11 of the 14 sources according to their storytelling model. Most were either educational (4) or therapeutic (4), while role-playing game media were relatively few (2). Despite the categorisation of the therapeutic models, their descriptions show that only the reminiscence therapy (Moon & Park, 2020) was used as a therapeutic intervention. The others were used in their studies to either explore the lived experiences of adolescents transiting from care, i.e., expressive remix media arts therapy (Jamerson 2017) and Memorify (Hammond, Cooper & Jordan, 2021) or change the help-seeking behaviour of veterans with PTSD, i.e., AboutFace (Bunnel et al 2017). Similarly, while the two role playing game media i.e., Games Changer Transmedia Games (Gillian et al 2012) and 'Night in the Woods' (Consalvo & Phelps 2020) might have affected the mental health of the participants, they were not used as therapeutic interventions. The articles simply described the structural components of the game media. While two sources studied the same target population with the same digital storytelling media, three digital media used transmedia video applications, making it the most common digital storytelling media platform or type found in the studies reviewed. This included the Transmedia Catalina app studied by Heilemann et al., (2017) and Sodermund et al. (2021) and the Game Changer Transmedia storytelling game studied by Gilliam et al. (2012). Most of the sources reviewed used different study-specific digital media in their studies.

Methodologies of Digital Storytelling studies

The study methodologies of the reviewed studies are categorised into 4 groups in Table 4: literature reviews (3/14), quantitative randomised controlled trials (2/14), qualitative studies (6/14) and mixed-methods studies (3/14). Together qualitative and mixed-methods were the most common research methods (9/14). The dominance of qualitative and mixed methods studies in digital storytelling research is also revealed in Table 4 that shows the distribution of study methods when the 14 studies reviewed in this paper are added to the total 66 studies reported by the 3 literature review sources (Park, Forham & Jones, 2021; Rincon et al., 2022; Stargatt et al., 2022). Together, qualitative and mixed-methods studies make up 72% of all 80 studies in total.

Systematic Literature Reviews

Basically, the two reviews by Park, Forhan, and Jones (2021) and Rincon et al., (2022) were designed to study the utilisation of a digital storytelling media. Only the review of health outcomes of involving older adults with dementia in digital storytelling activities by Stargatt et al. (2022) had components of therapeutic mental health intervention. Even though one of the reviews described its design as a scoping review (Park, Forham & Jones, 2021), all three reviews used the same multi-staged systematic literature search approach. However, only two sources outlined a five-staged procedure of their review of literature evidence using PRISMA guidelines (Rincon et al., 2022; Stargatt et al., 2022).

Quantitative Randomised Controlled Trials (RCTs)

The two RCT studies by Litvin et al. (2020) and Moon and Park (2020) were both intervention studies that tested the efficacy of the specific digital storytelling application used in their studies. However, only the study by Moon & Park (2020) – the single blind randomised controlled trial of the digital reminiscence therapy sessions to improve the cognition, depression, behavioural and

psychological symptoms of older adults with dementia – was a primary therapeutic study with people with mental health needs.

Mixed Methods Studies

The article by Ferrari et al. (2022), was a research protocol that outlined a mixed methods approach of a planned storytelling study. It was not a research report and so presented no results for data analysis. Also, the article by Gilliam et al. (2012) was a paper describing the programme of developing transmedia games with storytelling and sexuality education to influence change of youth sexual behaviour. Only the study by Heilemann et al. (2017) directly investigated the influence of a digital storytelling intervention on people with mental health needs. Still, rather than in a therapeutic context, it was used to change the health seeking behaviour of Latina women suffering from anxiety and depression.

Qualitative Studies

Different qualitative designs were used in digital storytelling research of six sources. These included a narrative study of the grief of young people affected by parental suicide (Hagstrom 2017); a case study of an innovative expressive remix art media therapy of adolescents in care (Jamerson 2017), and an ethnographic study of the lived experiences of adolescents in care (Hammond, Cooper, & Jordan 2021). The others were grounded theory method to construct the lived experiences of Latina women with mental health problems (Soderlund et al., 2021), theoretical framework analysis of the architecture and effects of a new digital game (Consalvo & Phelps (2020), and an evaluative study of the lived experiences of veterans with PTSD (Bunnell et al. 2017). The qualitative studies were rather descriptive of the utilisation of digital storytelling media in the different mental health contexts: ‘Guest Book’ chat blog media for grieving bereaved youth (Hagstrom, 2017), and ‘Expressive Remix Therapy’ (Jamerson, 2017) and ‘Memorify’ (Hammond, Cooper, & Jordan 2021) applications for adolescents in care. The article by Bunnell et al. (2017) was

a protocol for a study not reported. None of them explored the therapeutic use or effect of digital storytelling on people with mental health needs.

Effects of Digital Storytelling on Mental Health Symptoms

There was evidence in the reviewed sources that digital storytelling was used in different contexts of adolescents, young adults and older adult, albeit, not always in a therapeutic context. However, only five of the 14 sources reported evidence of the effects or outcomes of the use of digital storytelling generally or in mental health specifically. These are the two literature reviews by Rincon et al. (2022) and Stargatt et al. (2022); the two RCTs by Litvin et al. (2020) and Moon & Park (2020) and the mixed-methods study with a one study group pre/post-test design by Heilemann et al. (2017). However, without a control study group, the extent to which the effects reported by the literature reviews (Rincon et al., 2022; Stargatt et al., 2022) or the mixed study (Heilemann et al., 2017) can be generalised is limited.

Depression

Only two of the five sources reported the effect of digital storytelling on depression. Heilemann et al. (2017) and Moon and Park (2020) reported that the use of digital storytelling significantly decreased symptoms of depression across time ($p<0.001$) among older adults with dementia and the Latina women who participated in Catalina Transmedia digital storytelling videos. Based on measures with PHQ-9 (Patient Health Questionnaire 9-item) at screening and PHQ-8 at 1 week and 6 weeks follow-up, Heilemann et al. (2017) reported that the symptom of depression significantly reduced over time ($F_{2,54}=9.0$, $P<0.001$), with significantly linear decline of the PHQ-8 scores: screening = 13.2; Week 1 = 11 ($F_{1,27}=6.45$, $P=.02$) and week 6 = 9.3 ($F_{1,27}=14.2$, $P=.001$). Similarly, based on repeated measures ANOVA of the Korean Cornell Scale for Depression in Dementia (K-CSDD), Moon & Park (2020) reported that depression in adults with dementia significantly reduced in the intervention group compared to the control group at follow-up assessment intervals T1 (first) and T2 (second) of their RCT ($F = 7.62$, $p = 0.001$).

Anxiety

Also based on GAD-7 (Generalised Anxiety Disorder scale 7-item), Heilemann et al. 2017 reported a significant decrease in anxiety level over time among the Latina women intervened with Catalina Transmedia videos ($F_{2,54}$=18.7, P<0.001), with a sharp drop of GAD scores from 13.9 at screening to 9.5 at week 1 ($F_{1,17}$=25.5, P<.001) and 8.6 at week 6 ($F_{1,27}$=23, P<.001). Litvin et al. (2020) included anxiety measures as part of their RCT study of the well-being of Bosch employees using the *eQoo* mobile gaming app intervention. They reported that repeated measures ANOVA of the single-item anxiety score showed a significant main effect of intervention ($F_{2,342}$ = 4.972, p=0.007) and time ($F_{2,341}$ = 4.74, p=0.009). According to them, in all 3 study groups there was a consistent decline over time but the drop in the intervention eQoo group was significant only when compared to the waitlist group that did not receive any digital storytelling intervention. While the waitlist group showed the highest level of anxiety, there was no difference in mean anxiety scores or trend in time between the intervention group given the eQoo gaming app and the control group given cognitive behavioural therapy (CBT) journal app (Litvin et al., 2020).

Cognition, Memory, Mood and Dementia

Stargatt et al. (2022) found that seven of the eight studies they reviewed reported that storytelling interventions generally benefited the memory of participants. However, neither the literature review by Rincon et al. (2022) or the RCT by Moon & Park (2020) found a significant difference in cognition and autobiographical memory of older adults with dementia after exposure to digital storytelling intervention. According to Rincon et al. (2022), a study by Karlsson et al (2014) reported that using digital photograph diary had no impact on the wellbeing, memory, or cognitive abilities of dementia-affected older persons. They also reported that case study explored by Massimi et al. (2008) found no change in general cognition or memory of self after using digital story telling with “novel ‘off the desktop’ technologies to aid in memory” (p.876). Moon and Park (2020)

reported that cognition (F= 0.13, p= 0.821) and behavioural and psychological symptoms of dementia (F= 0.67, p= 0.485) were not significantly different between study groups and time points. In the literature review by Stargatt et al (2022), they found that all eight studies reported benefits related to mood and affect as a result of digital storytelling activities, but only two of these studies reported quantitatively significant improvements in mood post-intervention among older adults with dementia ($p<0.05$). From one of these, they reported that after viewing their digital stories, participants' levels of anxiety, depression, emotional distress, and functioning significantly improved ($p<0.05$) as rated by caregivers (Filoteo et al. 2018).

Well-being

In the gamification research by Litvin et al. (2020), well-being was assessed as a composite measure of resilience, personal growth, interpersonal relationship skills and anxiety. Resilience was assessed as one of the key elements in sustaining mental health, managing stressors healthfully, and lowering risk-taking behaviours. On the Adult Resilience Measure (ARM), they reported that the repeated measures ANOVA produced a significant a significant main effect of intervention ($F_{2,350}$ = 8.51, $p < 0.001$). Compared to the two comparison or control groups, the eQoo intervention group showed higher rises in ARM score over time, with a small effect size after intervention (pre M[SD] = 49.32[5.60], post M[SD] = 50.87[5.31]). The effect sizes were negligent in the CBT journal group (pre M[SD] = 48.56 [6.68], post M(SD) = 48.82[6.70]) and the waitlist no intervention group (pre M[SD] = 47.35[7.36], post M[SD] = 47.08[7.51]). These figures show there was no significant difference between eQuoo intervention and the CBT journal control groups. Nevertheless, the literature review by Stargatt et al. (2022) reported qualitative finding that digital storytelling encouraged enjoyment as well as other good emotions like a sense of pride, empowerment, pleasure, and contentment.

Self-efficacy

This combines the feeling or belief of importance of seeking help and the level of personal confidence. Heilemann et al., 2017 found that within 6 weeks of the Catalina Transmedia

intervention with Latina women, a higher level of perceived confidence to getting help was associated with decreasing levels of depression (Spearman ρ (rho)= -0.399, P=0.04) and anxiety (Spearman ρ= −0.460, P=0.01). Rincon et al (2022) reported a study by Bertera (2014) that found all outcome variables of self-efficacy measured (The Eating Decisions, the Diabetes Self-Efficacy Index and the High Blood Pressure Self-Efficacy Index) improved significantly after exposure to an educational digital storytelling intervention.

Interpersonal Relationships

Despite the partial evidence from their RCT, Litvin et al. (2020) still concluded that in comparison to the CBT journal and waiting control groups, eQuoo game participants showed bigger increases in scores for interpersonal relationship skills, anxiety, and personal growth. Stargatt et al. (2022) also concluded from their literature review that digital storytelling activities enhanced participant interactions with their family members and professional carers in five of the eight studies. Even exchanges between the participants, with other creators of the stories, or with the stories' audience improved during the studies. Rincon et al. (2022) reported that a study conducted by Massimi et al (2008) found the participant's relationships and interactions with the care partner improved as a result of the usage of digital storytelling, which also reduced apathy and enhanced sense of identity.

Discussion

There is evidence in literature that digital storytelling can ameliorate the mental health of its users. However, the studies reviewed indicate that the usefulness of digital storytelling has been researched in a few countries, and prominently in the USA. While there is a wide focus of research on different population groups, it appears children younger than 18 years and men have received less attention in digital storytelling research programmes. Generally, there is agreement in literature that digital storytelling is used to communicate the lived experiences of a target group through electronic multimedia technology, but no clear framework is found in the sources examined for the

classification and differentiation of the types of digital storytelling interventions used in research. Rather, different authors have simply described the digital storytelling media they used as it was applicable to their study contexts.

The evidence from this review therefore suggests that digital storytelling types can be classified according to six criteria, including: model of therapy (Moon & Park, 2020) or education (Bunnel et al, 2017); type of media (Gilliam et al., 2012; Jamerson, 2017); type of story (Park, Forham & Jones, 2021; Rincon et el. 2022); method of storytelling (Park, Forham & Jones, 2021), digital contents (Bunnell et al., 2017; Ferrari et al., 2022; Heilemann et al., 2017; Park, Forham & Jones 2021; Rincon et al. 2022; Stargatt et al., 2022), and type of base software (Rincon et al. 2022). However, relatively few of the digital storytelling media investigated in the reviewed sources were specifically studied as a type used for mental health therapy. Nevertheless, their study purposes aligned with the acclaimed benefits of digital storytelling interventions to heal patients with mental health illness, reconnect them socially to their families and communities, transform the intellect and influence their cognition, and to improve their overall mental health and wellbeing. These revealed that digital storytelling research is hinged on the theoretical assumptions that the intervention has therapeutic, educational, social, and psychological effects that can improve the lives of both the tellers of the stories and their audience.

The main rationales of the studies reviewed suggest digital storytelling and gaming research was necessitated by the scarceness of research evidence that the interventions improve mental health symptoms and the prevalence of the use of digital media facilities among the populations studied. However, with current domination of digital storytelling research by qualitative methodology and few studies using a randomised controlled trial design, objective and generalisable research that can credibly test the therapeutic effectiveness of digital storytelling as a better intervention compared to conventional therapies for people with mental needs is still scarce. Hence, the evidence of the effect of digital storytelling and gaming media on mental health symptoms was

found in relatively few studies. Nevertheless, there seems to be an agreement in the evidence gathered from the few studies that digital storytelling intervention significantly imparts some mental symptoms, especially depression – be it among symptomatic Latina women exposed to the Catalina Transmedia storytelling videos in the USA (Heilemann et al., 2017) or older adult patients with dementia given a series of digital reminiscence therapy sessions in Korea (Moon & Park, 2020).

However, evidence of the effect on anxiety symptoms is equivocal. While the Catalina digital videos significantly decreased anxiety among Latina women (Heilemann et al., 2017), the RCT of *eQuoo* storytelling gaming app found no convincing effect on the experience of anxiety by BOSCH employees (Litvin et al., 2020). Similarly, there is no agreement with the evidence that digital storytelling interventions significantly improves cognition, memory, mood of patients with dementia. The conclusion by Stargatt et al. (2022) from their literature review that digital storytelling generally benefited the memory, mood and affect of dementia patients was not fully supported by either the findings of the literature review by Rincon et al. (2022) or the single blind RCT by Moon & Park (2020). In the same vein, while studies seem to agree that patients' participation in digital storytelling sessions improved their social interactions, relationships, and help-seeking behaviours (Litvin et al. 2020; Stargatt et al. 2022), any evidence of its benefit on or its association with improvement of the related feeling of overall wellbeing and self-efficacy is partial or at best subjective (Heilemann et al. 2017; Rincon 2022).

Conclusions

Generally, we propose six criteria for the classification of the different digital storytelling types that emerged from this review. Studies of the therapeutic storytelling are few, and those involving digital gamification are even fewer. Although available literature evidence supports the possibly helpful effect of digital storytelling on depression, but there is no conclusive evidence that it relieves the cognitive and psychological symptoms of patients suffering from anxiety or dementia. However, any evidence of the efficacy of digital storytelling in mental health from this review is

limited by the relative scarcity of primary research data, inadequate therapeutic intervention research, and the saturation of digital storytelling and gaming research with qualitative methodology and its subjective study designs and non-generalisable results.

Implications for Further Research

This review identifies some important research gaps in literature that require further credible research. First, it seems that most digital storytelling research conducted so far has tactically omitted children aged below 18 years from their study population and has often depended more on women than men as narrators of lived experiences. Secondly, six criteria are proposed for the classification of digital storytelling types. The extent to which digital storytelling types can be categorised according to the proposed classification criteria needs to be explored for further theory development. Thirdly, Figure 2 suggests that based on the general purposes identified in the reviewed literature sources, it is proposed that digital storytelling interventions have therapeutic, educational, social, and psychological effects that can improve the lives of the recipients in such ways as to heal their mental health illness, transform cognition and intellect, improve well-being and relationships. It could be hypothesised that exposing patients to digital storytelling intervention will improve or solve their mental health problems. The evidence of the results of the studies reviewed has not proven this assumption to be entirely true. It is therefore important that further research should test the hypothesis.

Fourthly, this review found that some of the digital storytelling studies reviewed were based on an observed high prevalence of the use of digital media facilities for communication and social network by the study populations. It is therefore important for future digital storytelling research in a local setting that the level of accessibility and utilisation of digital technologies among the population targeted is surveyed empirically prior to the study. Lastly, considering the dominance of qualitative designs in digital storytelling research, future empirical studies of this subject should consider more objective and generalisable quantitative approaches. Particularly, due to the current

insufficient and inconclusive evidence of the effect on mental health illnesses, more experimental studies that are randomised and controlled should be used to test the efficacy of digital storytelling intervention. Therefore, this article leads us to suspect it would be a good area for the future Secret Story Network role-play gaming media investigation.

Limitations

This systematic review used PRISMA principles as guide for its literature search, but it is limited by the search strategy that restricted the sources identified, screened, selected and reviewed to only those published in English language and with full texts locally accessible to the authors. Thus, published evidence from digital storytelling studies that were either inaccessible or written in languages other than English were excluded from this review.

References

Anderson, K. & Wallace, B. (2015). Digital storytelling as a trauma narrative intervention for children exposed to domestic violence. In Cohen J, Johnson J, Orr P. (eds), *Video and filmmaking as psychotherapy* (pp.95-107). Routledge

Basset, T., & Stickley, T. (2010). Voices of experience: Narratives of mental health survivors. John Wiley & Sons.

Beaudoin, M., Moersch, M., & Evare, B. (2016). The Effectiveness of Narrative Therapy with Children's Social and Emotional Skill Development: An Empirical Study of 813 Problem-solving Stories. *Journal of Systemic Therapies*, 35 (3). https://doi.org/10.1521/jsyt.2016.35.3.42

Bertera, E. (2014). Storytelling slide shows to improve diabetes and high blood pressure knowledge and self-efficacy: Three-year results among community dwelling older African Americans. *Educational Gerontology*, 40(11), 785–800. (Cited in Rincon et al. 2022).

Bunnell, B. E., Davidson, T. M., Hamblen, J. L; Cook, D. L.; Grubaugh, A. L; Lozano, B. E., Tuerk, P. W., & Ruggiero, K. J. (2017). Protocol for the evaluation of a digital storytelling approach to address stigma and improve readiness to seek services among veterans. *Pilot and feasibility studies*; 2017; vol. 3; p. 7.

Burns, W.G. (2005). *101 Healing Stories for kids and Teens: using metaphors in therapy*. John Wiley and Sons: New Jersey, USA. ISBN: 0-471-47167-4

Cangelosi, P. & Sorrell, J. (2008). Storytelling as an educational strategy for older adults with chronic illness. *Journal of Psychosocial Nursing and Mental Health Services.* vol. 46 (7); p. 19-22.

Carrick-Sen D. (2019). Poetic narrative storytelling-a new powerful and cathartic research method to capture perinatal mental health stories. *Journal of Reproductive and Infant Psychology*; vol. 37 (3): p. 7. In Velayudham, V. (2019). Abstracts of papers and posters presented at 38th Annual SRIP Conference University of Lodz, Poland 11th – 12th September 2018. *Journal of Reproductive & Infant Psychology*, 37(3), e1–e33. https://doi.org/10.1080/02646838.2019.1632544

Cabassa, L. J., Molina, G. B., Baron, M. (2012). Depression fotonovela: development of a depression literacy tool for Latinos with limited English proficiency. *Health Promotion and Practice*, 13(6):747-754.

Consalvo, M., and Phelps, A. (2020). Getting through a tough day (again): What Possum Springs says about mental health and social class. *American Journal of Play*; vol. 12 (no. 3); p. 338-362.

Currie, A., & Sterelny, K. (2017). In defence of story-telling. *Studies in History and Philosophy of Science*, Part A, 62,14-21.

Davis, L. & Restrepo, E. (2003). Storytelling: Both Art and Therapeutic Practice. *International Journal for Human Caring,* 7 (1). DOI: 10.20467/1091-5710.7.1.43.

De Vecchi, N., Kenny, A., Dickson-Swift, V., & Kidd, S. (2016). How digital storytelling is used in

mental health: A scoping review. *International Journal of Mental Health Nursing*; Jun 2016; vol. 25 (no. 3); p. 183-193.

de Souza, J., Ventura, C.A.A., de Oliveira, J.L.G., Gaino, L.V., Dos Santos Monteiro, J.C., de Oliveira, J.L., de Almeida, L.Y., Richter, S., & Saint-Arnault, D. (2021). Experience of vulnerable women narrated through the body-mapping technique. *International Journal of Environmental Research and Public Health*; 18 (24): 1-25. https://doi.org/10.3390/ijerph182413094

Donohue-Smith, M. (2011). Telling the whole story: a conceptual model for analysing the mental illness memoir. *Mental Health Review Journal,* 16(3), 2011, pp.138-146.

Ellis, K., & Jones, F. (2022). An initial evaluation of narrative exposure therapy as a treatment of posttraumatic stress disorder among Sudanese refugees in Cairo, delivered by lay counselors. *Middle East Current Psychiatry*, *29*(1), 1–10. https://doi.org/10.1186/s43045-022-00194-0

Ferrari, M., Fazeli, S., Mitchell, C., Shah, J., Iyer, S. N. (2022). Exploring Empathy and Compassion Using Digital Narratives (the Learning to Care Project): Protocol for a Multiphase Mixed Methods Study. *JMIR research protocols*; vol. 11 (no. 1); p. e33525

Filoteo, J. V., Cox, E. M., Split, M., Gross, M., Culjat, M., & Keene, D. (2018). Evaluation of reminx as a behavioral intervention for mild to moderate dementia. *Annu Int Conf IEEE Eng Med Biol Soc.* 2018:3314-3317. 18-21 July 2018, Honolulu, Hawaii, USA, https://doi.org/10.1109/EMBC.2018.8513049 (cited in Stargatt et al, 2022).

Gersie, A. & King, N. (1989). *Storymaking in Education and Therapy*. Jessica Kingsley Publishers; Stockholm Institute of Education Press.

Gilliam, M., Orzalli, S., Heathcock, S., Sutherland, E., Jagoda, P., Menendez, A., & Ojengbede, O. (2012). From intervention to invitation: reshaping adolescent sexual health through story telling and games. *African journal of reproductive health*; vol. 16 (no. 2); p. 189-196.

Grove, N. (2015). Finding the sparkle: storytelling in the lives of people with learning disabilities. *Tizard Learning Disability Review*, 20(1), 2015, pp.29-36.

Hagstrom, A. S. (2017). Suicide stigma' renegotiated: storytelling, social support and resistance in an Internet-based community for the young suicide-bereaved. *Qualitative Social Work*, 16(6), 2017, pp.775-792.

Hamblen, J. L., Grubaugh, A. L., Davidson, T. M., Borkman, A. L., Bunnell, B. E., & Ruggiero, K. J. (2019). An online peer educational campaign to reduce stigma and improve help seeking in veterans with posttraumatic stress disorder. *Telemedicine and e-Health*, 25(1), 41-47.

Hammond, S. P., Cooper, N. J., & Jordan, P. (2021). Mental health, identity and informal education opportunities for adolescents with experience of living in state care: A role for digital storytelling. *Cambridge Journal of Education*; Dec; vol. 51 (no. 6); p. 713-732.

Hausknecht, S., Vanchu-Orosco, M. & Kaufman, D. (2019). Digitising the wisdom of our elders: connectedness through digital storytelling. *Ageing & Society*, 39(12): 2714 - 2734. DOI: https://doi.org/10.1017/S0144686X18000739

Heilemann, M. V., Soderlund, P. D., Kehoe, P., Brecht, Mary-Lynn. (2017). A Transmedia Storytelling Intervention with Interactive Elements to Benefit Latinas' Mental Health: Feasibility, Acceptability, and Efficacy. *JMIR mental health*; vol. 4 (no. 4); p. e47

Holmwood, C., Jennings, S. & Jacksties,S. (Eds.). (2022*). Routledge International Handbook of Therapeutic Stories and Storytelling*. Routledge.

Ilić-García, J., Izaurieta, F., Ormazábal, I., & Astudillo, H.F. (2022). Comparing the structures of storytelling and magic for science communication with an agent-based model. *Public Understanding of Scienc*e,31(1),119-132.

Jamerson, J. L. (2017). Expressive remix therapy: Facilitating narrative mash-ups through the use of digital media art. *Dissertation Abstracts International*: Section B: The Sciences and Engineering; vol. 78 (no. 5).

Kaltenbach, E., Hermenau, K., Schauer, M., Dohrmann, K., Elbert, T., & Schalinski, I. (2020). Trajectories of posttraumatic stress symptoms during and after Narrative Exposure Therapy (NET) in refugees. *BMC Psychiatry*, *20*(1), 1–14. https://doi.org/10.1186/s12888-020-02720-y.

Karlsson, E., Axelsson, K., Zingmark, K., Fahlander, K., & Sävenstedt, S. (2014). “Carpe Diem”: Supporting conversations between individuals with dementia and their family members. *Journal of Gerontological Nursing*, *40*(2), 38–46. (Cited in Rincon et al. 2022).

King, S. (2012). They were born with two tongues: Bilingual Asian American emotional disclosure of personal memories. *Dissertation Abstracts International*: Section B: The Sciences and Engineering; vol. 73 (no. 2-B); p. 1253.

Lely, J. C. G., Ter Heide, F. J. J., Moerbeek, M., Knipscheer, J. W., & Kleber, R. J. (2022). Psychopathology and resilience in older adults with posttraumatic stress disorder: a randomized controlled trial comparing narrative exposure therapy and present-centered therapy. *European Journal of Psychotraumatology*, *13*(1), 1–9. https://doi.org/10.1080/20008198.2021.2022277

Lin R.; Yan Y.-J.; Zhou Y.; Luo Y.-T.; Cai Z.-Z.; Zhu K.-Y.; & Li H. (2020). Effects of Creative Expressive Arts-based Storytelling (CrEAS) programme on older adults with mild cognitive impairment: Protocol for a randomised, controlled three-arm trial. *BMJ Open;* vol. 10 (11). http://dx.doi.org/10.1136/bmjopen-2020-036915

Litvin, S., Maier, M.A., Saunders, R., & Luttke, S. (2020). Gamification as an approach to improve resilience and reduce attrition in mobile mental health interventions: A randomized controlled trial. *PLoS ONE*; Sep 2020; vol. 15 (no. 9).

Madigan, S. (2011). *Narrative therapy*. American Psychological Association.

Massimi, M., Berry, E., Browne, G., Smyth, G., Watson, P., & Baecker, R. (2008). An exploratory case study of the impact of ambient biographical displays on identity in a patient with Alzheimer’s disease. *Neuropsychological Rehabilitation*, *18*(5–6), 742–765. (Cited in Rincon et al. 2022).

McNett, G. (2016). Using Stories to Facilitate Learning. *College Teaching*, 64:4, 184-193, DOI:

10.1080/87567555.2016.1189389

Moon S., and Park, K. (2020). The effect of digital reminiscence therapy on people with dementia: a pilot randomized controlled trial. *BMC geriatrics*, 2020, 20(1), 166. https://doi.org/10.1186/s12877-020-01563-2.

Moreau, K. A., Eady, K.,Sikora, L., & Horsley, T. (2018). Digital storytelling in health professions education: a systematic review. BMC Medical Education,18(1):1-9. https://doi.org/10.1186/s12909-018-1320-1

Nurser, K. P., Rushworth, I., Shakespeare, T., & Williams, D. (2018). Personal storytelling in mental health recovery. *The Mental Health Review*; 23 (1): p. 25-36.

O'Hagan, M. (2017). Peer support: Storytelling in the context of equality and mutuality. *Australian and New Zealand Journal of Psychiatry*; 51 (1); p. 63.

Park, E., Forhan, M., & Jones, C. A. (2021). The use of digital storytelling of patients' stories as an approach to translating knowledge: a scoping review. *Research involvement and engagement*; vol. 7 (no. 1); p. 58.

Raghuraman, S., Stuttard, N., & Hunt, N. (2021). Evaluating narrative exposure therapy for post-traumatic stress disorder and depression symptoms: A meta-analysis of the evidence base. *Clinical Psychology & Psychotherapy*, *28*(1), 1–23. https://doi.org/10.1002/cpp.2486

Rincon, A. M. R., Cruz, A. M., Daum, C., Neubauer, N., Comeau, A., & Liu, L. (2022). Digital Storytelling in Older Adults With Typical Aging, and With Mild Cognitive Impairment or Dementia: A Systematic Literature Review. *J Appl Gerontol.* 41(3):867-880. doi: 10.1177/07334648211015456. Epub 2021 May 19.

Sawyer, C. & Willis, J. (2011). Introducing Digital Storytelling to Influence the Behavior of Children and Adolescents. *Journal of Creativity in Mental Health,* 6 (4): pp.274-283. https://doi.org/10.1080/15401383.2011.630308

Soderlund, P.D., Martinez Hollingsworth, A.S., Heilemann, M.V. (2021). Participant engagement in a transmedia storytelling web-based app intervention for mental health of Latina women: qualitative analysis. *JMIR Mental Health*; vol. 8 (no. 1)

Stargatt, J., Bhar, S., Bhowmik, J., Abdullah, A. (2022). Digital Storytelling for Health-Related Outcomes in Older Adults: Systematic Review. *J Med Internet Res.* 2022 Jan 12; 24(1): e28113. doi: 10.2196/28113.

Weg, A. H. (2011). *OCD treatment through storytelling: A strategy for successful therapy.* New York, NY: Oxford University Press.

Wightman, S., O'Neill, M., Crowther, M., & Holroyd, L. (2009). *Portrait of a Life: A Multimedia Toolkit for Life Story Work.* Medipex Ltd: Leeds.

Table 1: Literature Review Checklist or grid

Main Components	Sub-components	Literature Evidence
Basic details of the source:	Title, Author(s), Year of publication Country of study	
Background Info on Digital Storytelling	Definitions of digital storytelling Digital storytelling in mental health, References to past studies of digital storytelling	
Theoretical background of study	Problem, Rationale, Purpose, aims & Objectives, research question(s) and hypothesis	
Methodological Framework	Digital Storytelling App / Intervention Study Population, Sampling, Main Variables, Research Methodology, Study design Methods of data collection Study Procedures Data Analysis method, Study Tools / Materials	
Study Findings	Key results of data analysis Observations Interpretation / data synthesis	
Conclusions	Author(s)'s inferences and recommendations	
Limitations	Limitations of study, if any specified.	

Table 2: Study focus of articles reviewed

Population	Sources	Quality	Focus of study	Study Population
Ethnic Minority	Heilemann et al (2017)	Research study	ethnic minority mental health (Latina women)	35 Latina women aged 21 to 55
	Soderlund et al. (2021)	Research study	ethnic minority mental health (Latina women)	28 Latina women aged 21-50
General	Ferrari et al. (2022)	Research protocol	Empathy and Compassion in mental health recovery	80 university students 18-35 years old (Phase 3 RCT)
	Park, Forhan, & Jones (2021)	Literature review	Knowledge Translation interventions in healthcare	21 studies with knowledge transfer component
	Consalvo & Phelps (2020)	Game description	Contemporary digital games	Not a research article
	Litvin et al (2020)	Research study	resilience and attrition in mental health interventions	358 Bosch UK employees
Old People	Stargatt et al. (2022)	Literature review	Older adults with psychological comorbidities	8 studies of older adults >/ 60living with dementia
	Rincon et al. (2022)	Literature Review	Old adults with dementia	34 studies of 510 adults >/ 50 with aging, cognitive impairment, or dementia 70% female
	Moon & Park (2020)	Research study	Digital reminiscence therapy in dementia	49 females aged ≥65 with mod. dementia,
Veterans	Bunnell et al. (2017)	Research protocol	PTSD Stigma and health seeking behaviour of veterans	20 veterans with post-traumatic stress disorder
Young People	Gilliam et al. (2012)	Program description	Sexual health and reproduction of youth	11 male and female youth in first workshop
	Hagstrom (2017)	Research study	Suicide bereavement for young people	Young mourners with parental suicide cases
	Hammond, Cooper, & Jordan (2021)	Research study	Mental health of adolescents in State care	10 adolescents (6m:4f) in care + 35 care home staff
	Jamerson (2017)	Non peer reviewed dissertation study	Digital media arts therapy with adolescents	4 Transition Age Youths in foster care

Table 3: Digital story Digital Storytelling / Gaming Intervention

Category	Media	Description	Sources
Educational	*eQuoo*	An eHealth mobile app - educates users about psychological concepts through psychoeducation, storytelling, and gamification	Litvin et al., 2020
	Transmedia "Catalina - Confronting My Emotions"	A web-based transmedia – short drama links to psychoeducational Latina successive video stories of Catalina as main character and Veronica the nurse and therapist.	Heilemann et al., 2017; Soderlund et al., 2021
	Guest Book	A Swedish website for the suicide bereaved – An online chat blog with communications between the website editors and study participants	Hagstrom 2017
	Digital Narratives (varied)	A narrative-based art form. Short, first person, self-made, 2- to 3-minute video narratives with images, and shared on the web to generate awareness, impart knowledge, and promote understanding	Ferrari et al., 2022
Therapeutic	*Digital Reminiscence Therapy*	Practical sessions delivered using multiple engaging media (webcams, photos, interactions with computer graphics and personalised videos) that allows for multiple users	Moon & Park 2020
	Expressive Remix Therapy	Digital media art created using web-based applications to remix many stories	Jamerson, 2017
	*AboutFace**	A web-based video gallery designed to help veterans recognise PTSD and motivate them to seek evidence-based treatment.	Bunnell et al., 2017
	Memorify	A private online digital storytelling space where adolescents with care experience could store digital artefacts	Hammond, Cooper, & Jordan, 2021
Role-Playing Games	*Games Changer Transmedia Game*	A game design that tells a single story across numerous technologies and media and can include text, video, audio, flash, print, phone calls, websites, email, and social media networks.	Gilliam et al., 2012
	"Night in the Woods" game	A digital game of adventure of a virtual town called Possum Springs that provides a setting or game clues for storytelling with a "proceduralised" architecture.	Consalvo & Phelps, 2020

*Note: The AboutFace article has been followed up with an article by Hamblen et al. (2019), potentially missed by the search terms

Table 4: Study Methodologies in Literature Sources Reviewed

Method	Design	Description	Sources
Literature Reviews	scoping review	21 studies to find out how patients *are using digital storytelling* as a knowledge translation tool	Park, Forhan, & Jones (2021)
	systematic review	8 studies to *identify the health-related outcomes, methods, and potential for implementation* of digital storytelling activities for older adults (>/ 60 years) living with dementia.	Stargatt et al. (2022)
	systematic review	34 studies to explore how *digital storytelling have been used* with older adults with aging and dementia problems and the associated outcomes	Rincon et al. (2022)
Quantitative	Randomised Controlled Trials	a non-blind randomisation 3 x 3 design (3 study groups and 3 assessments) to test the *efficacy of a mobile digital storytelling and gaming app named eQuoo* to improve the wellbeing and mental health of 358 Bosch UK employees	Litvin et al (2020)
		a single-blind 1:1 randomisation, two study groups to test the *efficacy of 8 sessions of mobile digital reminiscence therapy* to intervene the cognition, depression, behavioural and psychological symptoms of 49 older people with dementia	Moon & Park (2020)
Mixed Methods	Protocol: RCT + video narratives	To test the *effectiveness of digital storytelling video narratives to elicit empathy and compassion* among viewers in comparison with regular social media commercial campaigns as control, with 80 university students 18-35 years as storytellers.	Ferrari et al. (2022)
	multiple methods	Used personal narratives to create digital transmedia games through a series of storytelling games workshops and *to evaluate "how digital media could be adopted for sexuality education*" of the 11 male and females Chicago youths	Gilliam et al. (2012)
	Pre-post test with video narratives	"One-group pre-test and post-test design" with successive psychoeducational transmedia "Catalina" video storytelling reflective sessions with 35 Latina women, aged 21 to 55 years, struggling with anxiety and depression;	Heilemann et al. (2017)
Qualitative	Narrative study	Analysis of reconstructions of written posts in a web-chat forum called "Guest Book" to *explore the identity, grief and meaning-making* of young people suffering from parental suicide	Hagstrom (2017)
	Case study	Used a web-based Expressive Remix Therapy to describe *how a digital arts storytelling can be used for the "digital therapeutic intervention"* of 4 Transition Age Youth aged 19-24 years	Jamerson (2017)
	Protocol: Evaluative study	Assessed the users' experience of a web-based video gallery called 'AboutFace' to explore the stigma and health-seeking behaviour of 20 veterans with PTSD.	Bunnell et al. (2017)
	Theoretical framework analysis	Analyse the *game architecture and environment* of a digital adventure game called "Night in the Woods" and the effects on the mental health of its users.	Consalvo & Phelps (2020)

	Ethnographical study	Used a digital platform called 'Memorify' to *explore the lived experiences, daily activities and socio-political context* of adolescents in State care.	Hammond, Cooper, & Jordan (2021)
	Grounded Theory Method	construct *the experiences of Latina women with the* nurse character, Veronica in *Catalina transmedia* app and the effect on their mental health help-seeking behaviour	Soderlund et al. (2021)

Figure 1: Systematic search Strategy

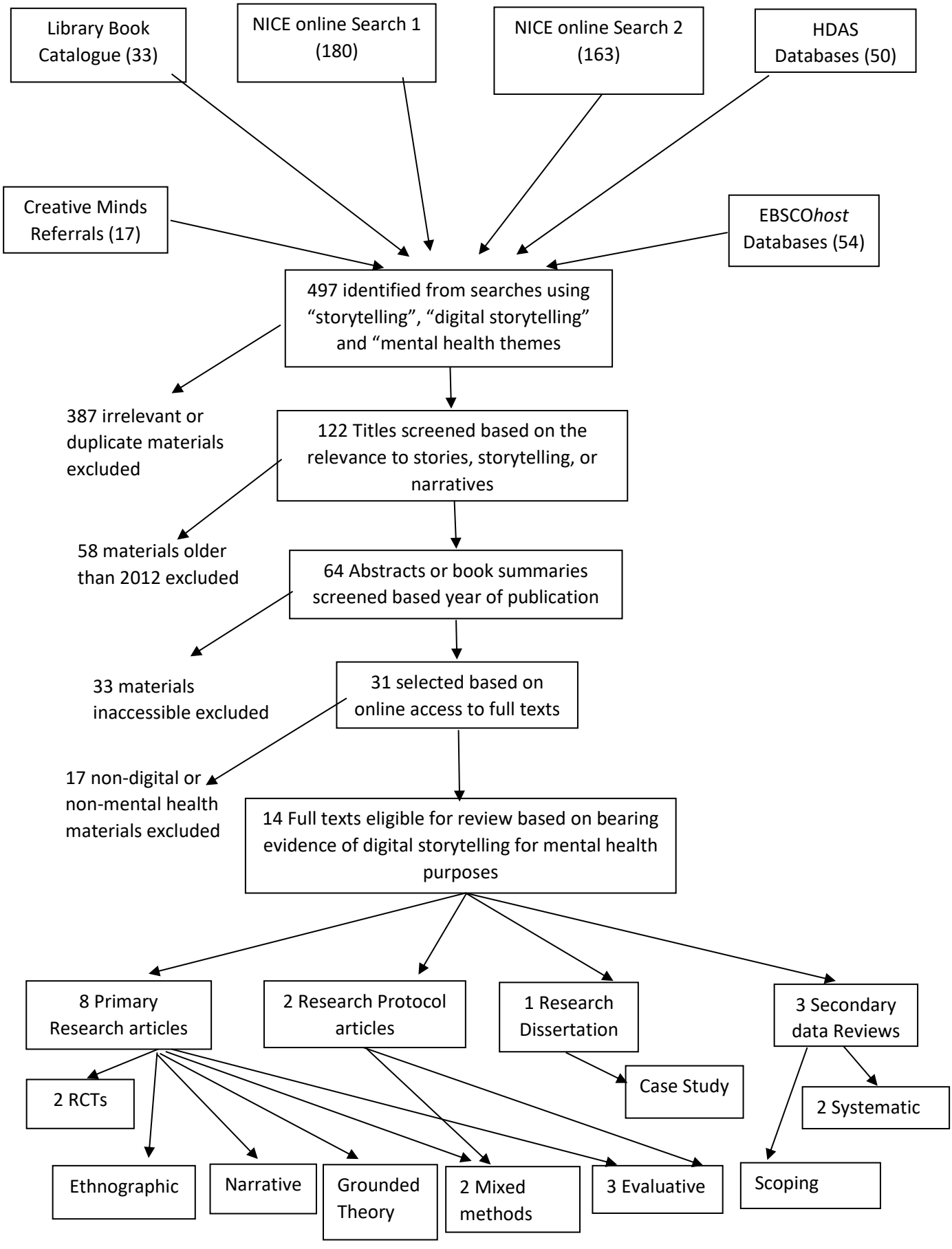
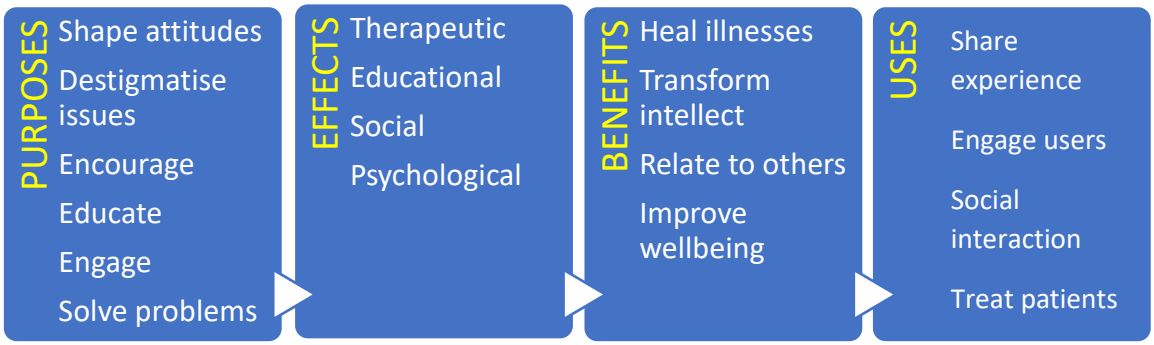


Figure 2: Theoretical background of Digital Storytelling identified in reviewed sources



N = 80 Studies