JOURNAL OF EDUCATIONAL RESEARCH & PRACTICE

Journal of Educational Research & Practice
2025, Volume 15, Pages 1–18
DOI: 10.5590/JERAP.2025.15.1983

Original Research

WALDEN UNIVERSITY

The Power of Storytelling: Creatively Facilitating Conceptual Change in the Classroom

Mackenzie S. Rose, MA, PhD candidate
Virginia Polytechnic Institute and State University, Blacksburg, Virginia, United States
https://orcid.org/0009-0006-4509-2123

Marcus Johnson, PhD
Virginia Polytechnic Institute and State University, Blacksburg, Virginia, United States
https://orcid.org/0000-0002-4018-4647

Contact: *mackenziesr@vt.edu*

Abstract

Conceptual knowledge encompasses understanding the interrelationships among multiple pieces of information. Misconceptions of these interrelationships illustrate the need for effective educational strategies to facilitate conceptual change, with the goal of facilitating changes in learner understanding to appropriate, accurate, and complete concepts. Strategies, such as refutation texts, have proven effective in addressing science misconceptions, yet there is a prominent gap in research on conceptual change in nonscience subjects and the use of storytelling to facilitate such change. Storytelling, presented in a range of educational subjects, invites learners to engage in social discourses and problem-solving exercises. Prompted by classroom storytelling practices, creativity, flexibility, and high levels of motivation support learners in approaching ambiguous or complex instructional material as well as promote abstract conceptualization. Despite storytelling's oral tradition, diverse formats using technology and digital platforms position storytelling as a multidimensional, multidisciplinary pedagogical strategy for conceptual change.

Keywords: *storytelling, conceptual change, narrative, pedagogical strategies*

Date Submitted: July 19, 2024 | Date Published: May 30, 2025

Recommended Citation

Rose, M. S., & Johnson, M. (2025). The power of storytelling: Creatively facilitating conceptual change in the classroom. *Journal of Educational Research & Practice, 15*, 1–18. https://doi.org/10.5590/JERAP.2025.15.1983

Introduction

Stories are the fundamental vessels through which human knowledge gains its vital context and meaning. From science and history to art, math, rhetoric, ethics, and technology, narratives do not merely present information; narratives weave the essential, contextual fabric that allows us to truly grasp complex ideas. When people confront a call of adventure, approach challenges, and solve worthy problems, they demonstrate not just solutions, but the crucial *why* and *how* that gives knowledge its deeper resonance.

While stories began in the realm of oral tradition, their evolution into print and multimedia formats serves to amplify their power as containers of context, allowing these vessels of understanding to reach wider audiences and transport meaning across cultural and temporal boundaries. Each story serves as a carefully crafted container, holding not only facts and events but vital contextual elements that transform raw information into genuine understanding. At times, stories can promote misconceptions of historical concepts; conversely, stories can accurately and dynamically depict scientific principles that would otherwise be perceived as flat and disengaging, such as what is generally found in a school textbook chapter (Smeda et al., 2014). The introduction of contextual and logical representations qualifies stories and the participatory framework of storytelling as effective pedagogical tools in all educational settings. The construction of curricula and assessment can rely on emotional and cognitive engagement through storytelling to boost the content's relevance for all grade levels and increase the attention of all learners.

Declarative knowledge involves knowing factual information, such as names, dates, and locations; procedural knowledge, on the other hand, entails knowing how to perform tasks such as tying a tie or riding a bike. In contrast, conceptual knowledge encompasses understanding the interrelationships among multiple pieces of information. Conceptual learning, therefore, is more intricate than mere memorization (Karpicke, 2012). As an example, a learner might know the story of Rumpelstiltskin (declarative knowledge) and understand how he spun straw into gold (procedural knowledge). However, this does not necessarily lead to a thorough conceptual understanding of how promises hold power in folklore (conceptual knowledge). Misconceptions, such as thinking Rumpelstiltskin was simply playful or that the miller's daughter was purely a victim, illustrate the need for effective educational strategies to facilitate conceptual change with the goal of facilitating changes in learners' understandings to appropriate, accurate, and complete concepts. And, while strategies such as refutation texts, argumentation, and transformative experiences have proven effective in addressing misconceptions in science (Johnson et al., 2023), there is a notable gap in research on conceptual change in nonscience subjects, especially in the humanities, and the use of storytelling to facilitate such change.

This article seeks to address the notable research gap on conceptual change in nonscience subjects and the use of storytelling to facilitate such change by exploring the potential applications of storytelling in both science and nonscience subjects. We will also offer recommendations for educators to employ storytelling as a method to promote conceptual change.

Conceptual Change

Learning is complex and requires making psychological, physiological, and sociocultural connections (Alexander et al., 2009). Learning relies on the formation of new pathways for new information and bridging that new information to prior knowledge. Learner characteristics can affect inferences and, thus, constrain creativity, which then confines new knowledge and prohibits the bridging of this new knowledge with prior knowledge (Bohn-Gettler & Kaakinen, 2022; Ohlsson, 2009). For example, a lack of awareness can influence the construction and categorization of conceptual knowledge, which may potentially lead to misconceptions (Sinatra & Taasoobshirazi, 2017).

When problem-solving scenarios invite learners to utilize conceptual knowledge (Miller & Hudson, 2007), which can inadvertently engage misconceptions, learning and comprehension difficulties can arise and may appear as a hierarchical mis-categorization (think flora and fauna) to a robust misunderstanding of a scientific fact (such as a connection between vaccines and neurodiversity). As misconceptions readily appear in learners' conceptual ecology, conceptual change can also occur and facilitate inductive processing of new information. This may be promoted by learners themselves. Additionally, if the misconception is deeply rooted, conceptual change can be engaged by teacher-modeled scientific thinking or fruitful interactions with instructional material. Regardless of the catalyst, conceptual change requires clarity, plausibility, and intelligibility as the learner uncovers dissatisfaction, or the lack of belief, with an existing concept (Posner et al., 1982).

Due to the complexity of learning, an educator's attempt to change learner biases is fraught with friction and cognitive dissonance (Sinatra, 2005). By addressing the conflict of new knowledge (Sinatra & Seyranian, 2015) and accommodating the expansion of prior concepts (Dole & Sinatra, 1998), researchers have proposed multiple models to answer how learners experience and reach conceptual change. The Cognitive Reconstruction of Knowledge Model (CKRM) and Elaboration Likelihood Model (ELM) consider a learner's personal values in evaluating new knowledge. The Cognitive-Affective Model of Conceptual Change (CAMCC) asserts the learner's cognitive affective responses as motivation to assimilate new concepts (Sinatra, 2005). These models inspect the barriers learners face while experiencing knowledge reformation, and these barriers become a critical element for educators to consider.

Conceptual change does not follow the brisk wave of a wand (although it does inspire a montage of Cinderella pirouetting from rags to an opalescent ball gown). Instead, reaching meaningful and lasting conceptual change can take time and rely on deliberate scaffolding and valuable interventions (Johnson & Bungum, 2013). For example, implementing approach goals, introducing detailed expository texts, or inducing intrinsic motivation through task values are impactful, like the many renditions of the rags-to-riches folktales found throughout history. But just as the multitude of Cinderellas strewn about the globe reflect significant differences, every learner is unique with a variation in frame of mind. Learner reactions to new knowledge can include any or all of the following: to ignore, to reject, to exclude, to hold in abeyance, to reinterpret, to modify, or to reconstruct (Lombardi et al., 2016).

Current Research on Conceptual Change

Research on conceptual change indicates that it is a challenging process; simply correcting a learner's concepts by presenting accurate information is often insufficient. Various factors, such as a lack of motivation or emotional readiness, skepticism about new information, or insufficient background knowledge, can hinder conceptual change (Pintrich et al., 1993). Early theories of conceptual change, which primarily targeted rectifying science misconceptions, articulated that learners must become "dissatisfied" with their current conceptions before change can happen—meaning that learners had to confront the flaws or errors of their current conceptions (Posner et al., 1982). One pedagogical strategy to promote conceptual change, as well as present "dissatisfaction" in a nonintrusive way, has been the use of refutation texts. These texts acknowledge and refute a common misconception with a correct explanation.

Encountering contradictory information prompts students to update their understanding and minimize the impact of their misconceptions (Will et al., 2019). Refutation texts specifically introduce a common misconception into a learner's working memory and then directly refute that misconception with the correct delineation (explanation). This two-step process might read like this:

> Some people think *The Little Mermaid* illuminates how changing yourself for love leads to happiness [a common misconception]. This is not the case [direct refutation], however, because the original story shows that the mermaid's transformation causes pain, her love remains unrequited, and she ultimately chooses to dissolve into sea foam rather than harm the prince, becoming a spirit of the air. These actions demonstrate themes of sacrifice and spiritual redemption rather than romantic success [explanation].

Conceptual change scholars have reported that refutation texts are effective in negating initial misconceptions within science learning (Sinatra & Broughton, 2011), literacy, and culturally responsive instruction (Zengilowski et al., 2022). When texts present counterarguments to learners' existing beliefs, they can have two effects: They may diminish learners' sense of empowerment and create mental conflict (Ferrero et al., 2020).

While experiencing cognitive dissonance—or the discomfort of having one's beliefs challenged—can lead to changes in understanding, students will only change their views if they find the new information both understandable and valuable (Hynd, 2001). This approach is limited, and a gap is left. As the field of education faces growing complications, educators may feel as if every tool in their toolbox has been well circulated. There is an exception: storytelling.

Storytelling

Storytelling is immediately recognizable as an early educational pastime in public libraries, daycare centers, and prekindergarten classrooms, but the misconception of a “storytelling age limit” impedes its use at all levels of connection and learning (Lwin, 2020). In fact, learning through the interconnection of play, emotions, and creativity, storytelling supports the foundational development of knowledge at all ages (Hamer & Ross, 2024). Storytelling universally declares you belong. Its use as a pedagogical instrument motivates holistic learning in all educational settings and during all stages of human development—even well into adulthood (Nijhof & Willems, 2015; Tsai, 2012).

By first addressing storytelling as an ancient art of conveying experiences and ideas through the use of compelling characters and plot structures, narrative stories engage human emotion and memory. These memories and emotions reinforce how educators might effectively incorporate storytelling into their lessons through the use of character-driven scenarios as a way to explain complex concepts, break lessons into narrative arcs with clear conflicts and resolutions, and ultimately encourage students to create their own stories to demonstrate understanding. Narrative stories tap into our innate love of patterns and meaning-making.

At its core, storytelling is a tool for communication. Across cultures, our ancestors interpreted and defined their world through oral traditions that became records of social processes (Schafer et al., 2004; Thom, 2003). They relied on a linear processing of the categorization of events. *First, ...; Next, ...; Finally.* By distinguishing events, perceptions and comprehension grew, thus supporting individual survival and group sociality (Boyd, 2018). So, storytelling expanded into an opportunity for making meaning (Gualberto & Kress, 2018) and an art form for connection. For storytelling to be purposeful, the narrative must be communicated with others (Yoder-Wise & Kowalski, 2003). It is a dyadic process between a teller and an audience. Simply, something must be shared between the two agents.

Storytelling Through Fairy Tales

Fairy tales have become an enduring narrative framework for storytelling. Their archetypal structures have served as vessels of cultural wisdom and moral understanding for centuries. The familiar pattern of fairy tales—trials, transformations, and triumphs—have become so deeply embedded in our collective consciousness that they act as ready-made containers for new understanding—even though their transmission is not as straightforward as Gretel passing Hansel a slice of bread from her apron, or as simple as only relying on fairy tales to convey a metaphorical message. Participation in a narrative includes experiencing, evaluating, telling, viewing, and reflecting (Lwin, 2020), and the meaning-making process that follows delivers motivational breadcrumbs from the story’s plot to one’s schema, positioning “self” in the role of protagonist (Yuan et al., 2018). Hansel dropped the breadcrumbs out of sheer love and protection for his sister; he sacrificed his nourishment to ensure a way back home. Similarly, empathetic responses generated during narrative prediction and story construction reinforce humanity’s innate need to validate emotions and experiences (Curci & Bellelli, 2004; Stueber, 2006).

Storytelling’s Utility

Not only does storytelling satisfy distinctive cognitive demands for inclusion, it also supports cognitive development during learning (Harris, 2007). Already identified as an important mechanism in early education, storytelling also reaches older learners by stimulating cognitive flexibility in problem solving, decision making, and planning (Diamond, 2013), which strengthens creativity (Aquilina et al., 2024) and engages the positive psychology of humor and playfulness (Proyer, 2018). Classroom storytelling practices promote flexibility and support learners in approaching ambiguous (Martinez-Conde et al., 2019) or complex instructional material to promote abstract conceptualization. For example, interpretation of abstract concepts, such as “the butterfly effect,” is influenced by learners’ personal context, maybe pushing them to reflect on it as not only a literary but a social and political theme as well (Funkhouser & Nicoladis, 2023). Storytelling also invites learners to consider how the world *could be* and to engage with a different perspective, thus deflating categorical rigidities (Somers, 1994). Storytelling’s transformative function interweaves learner perspectives and novel interpretations to motivate a deeper level of learning (Harris, 2007), thus positioning storytelling as a multidimensional, multidisciplinary pedagogical strategy.

The reformation of intricate scientific concepts benefits from following a story format (Stevenson & Huffling, 2021). For example, Aquilina et al. (2024) supported learner understanding of atomic relationships by mirroring the dynamics found in *Romeo and Juliet*. Just as the star-crossed lovers reached a tragic demise, learners grasped principles of disturbed equilibrium and were able to dismantle misconceptions of atomic activity. Innovative processes of discovery and imaginative invention move science in educational settings away from traditional academic structures (Kokkotas et al., 2010). In addition, the mechanisms of familiar story formats, which are also found in folktales and fairy tales, urge learners to engage in a deeper discourse on status quo and its propensity to *other* social groups (Hajisoterious et al., 2022). The following examples cover multiple genres and reading levels but consistently provide evidence of this point.

Remedy for Othering

Just read the first passages of *The Bluest Eye* or watch the first season of *Stranger Things* to find immediate examples of “othering,” or treating someone as if they are not part of the group. Perhaps a more well-known example can be found in *The Ugly Duckling*. In this story, animal groups are segregated just like cliques that form in schools. The duckling is taunted for being gangly and not belonging. Because of this common thread, learners are able to identify, in a nonthreatening manner, the harm of othering. In fact, folktales and fairy tales, although not always written as children’s stories, are a highly effective tool for learners to identify the binary of good and bad, right and wrong (McManimon, 2018).

Folktales and Counter-Story Collaboration

Hajisoterious et al. (2022) found that appealing to learners’ imaginations through traditional folktales prompted fruitful dissections of current social circumstances. Learners then collaborated on counter-stories to propose creative scenarios of global social justice. The deconstruction of negative social perceptions immerses learners in conscious decision making and event outcomes. Storytelling exercises, presented in a range of academic disciplines, invite learners’ social imaginations to challenge issues of power and prejudice and to ameliorate new ideas (Hajisoterious et al., 2022). Accordingly, the design of academic tasks and projects is equally important—if not more so—to the content implementation (Kiselyov & Schunn, 2022).

Contextual Understanding Through Storytelling

The oral tradition of storytelling stands as humanity’s original vessel for transmitting contextual understanding; its roots reach deep into the monomyth and symbolic quests that have shaped civilizations. From King Gilgamesh’s search for immortality to Beowulf’s protection of his people, and from Odysseus’s long journey home to Sir Gawain’s test of honor, these epic tales serve as intricate containers of cultural wisdom. Each of these tales carries, within its narrative structures, the essential contexts of what it means to be human. These stories moved from teller to audience not merely as entertainment but as carefully crafted vessels transmitting their society’s most vital constructions of knowledge: moral codes, social expectations, cultural values, and collective wisdom (Greene, 1961).

Storytelling Through Technology Supports Learner Ability

The evolution of storytelling through technological interventions has not diminished its vessel-like quality. Instead, technology has expanded its capacity, allowing these containers of context to hold even more layers of meaning through dynamic components of visual, spatial, and audio mechanisms. Modern digital storytelling tools have transformed ancient vessels into multimedia repositories of context, capable of conveying complex cultural and conceptual understanding through an intricate interplay of sight, sound, and interactive engagement, all while still maintaining the fundamental power of narrative to transport and transform understanding. Moreover, research has found that digital storytelling promotes individualized and autonomous story design (Kilic, 2014). With its reduced demand on cognitive memory resources and its increased creative visual and audio elements (Takacs et al., 2015), digital storytelling supports learner ability to indicate growth in conceptual knowledge (Hull & Nelson, 2005).

Storytelling For Understanding

Storytelling as a multimodality presents opportunities to understand large-scale social scenarios, such as racial trauma or climate change, by mobilizing characters, plot, and resolutions in creative ways (Stenmark, 2015; Stevenson, 2018). Furthermore, posttests of storytelling interventions show well-defined increases in learners' holistic understanding of instructional material, as both prospective and respective judgments were engaged (Fleming & Dolan, 2012). The awareness of one's own thinking, or metacognition, is a paramount skill for learner revision and application of conceptual knowledge, especially as learners develop and regulate their learning processes (Fleur et al., 2021).

Applications of Storytelling for Conceptual Change

Although positive emotions have been deemed as pivotal for engaging teaching and learning to occur (Um et al., 2012), it is important to acknowledge that we have not yet *Goldilocks*-ed our way to facilitating conceptual change in a manner that is *just right*. Learners' emotional barriers still exist in this kingdom of storytelling, and diverse emotions are a normal experience in educational settings, as learners' mental models can generate positive or negative emotions during learning. In fact, the presence of emotional barriers can further support learning efficacy and intrinsic motivation (Kuo et al., 2023). Often, the learners' affective responses can be a frustrating "hot bowl of porridge," which greatly impacts their cognitive processes. Learners can practice recognizing complex emotions and strengthening intrapersonal awareness (Acim, 2021; Catala et al., 2023) through rich-with-emotion story formats by using a variety of available contexts to support their exploration of social language and empathy and by also gaining an understanding of *others'* states of being (Unsworth, 2014; Kucirkova, 2017).

Safely Examining Conceptual Frameworks

When stories present characters who are grappling with misconceptions or encountering evidence that challenges their existing beliefs, learners can safely examine their own conceptual frameworks through this narrative lens. Emotional resonance, created through storytelling, provides a scaffold for conceptual change (Deane et al., 2019). As learners empathize with characters working through cognitive conflict, they develop a greater willingness to engage in their own process of conceptual transformation. Thus, stories serve as both mirror and window, allowing learners to reflect on their own conceptual journey while glimpsing alternative ways of thinking through the experiences of characters.

Removing Restrictive Labels and Dismantling Prejudice

Educational environments often classify learners through restrictive labels. These labels are based on academic performance, behavioral patterns, language proficiency, socioeconomic background, and perceived ability levels, which can manifest emotional barriers, such as stereotype threat (Mangels et al., 2012), reduced self-efficacy, anxiety, and disengagement during learning (Sinatra et al., 2008). These biases run deep in educational and social domains, so putting inclusive educational interventions into place is imperative to dismantling prejudice (Dawson, Kilgore, & Rawcliffe, 2022).

Rather than relying on traditional literature, the educator can bring in diversified experiences and voices to help break down barriers (Baldasaro et al., 2014). The use of culturally and socially diverse literature allows learners to see themselves and their life experiences reflected, which further enables them to better understand their peers and the experiences of others (Leahy & Foley, 2018). From there, learners can create counter-stories or collaborate on thematic elements that advance their individual cultures.

Addressing Misconceptions Through Shared Narratives

Storytelling reveals cultural frameworks and addresses misconceptions through shared narratives. When communities share their stories, they create opportunities for deeper cultural understanding and learning, as illustrated by Indigenous tribe storytelling that explains the spiritual significance of white bison beyond their mere biological rareness (Hogrefe, 2017). Through such sharing, stories become vessels that carry and translate cultural context across different groups of people. This example furthers the conceptual change models' interactional and reconstructive processes of learning, as exposure to different cultures strengthens meaning-making (Luwisch, 2001). Storytelling and re-storying create opportunities to diminish atypicality, prompt reflexive socialization, and increase relatability (Kaufman et al., 2003).

Improving Accessibility

The accessibility of storytelling helps cultivate problem-solving skills through a variety of formal and informal learning opportunities (Gatt & Theuma, 2012). Storytelling's easy access also bolsters its application for learners across age groups, abilities, and backgrounds. And through observation of modeled oral narratives and the scaffolding of retelling practices, learners engage in creative language and recall skills.

Yotta (2023) found that intrapersonal differences in organizing information can impact learners' abilities to recall educational material in a unilateral method. Pauls and Archibald (2021) found that storytelling is an intervention for learners with language delays, as found in developmental language disorder (DLD). Other studies (Craig & Baron-Cohen, 2000; Loukusa et al., 2014) showed that storytelling impacted social skills and executive functioning, as found in autism spectrum disorder (ASD).

Storytelling bolsters working memory and developmental communication mechanisms for all grade levels and learners, which is promoted by its key linguistic and supplemental visual components (Veraksa et al., 2020). For this reason, storytelling strongly complements identified pedagogical strategies—such as personalized learning, inquiry-based instruction, cooperative learning, differentiated instruction, formative assessment, and project-based learning—that are used in current classrooms. When scientific concepts are presented through narrative structures, learners are more likely to engage with evidence that challenges their existing mental models, as storytelling provides familiar contexts that make complex information more accessible and persuasive. From the information presented in story formats, audiences can generalize and utilize inductive reasoning to apply newly developed concepts to challenging scenarios (Dahlstrom, 2014).

The compelling delivery of novel information through storytelling encourages the audience to more openly consider its narratives (Slater & Rouner, 2002) and to accept its new knowledge. Here, it is important to acknowledge that storytelling is *just as powerful a tool* for negative messaging as for positive, conceptual change.

Credible research is performed every day, and the need to convey significant data that may be facing social and political contention (like virology and climatology) in a manner that minimizes threats is important. Storytelling can present truths in a manner that feels safe to listeners. For example, approaching sensitive topics such as climate change through storytelling helps avoid finger-pointing. In this example, storytelling helps inspect sociocultural symptoms of record-setting temperatures in a way that allows positive attitudes to overcome cynicism (Gehlback, et al., 2023). Additionally, an increase in narrative-based research helps further audiences' active inquiry of information (Borah et al., 2022) and promotes listener comprehension in widely understood story formats.

Practical Recommendations

To design effective storytelling interventions that facilitate conceptual change, educators should focus on key implementation strategies. First, stories should align clearly with learning objectives, while also assuring learners of their relevance (Green, 2004). Second, through metaphor and symbolic representation, learners should emotionally engage with content (Citron & Goldberg, 2014) and create personal interpretations that enhance motivation. Finally, through integrating elements of departure, challenges, conflict, and rebirth, stories can illustrate the process of conceptual change, and show characters resolving their misunderstandings.

Information-rich stories support content connections (McNett, 2016), while follow-up reflection and peer dialogue allow students to articulate thoughts and confront preconceptions actively (Chang, 2019). In addition to peer dialogue and reflection, private journaling also gives learners time to organize their conceptual understanding (Walker, 2006) of the new knowledge. This careful design creates powerful tools for promoting lasting conceptual change.

Table 1. *Storytelling Interventions*

Activity	Description	Conceptual Change Elements
Tale Transformations: Reimagining Folklore	Learners use familiar fairy tales and folktales as vessels to explore and explain academic concepts, leveraging the universal understanding of these stories to build new knowledge (Kole, 2018).	• Uses familiar narrative structures • Provides scaffolding for complex ideas • Enhances memory through story association • Develops creative-thinking skills • Builds cross-disciplinary connections
Living History Narratives	Learners develop first-person narratives from historical or scientific perspectives (Metz et al., 2007).	• Utilizes context-based learning of events • Understands cause and effect • Facilitates connections between past and present
Cross-Cultural Story Integration	Learners explore different cultural stories that explain similar phenomena, comparing various perspectives (Dunn & Cherup, 2023).	• Recognizes universal themes • Analyzes critically different perspectives
Story-Based Experiments	Learners design and conduct experiments framed as stories (Prins et al., 2017).	• Integrates scientific method with narrative structure • Develops hypothesis-testing skills • Enhances observational abilities • Builds procedural-thinking skills
Story Circle Evolution	Learners collaboratively build a story, with each student adding one element that builds on established concepts (Parks, 2023).	• Builds active listening as participants, must connect their contribution to previous elements • Strengthens sequential thinking and cause–effect understanding

Activity	Description	Conceptual Change Elements
Time Travelers	Learners become anthropologists who travel through time and discover how different civilizations solved complex problems specific to an academic discipline (Barnes, 1992).	• Demonstrates how a specific discipline responds to societal needs • Shows multiple approaches to solving same problems
Character-Based Problem Solving	Learners create characters facing real-world problems related to their coursework (Suhirman et al., 2020).	• Makes abstract concepts concrete through character embodiment • Creates connections between problems and solutions • Builds empathy through character perspective-taking
Reverse Engineering Stories	Learners analyze familiar stories to identify core elements, then remake them to explain course concepts (Zhong et al., 2024).	• Thinks critically through story deconstruction • Recognizes patterns across different contexts • Makes connection between familiar and new concepts
Narrative Boardwalk	Learners navigate a game board on which each space triggers different story elements and learning concepts; the game becomes a vessel for both narrative construction and content mastery (Thacker, 2024).	• Creates engaging context for problem solving • Provides structured framework for narrative development • Encourages collaborative learning • Makes abstract concepts concrete through game mechanics
Personal Connection Stories	Learners write stories connecting course material to their own experiences (Eodice et al., 2019).	• Recognizes real-world applications • Develops metacognitive skills • Enhances personal relevance in learning
Digital Story Mapping	Learners craft multimedia stories using digital tools, incorporating research and course concepts (Berendsen et al., 2018).	• Develops organizational and sequential thinking • Enhances research and synthesis abilities
Story-Based Assessments	Instead of traditional tests, learners demonstrate understanding by creating stories that accurately incorporate course concepts (Jankowski, 2021).	• Integrates multiple concepts • Assesses knowledge more authentically
The Great Character Debate	Learners choose opposing characters from different stories or create original characters who hold contrasting views on a relevant course concept (Oros, 2007).	• Understands multiple perspectives on complex issues • Develops empathy for opposing viewpoints through character embodiment • Practices evidence-based argumentation while maintaining creative engagement

Activity	Description	Conceptual Change Elements
Misconception Metamorphosis: A Journey	Learners practice personifying misconceptions and accurate concepts as characters in conflict, creating a story of transformation and understanding (Trabucchi et al., 2022).	• Makes metacognition visible and concrete • Creates emotional distance from misconceptions • Allows safe exploration of incorrect ideas • Provides framework for conceptual change • Develops reflective-thinking skills

Future Research Directions

Beyond scientific subjects, future research should explore the potential of storytelling in other fields of study—such as history, literature, ethics, and social studies—where narrative techniques could profoundly enhance conceptual understanding. Investigations could examine how storytelling influences student critical thinking, empathy, and retention of complex concepts in these areas of study. Additionally, comparative studies between storytelling and other pedagogical strategies across subject matters could provide valuable insights into the most effective methods for fostering deep, conceptual learning. Longitudinal studies tracking the long-term effects of storytelling on student outcomes would also contribute to a more comprehensive understanding of its educational benefits. By broadening the scope of research to include a variety of academic disciplines, educators can develop more nuanced and effective approaches to utilizing storytelling as a powerful tool for conceptual change across the curriculum.

Further research should explore storytelling's efficacy through experimental investigations in education. In addition to conducting comparative studies that assess the effectiveness of storytelling-based interventions across various subject matters, interventions could also be assessed across educational levels in a variety of learning environments. As a learning strategy, storytelling's effectiveness can be compared to other active strategies, such as reenactments, role-playing, and debates. Furthermore, research should compare teacher-led versus student-led storytelling as a way to understand how the characteristics of the storyteller might influence the understanding and retention of key concepts for listeners. By expanding research to encompass these diverse approaches, educators and scholars can develop a more nuanced understanding of how storytelling can optimally enhance educational practices and promote conceptual change across diverse learning environments.

Conclusion

Implementing classroom storytelling interventions should follow key steps in order to successfully facilitate conceptual change, and, perhaps, choosing the story or storytelling format may be the most important. Learner engagement begins with the introduction of the story and its relevance to the instructional material. Fortunately, educators do not need to spend precious planning time on writing heavily detailed manuscripts, as many well-known narratives, folktales, and fairy tales can be vehicles for this process.

Once educators align the intervention with current content objectives, they should practice instructional scaffolding by involving learners in discussions of vocabulary and symbolic representations found in the story. If the intervention is to identify *misconceptions*, for example, educators can invite learners to define the word and then provide a variety of realistic or imaginative examples. Having adapted a familiar folktale to illustrate misconceptions, the educator then presents the story, which frames how misconceptions arise and become problematic. Here is an example:

> Once upon a time, a piece of the sky fell on Chicken Little's head. Or so Chicken Little believed. The evidence was clear to Chicken Little, though, since the object that fell came directly from above. An intuitive preconception of how the world works was immediately confirmed by Chicken Little.
>
> As Chicken Little's emotions heightened, the fear of the whole sky eventually falling down became too overwhelming. Chicken Little felt motivated to inform others of this phenomenon, so Chicken Little shared the concept of the sky falling with several other barnyard characters.
>
> Each declaration of impending disaster perpetuated Chicken Little's theory of the experience. And each time Chicken Little told the story, it was with belief-revising accommodations. With each revision, the barnyard characters similarly evaluated Chicken Little's declaration: by not responding.
>
> In the end, Chicken Little's misconception of the sky's fallen piece, which was a categorical mistake—and in fact simply an acorn—led Chicken Little and the other barnyard characters straight to Foxy Loxy. Emotional dysregulation of the group blinded them to the imminent danger revealed in Foxy Loxy's toothy grin.

Conceptual change is powerful, and stories can create a nonthreatening mode in which this process can occur. One positive impact of conceptual change through storytelling is self-regulated learning. By focusing instruction on common misconceptions, educators can help learners become aware of their representations of knowledge and motivate learners' conceptual transformations, which support learners' development of valuable, lifelong, critical-thinking skills. Storytelling engages learners in multiple disciplines in a variety of ways to competently explore the intelligibility and fruitfulness of new concepts. The next chapter of creative pedagogical strategies lies with incorporating storytelling interventions.

References

Acim, R. (2021). Why narrative poetry still matters in stylistics. *Journal of Educational Research & Practice, 11*(1), 439–453. https://doi.org/10.5590/JERAP.2021.11.1.31

Alexander, P. A., Schallert, D. L., & Reynolds, R. E. (2009). What is learning anyway? A topographical perspective considered. *Educational Psychologist, 44*(3), 176–192. https://doi.org/10.1080/00461520903029006

Aquilina, G., Iacono, U. D., Gabelli, L., Picariello, L., Scettri, G., & Termini, G. (2024). "Romeo and Juliet: A love out of the shell": Using storytelling to address students' misconceptions and promote modeling competencies in science. *Education Sciences, 14*(3), 239. https://doi.org/10.3390/educsci14030239

Baldasaro, M. M., Maldonado, N., & Baltes, B. (2014). Storytelling to teach cultural awareness: The right story at the right time. *LEARNing Landscapes*, *7*(2), 219–232. https://doi.org/10.36510/learnland.v7i2.661

Barnes, N. (1992). The fabric of a student's life and thought: Practicing cultural anthropology in the classroom. *Anthropology & Education Quarterly, 23*(2), 145–159. https://doi.org/10.1525/aeq.1992.23.2.05x1263o

Berendsen, M. E., Hamerlinck, J. D., & Webster, G. R. (2018). Digital story mapping to advance educational atlas design and enable student engagement. *ISPRS International Journal of Geo-Information, 7*(3), 125. https://doi.org/10.3390/ijgi7030125

Bohn-Gettler, C. M., & Kaakinen, J. K. (2022). Introduction to the special issue on emotions in reading, learning, and communication. *Discourse Processes, 59*(1–2), 1–12. https://doi.org/10.1080/0163853X.2021.1899369

Borah, P., Xiao, X., & Lee, D. K. L. (2022). Narrative messages, information seeking and COVID-19 vaccine intention: The moderating role of perceived behavioral control. *American Journal of Health Promotion, 36*(6), 923–933. https://doi.org/10.1177/08901171221075019

Boyd, B. (2018). The evolution of stories: From mimesis to language, from fact to fiction. *WIREs Cognitive Science, 9*(1), e1444. https://doi.org/10.1002/wcs.1444

Catala, A., Gijlers, H., & Visser, I. (2023). Guidance in storytelling tables supports emotional development in kindergartners. *Multimedia Tools and Applications, 82*, 12907–12937. https://doi.org/10.1007/s11042-022-14049-7

Chang, B. (2019). Reflection in learning. *Online Learning, 23*(1), 95–110. https://doi.org/10.24059/olj.v23i1.1447

Citron, F. M. M., & Goldberg, A. E. (2014). Metaphorical sentences are more emotionally engaging than their literal counterparts. *Journal of Cognitive Neuroscience, 26*(11), 2585–2595. https://doi.org/10.1162/jocn_a_00654

Craig, J., & Baron-Cohen, S. (2000). Story-telling ability in children with autism or Asperger syndrome: A window into the imagination. *Israel Journal of Psychiatry and Related Sciences, 37*(1), 64–70. https://s3.eu-west-1.amazonaws.com/docs.autismresearchcentre.com/papers/2000_Craig_BC.pdf

Curci, A., & Bellelli, G. (2004). Cognitive and social consequences of exposure to emotional narratives: Two studies on secondary social sharing of emotions. *Cognition and Emotion, 18*(7), 881–900. https://doi.org/10.1080/02699930341000347

Dahlstrom, M. F. (2014) Using narratives and storytelling to communicate science with nonexpert audiences. *Proceedings of the National Academy of Sciences, 111*(Suppl. 4), 13614–13620. https://doi.org/10.1073/pnas.1320645111

Dawson, B. A., Kilgore, W., & Rawcliffe, R. M. (2022). Strategies for creating inclusive learning environments through a social justice lens. *Journal of Educational Research & Practice*, *12*(0), 3–27. https://doi.org/10.5590/JERAP.2022.12.0.02

Deane, P., Somasundaran, S., Lawless, R. R., Persky, H., & Appel, C. (2019), The key practice, building and sharing stories and social understandings: The intrinsic value of narrative. *ETS Research Report Series, 2019*(1), 1–78. https://doi.org/10.1002/ets2.12266

Diamond, A. (2013). Executive functions. *Annual Review of Psychology, 64*, 135–168. https://doi.org/10.1146/annurev-psych-113011-143750

Dole, J. A., & Sinatra, G. M. (1998). Reconceptualizing change in the cognitive construction of knowledge. *Educational Psychologist, 33*(2–3), 109–128. https://doi.org/10.1080/00461520.1998.9653294

Dunn, T. M., & Cherup, S. (2023). Storytelling and success: How storytelling can be used to promote diversity, cross-cultural understanding, and confidence in the classroom. *Journal of Education, 203*(3), 690–699. https://doi.org/10.1177/00220574211032309

Eodice M., Geller, A. E., & Lerner, N. (2019). The power of personal connection for undergraduate student writers. *Research in the Teaching of English, 53*(4), 320–339. https://doi.org/10.58680/rte201930141

Ferrero, M., Hardwicke, T. E., Konstantinidis, E., & Vadillo, M. A. (2020). The effectiveness of refutation texts to correct misconceptions among educators. *Journal of Experimental Psychology: Applied, 26*(3), 411–421. https://doi.org/10.1037/xap0000258

Fleming, S. M., & Dolan, R. J. (2012). The neural basis of metacognitive ability. *The Royal Society, 367(*1594), 1338–1349. https://doi.org/10.1098/rstb.2011.0417

Fleur, D. S., Bredeweg, B., & van den Bos, W. (2021). Metacognition: Ideas and insights from neuro- and educational sciences. *NPJ Science of Learning, 6*(1), 13. https://doi.org/10.1038/s41539-021-00089-5

Funkhouser, A., & Nicoladis, E. (2023). A really good example helps learning about an abstract concept. *International Journal for the Scholarship of Teaching & Learning, 17*(1), 12. https://doi.org/10.20429/ijsotl.2023.17112

Gatt, S., & Theuma, G. (2012, Winter). Inquiry-based learning in early years through story-telling. *Journal of Emergent Science*, 19–24. https://www.researchgate.net/publication/259533561_Inquiry-based_Learning_in_Early_years_through_Story-telling

Green, M. C. (2004, April 1). *Teaching tips: Storytelling in teaching*. Association for Psychological Science. https://www.psychologicalscience.org/observer/storytelling-in-teaching

Greene, T. (1961). The norms of epic. *Comparative Literature, 13*(3), 193–207. https://doi.org/10.2307/1768997

Gualberto, C., & Kress, G. (2019). Social semiotics. In R. Hobbs, P. Mihailidis, G. Cappello, M. Ranieri, & B. Thevenin (Eds.), *The International Encyclopedia of Media Literacy*. Wiley-Blackwell. https://doi.org/10.1002/9781118978238.ieml0226

Hajisoteriou, C., Panaou, P., & Angelides, P. (2022). Empowering children to speak up and act on social justice issues: The use of folktales and collaborative storytelling as tools of social imagination. *British Educational Research Journal, 48*(2), 253–271. https://doi.org/10.1002/berj.3765

Hamer, L., & Ross, W. (2024). Forms of knowing: Emotion, creativity and play in learning. In A. Valquaresma, L. Dantas de Paula, & T. K. Rodney (Eds.), *Creativity and learning* (pp. 45–75). Palgrave Macmillan. https://doi.org/10.1007/978-3-031-73393-2_3

Harris, R. B. (2007). Blending narratives: A storytelling strategy for social studies. *The Social Studies, 98*(3), 111–116. https://doi.org/10.3200/TSSS.98.3.111-116

Hogrefe, J. (2017). Technopoïeses and the myth of the white buffalo woman. *Icono 14, 15*(1), 46–62. https://doi.org/10.7195/ri14.v15i1.1025

Hull, G. A., & Nelson, M. E. (2005). Locating the semiotic power of multimodality. *Written Communication, 22*(2), 224–261. https://doi.org/10.1177/0741088304274170

Hynd, C. R. (2001). Refutational texts and the change process. *International Journal of Educational Research*, *35*(7–8), 699–714. https://doi.org/10.1016/S0883-0355(02)00010-1

Jankowski, N. (2021, February). *Evidence-based storytelling in assessment* (Occasional Paper No. 50). National Institute for Learning Outcomes Assessment. https://www.learningoutcomesassessment.org/wp-content/uploads/2021/02/Occasional-Paper-50_EBST.pdf

Johnson, M. L., & Bungum, T. (2013). Identifying and reconstructing common cold misconceptions among developing K–12 educators. *American Journal of Health Education, 44*(3), 169–175. https://doi.org/10.1080/19325037.2013.779901

Johnson, M. L., Herrick, I. R., Vaughn, A. R., Jones, S. H., Schoepf, S., & Taasoobshirazi, G. (2023). Strategies and challenges to teaching for conceptual learning. In M.M. Buehl, & J. S. Vogler (Eds.), *Theory to practice: Educational psychology for teachers and teaching: Teaching learning for effective instruction* (pp. 145–168). Information Age Publishing.

Karpicke, J. D. (2012). Retrieval-based learning: Active retrieval promotes meaningful learning. *Current Directions in Psychological Science, 21*(3), 157–163. https://doi.org/10.1177/0963721412443552

Kaufman, J. S., Ewing, M. S., Montgomery, D. M., Hyle, A. E., & Self, P. A. (2003). Chapter 3: Memory and memory-work. *Counterpoints, 116*, 25–42. http://www.jstor.org/stable/42977235

Kiliç, F. (2014). Awareness and cognitive load levels of teacher candidates towards student products made by digital storytelling. *Turkish Online Journal of Distance Education, 15*(3), 94–107. https://files.eric.ed.gov/fulltext/EJ1043693.pdf

Kiselyov, K., & Schunn, C. D. (2022). Storytelling as a tool to enhance conceptual knowledge in cell biology. *Journal of Microbiology and Biology Education, 23*(2), e00303-21. https://doi.org/10.1128/jmbe.00308-21

Kokkotas, P., Rizaki, A., & Malamitsa, K. (2010). Storytelling as a strategy for understanding concepts of electricity and electromagnetism. *Interchange, 41*(4), 379–405. https://doi.org/10.1007/s10780-010-9137-9

Kole, K. (2018). The role of fairy tales in affective learning: Enhancing adult literacy and learning in FE and community settings. *Australian Journal of Adult Learning, 58*(3), 365–389. https://files.eric.ed.gov/fulltext/EJ1199892.pdf

Kucirkova, N. (2017), An integrative framework for studying, designing and conceptualising interactivity in children's digital books. *British Educational Research Journal, 43(6), 1168–1185.* https://doi.org/10.1002/berj.3317

Kuo, Y.-K., Batool, S., devi, S., Tahir, T., & Yu, J. (2024). Exploring the impact of emotionalized learning experiences on the affective domain: A comprehensive analysis. *Heliyon, 10*(1), e23263. https://doi.org/10.1016/j.heliyon.2023.e23263

Leahy, M. A., & Foley, B. C. (2018). Diversity in children's literature. *World Journal of Educational Research, 5*(2), 172–183. https://doi.org/10.22158/wjer.v5n2p172

Lombardi, D., Nussbaum, E. M., & Sinatra, G. M. (2016). Plausibility judgments in conceptual change and epistemic cognition. *Educational Psychologist, 51*(1), 35–56. https://doi.org/10.1080/00461520.2015.1113134

Loukusa, S., Mäkinen, L., Kuusikko-Gauffin, S., Ebeling, H., & Moilanen, I. (2014). Theory of mind and emotion recognition skills in children with specific language impairment, autism spectrum disorder and typical development: Group differences and connection to knowledge of grammatical morphology, word-finding abilities and verbal working memory. *International Journal of Language and Communication Disorders, 49*(4), 498–507. https://doi.org/10.1111/1460-6984.12091

Luwisch, F. E. (2001). Understanding what goes on in the heart and the mind: Learning about diversity and co-existence through storytelling. *Teaching and Teacher Education, 17*(2), 133–146. https://doi.org/10.1016/S0742-051X(00)00047-0

Lwin, S. M. (2019). Introduction. In *A multimodal perspective on applied storytelling performances: Narrativity in context* (pp. 1–14*)*. Routledge. https://doi.org/10.4324/9781351059992-1

Mangels, J. A., Good, C., Whiteman, R. C., Maniscalco, B., & Dweck, C. S. (2012). Emotion blocks the path to learning under stereotype threat. *Social Cognitive and Affective Neuroscience, 7*(2), 230–241. https://doi.org/10.1093/scan/nsq100

Martinez-Conde, S., Alexander, R. G., Blum, D., Britton, N., Lipska, B. K., Quirk, G. J., Swiss, J. I., Willems, R. M., & Macknik, S. L. (2019). The storytelling brain: How neuroscience stories help bridge the gap between research and society. *Journal of Neuroscience, 39*(42), 8285–8290. https://doi.org/10.1523/JNEUROSCI.1180-19.2019

McManimon, S. K., & Casey, Z. A. (2018). (Re)beginning and becoming: Antiracism and professional development with white practicing teachers. *Teaching Education*, *29*(4), 395–406. https://doi.org/10.1080/10476210.2018.1506429

McNett, G. (2016). Using stories to facilitate learning. *College Teaching, 64*(4), 184–193. https://doi.org/10.1080/87567555.2016.1189389

Metz, D., Klassen, S., McMillan, B. A., Clough, M. P., & Olson, J. K. (2007). Building a foundation for the use of historical narratives. *Science and Education 16,* 313–334. https://doi.org/10.1007/s11191-006-9024-z

Miller, S. P., & Hudson, P. J. (2007). Using evidence-based practices to build mathematics competence related to conceptual, procedural, and declarative knowledge. *Learning Disabilities Research & Practice, 22*(1), 47–57. https://doi.org/10.1111/j.1540-5826.2007.00230.x

Nijhof, A. D., & Willems, R. M. (2015). Simulating fiction: Individual differences in literature comprehension revealed with fMRI. *PLoS ONE, 10*(2), e0116492. https://doi.org/10.1371/journal.pone.0116492

Ohlsson, S. (2009). Resubsumption: A possible mechanism for conceptual change and belief revision. *Educational Psychologist, 44*(1), 20–40. https://doi.org/10.1080/00461520802616267

Oros, A. L. (2007). Let's debate: Active learning encourages student participation and critical thinking. *Journal of Political Science Education, 3*(3), 293–311. https://doi.org/10.1080/15512160701558273

Pauls, L. J., & Archibald, L. M. (2021). Cognitive and linguistic effects of narrative-based language intervention in children with developmental language disorder. *Autism and Developmental Language Impairments, 6*. https://doi.org/10.1177/23969415211015867

Parks, P. (2023). Story circles: A new method of narrative research. *American Journal of Qualitative Research*, 7(1), 58–72. https://www.ajqr.org/download/story-circles-a-new-method-of-narrative-research-12844.pdf

Pintrich, P. R., Marx, R. W., & Boyle, R. A. (1993). Beyond cold conceptual change: The role of motivational beliefs and classroom contextual factors in the process of conceptual change. *Review of Educational Research 63*(2), 167–199. https://doi.org/10.3102/00346543063002167

Posner, G. J., Strike, K. A., Hewson, P. W., & Gertzog, W. A. (1982). Accommodation of a scientific conception: Toward a theory of conceptual change. *Science Education, 66*(2), 211–227. https://doi.org/10.1002/sce.3730660207

Prins, R., Avraamidou, L., & Goedhart, M. (2017). *Tell me a story*: The use of narrative as a learning tool for natural selection. *Educational Media International, 54*(1), 20–33. https://doi.org/10.1080/09523987.2017.1324361

Proyer, R. T. (2018). Playfulness and humor in psychology: An overview and update. *HUMOR, 31*(2), 259–271. https://doi.org/10.1515/humor-2016-0080

Schafer, J., Ezirim, M., Gamurorwa, A., Ntsonyane, P., Phiri, M., Sagnia, J., Salakana, L., & Bairu, W. W. (2004). Exploring and promoting the value of indigenous knowledge in early childhood development in Africa. *International Journal of Educational Policy, Research, and Practice*, *5*(3), 61–80. https://files.eric.ed.gov/fulltext/EJ795171.pdf

Sinatra, G. M. (2005). The "warming trend" in conceptual change research: The legacy of Paul R. Pintrich. *Educational Psychologist, 40*(2), 107–115. https://doi.org/10.1207/s15326985ep4002_5

Sinatra, G. M., Brem, S. K. & Evans, E. M. (2008). Changing minds? Implications of conceptual change for teaching and learning about biological evolution. *Evolution: Education and Outreach. 1*, 189–195. https://doi.org/10.1007/s12052-008-0037-8

Sinatra, G. M., & Broughton, S. H. (2011), Bridging reading comprehension and conceptual change in science education: The promise of refutation text. *Reading Research Quarterly, 46*(4), 374–393. https://doi.org/10.1002/RRQ.005

Sinatra, G. M., & Seyranian, V. (2015). Warm change about hot topics: The role of motivation and emotion in attitude and conceptual change about controversial science topics. In L. Corno & E. M. Anderman (Eds.), *Handbook of educational psychology* (3rd ed., pp. 245–256). Routledge.

Sinatra, G. M., & Taasoobshirazi, G. (2018). The self-regulation of learning and conceptual change in science: Research, theory, and educational applications. In D. H. Schunk & J. A. Greene (Eds.), *Handbook of self-regulation of learning and performance* (2nd ed., pp. 153–165). Routledge. https://doi.org/10.4324/9781315697048-10.

Slater, M. D., & Rouner, D. (2002). Entertainment–education and elaboration likelihood: Understanding the processing of narrative persuasion. *Communication Theory, 12*(2), 173–191. https://doi.org/10.1111/j.1468-2885.2002.tb00265.x

Smeda, N., Dakich, E., & Sharda, N. (2014). The effectiveness of digital storytelling in the classrooms: A comprehensive study. *Smart Learning Environments 1*(1), 6. https://doi.org/10.1186/s40561-014-0006-3

Somers, M. R. (1994). The narrative constitution of identity: A relational and network approach. *Theory and Society, 23*(5), 605–649. https://doi.org/10.1007/BF00992905

Stenmark, L. L. (2015). Storytelling and wicked problems: Myths of the absolute and climate change. *Zygon: Journal of Religion and Science, 50*(4), 922–936. https://doi.org/10.1111/zygo.12218

Stevenson, A. D., & Huffling, L. D. (2021). A culturally responsive literacy approach to develop scientific conceptual knowledge through creative narratives. *Journal of Educational Research & Practice*, *11*(1), 386–403. https://doi.org/10.5590/JERAP.2021.11.1.28

Stevenson, N. (2019). Developing cultural understanding through story-telling. *Journal of Teaching in Travel & Tourism, 19*(1), 8–21. https://doi.org/10.1080/15313220.2018.1560528

Stueber, K. R. (2006). Rediscovering empathy: Agency, folk psychology, and the human sciences. *The MIT Press*. https://doi.org/10.7551/mitpress/5833.001.0001

Suhirman, S., Yusuf, Y., Muliadi, A., & Prayogi, S. (2020). The effect of problem-based learning with character emphasis toward students' higher-order thinking skills and characters. *International Journal of Emerging Technologies in Learning, 15*(6), 183–191. https://doi.org/10.3991/ijet.v15i06.12061

Takacs, Z. K., Swart, E. K., & Bus, A. G. (2015). Benefits and pitfalls of multimedia and interactive features in technology-enhanced storybooks: A meta-analysis. *Review of Educational Research, 85*(4), 698–739. https://doi.org/10.3102/0034654314566989

Thacker, I. (2024). Supporting secondary students' climate change learning and motivation using novel data and data visualizations. *Contemporary Educational Psychology, 78*, 102285. https://doi.org/10.1016/j.cedpsych.2024.102285

Trabucchi, D., Buganza, T., Bellis, P., Magnanini, S., Press, J., Verganti, R., & Zasa, F. P. (2022). Story-making to nurture change: Creating a journey to make transformation happen. *Journal of Knowledge Management, 26*(11), 427–460. https://doi.org/10.1108/JKM-07-2022-0582

Tsai, K. C. (2012). Play, imagination, and creativity: A brief literature review. *Journal of Education and Learning, 1*(2), 15–20. https://doi.org/10.5539/jel.v1n2p15

Thom, B. (2003). The anthropology of northwest coast oral traditions. *Arctic Anthropology, 40*(1), 1–28. https://doi.org/10.1353/arc.2011.0035

Um, E., Plass, J. L., Hayward, E. O., & Homer, B. D. (2012). Emotional design in multimedia learning. *Journal of Educational Psychology, 104*(2), 485–498. https://doi.org/10.1037/a0026609

Unsworth L. (2014). Point of view in picture books and animated film adaptations: Informing critical multimodal comprehension and composition pedagogy. In E. Djonov & S. Zhao (Eds.), *Critical Multimodal Studies of Popular Culture* (pp. 202–216). Routledge.

Veraksa, A., Bukhalenkova, D., Kartushina, N., & Oshchepkova, E. (2020). The relationship between executive functions and language production in 5–6-year-old children: Insights from working memory and storytelling. *Behavioral Sciences, 10*(2), 52. https://doi.org/10.3390/bs10020052

Walker S. E. (2006). Journal writing as a teaching technique to promote reflection. *Journal of Athletic Training, 41*(2), 216–221. https://www.researchgate.net/publication/6993680_Journal_Writing_as_a_Teaching_Technique_to_Promote_Reflection

Will, K. K., Masad, A., Vlach, H. A., & Kendeou, P. (2019). The effects of refutation texts on generating explanations. *Learning and Individual Differences, 69*, 108–115. https://doi.org/10.1016/j.lindif.2018.12.002

Yoder-Wise, P. S., & Kowalski, K. (2003) The power of storytelling. *Nursing Outlook, 51*(1), 37–42. https://doi.org/10.1067/mno.2003.2

Yotta, E. G. (2023). Accommodating students' learning styles differences in English language classroom. *Heliyon, 9*(6), e17497. https://doi.org/10.1016/j.heliyon.2023.e17497

Yuan, Y., Major-Girardin, J., & Brown, S. (2018). Storytelling is intrinsically mentalistic: A functional magnetic resonance imaging study of narrative production across modalities. *Journal of Cognitive Neuroscience, 30*(9), 1298–1314. https://doi.org/10.1162/jocn_a_01294

Zengilowski, A., Nash, B. L., Schuetze, B. A., & Schallert, D. L. (2022). Bringing refutation texts back to their literacy roots: What do critical literacy and culturally responsive pedagogy have to teach us about students' conceptual change? *Literacy Research: Theory, Method, and Practice, 71*(1), 341–358. https://doi.org/10.1177/23813377221109544

Zhong, B., Liu, X., & Li, X. (2024). Effects of reverse engineering pedagogy on students' learning performance in STEM education: The bridge-design project as an example. *Heliyon, 10*(2), e24278. https://doi.org/10.1016/j.heliyon.2024.e24278

JERAP

The *Journal of Educational Research & Practice* is a peer-reviewed journal that provides a forum for studies and dialogue about developments and change in the field of education and learning. The journal includes research and related content that examine current relevant educational issues and processes. The aim is to provide readers with knowledge and with strategies to use that knowledge in educational or learning environments. *JERAP* focuses on education at all levels and in any setting, and includes peer-reviewed research reports, commentaries, book reviews, interviews of prominent individuals, and reports about educational practice. The journal is sponsored by The Richard W. Riley College of Education and Human Sciences at Walden University, and publication in *JERAP* is always free to authors and readers.