

A NARRATIVE APPROACH TO EDUCATIONAL VIDEO TRAINING

by

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A thesis submitted in partial fulfillment
of the requirements for the degree

of

MASTER OF SCIENCE

in

Instructional Technology and Learning Sciences

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2019

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ABSTRACT

A Narrative Approach to Educational Video Training

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Narrative, or storytelling, is an imperative piece of learning and teaching. Educational videos are frequently used in classroom settings, but some scholars argue narrative approaches should be used more frequently in educational settings, such as online classes. Presently, there is limited research on narratives inserted into educational videos, especially within a technical education context. In this study, dental assisting students learned how to assist with a composite restoration after watching a video training either with or without a narrative. Knowledge retention, procedural understanding, motivation, and preference were measured to see whether the narrative affected student learning outcomes or if the students preferred one video to another. A group of dental assisting students from Bridgerland Technical College in Logan, Utah were randomly assigned to two groups. The treatment group watched instructional video content explaining the dental procedures with a story about an instructor's experiences

dealing with a real patient. The control group watched similar video content with the same instruction without any stories from the instructor. The number of students completing this portion of the study was much lower than expected (n=11). Pretest and posttest assessments indicated that there was no significant difference in knowledge retention, procedural understanding, or motivation. Another group of students (also n=11), were shown both video trainings to determine additional insights via student interviews. Students said they preferred the non-narrative video as a reference for the dental procedure overall. Students also reported the brevity and simplicity of the non-narrative as positive features. In contrast, students reported the narrative video as more emotionally engaging, including in regards to developing empathy. Students also reported the narrative video as preparing them to work with patients.

(91 pages)

PUBLIC ABSTRACT

A Narrative Approach to Educational Video Training

Matthew S. Havertz

Teachers often use videos to teach their students, but stories are not used as often in educational videos as they could be. Experts tell us that stories are an important part of teaching and learning. Unfortunately, there is only a small amount of research and no definitive expert agreement about stories used in educational videos. This is especially true for videos used with technical education students, like mechanic students or dental assisting students. In this study, dental assisting students learned how to assist a dentist with a standard cavity procedure after watching a video with or without a story. The study measured which video helped students get better quiz scores, feel more motivated, and which videos they preferred better. The students were randomly assigned to watch either video. The results demonstrated no significant difference in quiz scores or motivation, part of this was due to the low number of participants in this section of the study. Another group of students were shown both videos and then interviewed to determine additional insights. Overall, students preferred the video without the story as a reference for the dental cavity procedure. Students also seemed to like the video without the story because it was short and simple. In contrast, students reported the video with the story was more emotionally engaging, especially in regards to developing empathy for patients. Students also reported the video with the story better helped prepared them to work with patients.

ACKNOWLEDGMENTS

I would like to acknowledge Bridgerland Technical College for their incredible support on my thesis. Mason Lefler, the Director of the Technology Enhanced Instruction Department, graciously allowed me to use the evaluation I did as an employee at Bridgerland for my thesis. The Department Head and instructors in the Dental Department were both patient with me as I created the videos for this research and kept coming back for help with resolving issues.

I would also like to acknowledge the people I worked with as a student at Utah State University. Dr. Andrew Walker, the Department Head of the Instructional Technology and Learning Science Department, was instrumental in helping me to secure some small funding for this research from the Emma Eccles Jones College of Education and Human Services as well as being supportive to me personally during this process. I could not have done this without my encouraging thesis committee, including my chair, Dr. Breanne Litts. Bert Sainsbury, an English instructor, also kindly offered to review and provide feedback for my thesis.

Finally, I would like to express special gratitude to my wife Melissa Havertz for her emotional support. She encouraged me along throughout my graduate school experience and stayed up with me countless nights as I worked on this research.

Matthew S. Havertz

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CHAPTER 1

INTRODUCTION

If narrative, or storytelling, is one of the fundamental ways “reality” is constructed in the mind (Bruner, 1991) and even central to our intelligence (Schank, 1990), it must be imperative to learning and teaching. Bruner, Schank, and other experts in cognition and learning explained narrative is a fundamental part of learning (Bruner, 1991; Schank, 1990; Collins, 1999). A distinguished screenwriting consultant may have summed up part of the reason stories have a powerful teaching effect when he wrote, “Stories ... give people metaphors by which they can better understand their own lives” (Vogler, 1998, p. 295). Similarly, Schank explained, “In order to learn or understand something, our minds attempt to process everything we see and hear by comparison ... Understanding a story means being able to correlate the story we are hearing with one that we already know” (Schank, 1990, p. 19; 21). This means stories are central to the way we learn and grow.

Hokanson and Fraher discussed the implementation of stories in educational videos “to increase the effectiveness and efficiency of instruction design,” but they acknowledged storytelling is not used in educational videos as frequently as it could be (Hokanson & Fraher, 2008, p. 27). Organizations and individuals which use storytelling as an educational tool in their videos exist. For example, TED-Ed often uses narrative in their animated YouTube videos (TED-Ed, 2019). A middle school math teacher in Pennsylvania gained local news attention in 2010 for producing instructional math videos using humorous stories (Dreon, Kerper, & Landis, 2011). However, even though these

recent examples have come forth since the time Hokanson and Fraher published their article, their point is still relevant, storytelling in educational videos still could be used much more frequently than they are currently. The limited previous research on educational videos with narrative is mixed suggesting narrative videos do not promote retention of knowledge in specific contexts (Shen, Sheer & Li, 2015), while others have found an increase in retention abilities (Morgan, Movius, & Cody, 2007). Additional research needs to assess the impact of narrative as an educational tool in instructional video, especially because of its suggested potential impact (e.g., Hokanson & Fraher, 2008).

The aim of this research study was to answer the question of whether narrative instruction is effective in technical education, specifically among dental assisting students at Bridgerland Technical College in Logan, Utah. To what extent do narratives inserted into an educational video training for these students affect learning outcomes, student motivation, and student preference? Storytelling is not often a formal instructional tool in dental assisting education; for example, most dental assisting textbooks merely describe the purpose for a dental procedure and the procedure's steps (e.g., Bird & Robinson, 2017). Some research studies have evaluated case studies inserted into dental and dental hygiene education (Abbey, Arnold, Halunko, Huneke, & Lee, 2003; Cragun, et al., 2012; McKenzie, 2013; Richards & Inglehart, 2006), but dental assisting students are very rarely exposed to storytelling teaching techniques.

For my research, I conducted a mixed-methods study examining the efficacy of narrative-based instructional video content with dental assisting students. This study attempted to measure how well dental assisting students learned how to assist with a

composite restoration after watching either a video training with or without a narrative. I also attempted to measure video engagement and preference. Furthermore, I randomly assigned dental assisting students to two groups. The treatment group watched instructional video content explaining the dental procedures with a story about an instructor's experiences dealing with real patients. The control group watched video content of the same length with the same instruction without any stories from the instructor. Pretest and posttest assessments measured knowledge retention and motivation. For the qualitative portion of the study, I interviewed another group of students, who were shown both video trainings, to determine what characteristics may have made either video preferable. These data were originally collected for Bridgerland Technical College's evaluation purposes in order to inform the design of future instructional video content at the school.

CHAPTER 2

THEORETICAL FOUNDATIONS AND BACKGROUND

Theoretical Foundations

Historical Roots

Before cognitive psychologist like Bruner and Schank wrote about narratives being essential to the human mind's ability to process information, many great teachers utilized storytelling as a vehicle for disseminating knowledge. As one author noted, "The telling of stories lies at the heart of human communication. If we go back to the earliest human civilizations, we find that it is through story that knowledge, information, meaning and wisdom are passed from generation to generation" (Brophy, 2016, p. ix). For instance, Native Americans use oral stories as a way to share and preserve cultural values and used stories long before European settlers arrived with their own narratives (Archibald, 2008). Aesop, an ancient Greek storyteller, used stories to teach principles (Nichelli, et al., 1995). Most ancient religious texts are littered with, if not completely comprised of, stories (Greenstein, 1981). Anciently, the dramatic story form is attributed to Aristotle (Aristotle, trans. 1997). This historical precedence shows why narratives are central to learning; these time-honored instructional stories have been preserved for centuries. However, the historical use of stories is not the only evidence advocating the use narratives in modern-day education.

According to Schank, the ability to create and communicate with stories is one of the main skills that differentiates human intelligence from artificial intelligence (Schank,

1990). In his book *Tell Me a Story*, Schank argued that at the core of human intelligence is not just the ability to hear stories, but also the ability to organize experiences into stories and communicate those stories to others. To Schank, humans catalog stories into memories for retrieval for application to navigate new situations. He explained stories can be so essential to learning and communicating that “if the story is good enough, you usually don’t have to state your point at all” (Schank, 1990, p. 11).

Bruner added a second witness to the idea that peoples’ brains categorize information as narrative. He said, “We organize our experience and our memory of human happenings mainly in the form of narrative” (Bruner, 1991, p. 4). Bruner, however, felt stories shaped not only personal development, but reflected the construction of reality, including in cultures: stories can be used by groups to shape the larger group identity and behavior. He emphasized scholars are not to analyze narratives in a “cultural vacuum” (Bruner, 1991, p. 20). It is important to note, Bruner defined narrative as “an account of events occurring over time,” but he recognized, most stories were much more complex: “not every sequence of events recounted constitutes of narrative” (Bruner, 1991, p. 6; 11).

Some scholars provide detailed reasons for why and how narratives stimulate learning. For example, narratives may be used to assist with comprehension, to build mental and verbal imagery, to assist with emotional development (especially in developing empathy), to assist in producing cultural identity, and as scaffolding for developing language skills (Collins, 1991). This compelling evidence again shows us why narratives should be used in education, especially including educational video training.

Cognitive Psychology

Some scholars even assert narrative is connected to human consciousness.

“Narrative,” one scholar argued, “can be viewed ... as a cognitive structure or way of making sense of experiences” (Abbott, 2010, p. 1). Other scholars agree that understanding and sense making is psychologically possible through narrative (Mateas & Sengers, 1999). Part of the reason for this may be that narrative is used as a way of establishing and exploring self-identity (Fina & Georgakopoulou, 2011; Michele, 2000; Ochs & Capps, 1996). Ochs and Capps even go as far as to assert, “Narrative and self are inseparable” (Ochs & Capps, 1996, p. 19). They explained, stories originate chiefly from our lived experiences and then give rise to further experiences as we make choices based on these narratives in a cyclical pattern (Ochs & Capps, 1996).

Stories are not only important for personal self-identity, but cultural self-identity as well. Archibald, an Indigenous scholar and member of the Stó:lō Nation, explained stories can be a means to pass down cultural heritage and values. According to Archibald, for many Aboriginal People, stories connect them to themselves, their family, their community, and their nation. Archibald also said, “Stories have the power to make our hearts, minds, bodies, and spirits work together. When we lose a part of ourselves, we lose balance and harmony” (Archibald, 2008, p. 12). Stories are used more often than most realize to shape perspectives and attitudes, which in turn, shape our behavior. It is clear narratives are also created culturally as well and are at the heart of our cultural identities and the way we connect to each other.

With the aforementioned affordances of stories in mind, it only follows that narratives are indeed a fundamental part of human intelligence and learning, as Schank

and Bruner argued (Bruner, 1991; Schank, 1990). However, since Shank and Bruner published their ideas, it is important to note that artificial intelligence (AI) has been able to replicate human storytelling to a certain degree. An AI system called BRUTUS has been reported to produce stories and “not just humdrum stories of the sort seen for years in AI, but first-rate fiction thought to be the province of human genius” (Bringsjord, Ferrucci, & Ferrucci, 1999, p. 262). With this being said, it appears these computer systems cannot quite replicate the narrative processing, cataloging, and self-reflection originally described by Schank.

Narrative Structure

Narrative can easily be defined in its simplest, broadest terms: something happened over time. In *The Encyclopedia of the Novel*, Abbot first begins by explaining narrative simply in terms of chronology: occurrences unfolding through time (Abbott, 2010; Herman, 2011). However, as Herman pointed out, if narrative were merely that simple, that would mean plant growth and cookie recipes would constitute a story; popular opinion would probably dispute such a claim (Herman, 2011). Abbot asserted, once the simplest definition of story is off the table “immediately differences of opinion arise” (Abbott, 2010, p. 1). Story is often defined by scholars in more complex terms.

Differences in defining narrative go all the way back to ancient myths. For example, Aristotle discussed in detail a form of dramatic narrative being enacted on the stage with actors. He defined what made these dramas successful and effective (Aristotle, trans. 1997). Speaking of dramatic ancient Greek myths, Joseph Campbell’s seminal work regarding the monomyth or the hero’s journey also provides another definition for narrative. Campbell defined classic, time-tested narrative in 17 stages,

categorized within three main acts. The three major parts include an introduction to the protagonist's ordinary world, a departure on a heroic journey, and a return to the protagonist's homeland with a special reward or distinction. Campbell demonstrated this story structure as existing independently in most cultures throughout the world (as cited in Sonnenburg & Runco, 2017). Gustav Freytag outlined stories using five major plot points dramatic narrative must follow: exposition, rising action, climax, falling action, and denouement (Freytag, 1908). Other nonlinear story models have been defined as well: *in medias res* (starting a story in the middle of the action and then returning to the beginning), nested loops and frame stories (a story or stories fitting within a larger story), the petal structure or the hub-and-spoke model (story elements revolving around a central point that can be told out of order), and more (Sparkol, 2018). It is clear there are many different way to define and structure narrative and there is not one correct method to use in every instance, but adopting a clearer definition than “something happened to someone” seemed necessary to bring clarity to this research. It also makes it possible for others to understand exactly what I mean by narrative and how I applied it.

Freytag's Five-Act Structure

In this study, I take up Freytag's definition of narrative for reasons discussed below. Freytag first outlined what he defined as a dramatic story in the early twentieth century. Although he discusses Aristotle's *Poetics*, the history of theater, characters, monologues, and even the number of people in a scene, he is most commonly remembered for his five-act narrative structure. He said, “The drama possesses—if one may symbolize its arrangement by lines—a pyramid structure” (Freytag, 1908, p. 114). Again, he originally outlined this rising and falling action in terms of five distinct plot

points: exposition, rising action, climax, falling action, and denouement. First, the exposition is the introduction to the story; the characters are introduced, the tone is painted, and the overall setting and context is revealed. Second, complications arise: the main problem or conflict is incited. Third, the climax is when the conflict comes to its final head. Fourth, the result of the climax begins the falling action. Fifth and finally, in the end, all the plot points are resolved, the problems are untangled, and the story comes to a close (Freytag, 1908).

Freytag's dramatic narrative form is the lens with which I defined and applied narrative for this project for several reasons. First, too simple a definition of narrative (e.g., events occurring through time) would not have provided enough structure to differentiate a narrative from other teaching techniques. Second, the five-act story form has been demonstrated to exist within videos of only a few minutes: in a laboratory experimental video about a little boy with cancer and his father (Barraza & Zak, 2009), in effective Super Bowl commercials (Quesenberry & Coolson, 2014), and in successful viral YouTube videos (Quesenberry & Coolson, 2017). In each of these narrative video studies, the five-act structure was proven effective in certain respects (this will be discussed further in later sections). Third, other story structures, while robust, would have taken longer to develop. I personally find Campbell's hero's journey the most compelling story structure, but the entire 17-step structure would have been difficult to implement in an educational video of only a few minutes. There is great overlap between the five-act structure and the hero's journey and it could be argued the basic three-act structure of the hero's journey could be implemented in a few minutes; however, an essential piece of the Campbell's monomyth is the hero's return to her/his place of origin,

which may have proved difficult to implement as well. Finally, nonlinear narrative structures may have been harder for students to follow. I was already concerned that narrative itself would add to students' extraneous cognitive load; adding any nonlinear elements presumably would not have helped with cognitive load. The aim of this study was to test whether a simple narrative itself made an impact on student learning, not to experiment with various narrative structures.

There are tradeoffs to using the five-act structure for this project. Freytag was originally analyzing plays intended to provide an emotional reaction among viewers. He said, "The dramatic includes those emotions of the soul which steel themselves to will, and to do, and those emotions of the soul which are aroused by a deed or course of action" (Freytag, 1908, page 19). Eliciting some emotions may not be all bad, but it could be argued Freytag's structure was intended for long-form plays created for that purpose, not for short educational videos. In a six-minute video, every one of the acts would need to be completed within, more or less, 70 seconds. Nevertheless, positive emotions have been associated with student motivation (Ochs & Capps, 1996) and there is a precedence for the five-act structure existing in short videos (Barraza & Zak, 2009; Quesenberry & Coolson, 2017; Quesenberry & Coolson, 2014), so I proceeded with Freytag's views.

Narrative and Case Studies

Many educators utilize case studies in their teaching and some may wonder what distinguishes narrative from a case study. According to experts, a case study is a representation of a singular or particular instance of a larger whole grounded in a real situation (Thomas & Myers, 2015). For example, in dental and dental hygiene education,

it may be a written example of a patient coming in for treatment of a toothache. One particular research article about case studies used in dental and dental hygiene education explained, “Case-based learning offers exposure to clinical situations that health professions students may not encounter in their training” (Cragun, et al., 2012, p. 590). Case-based learning is frequently used in education and “has been extolled for its ability to engage students and develop critical-thinking skills, among other benefits” (Herrier & Schiller, 2013, p. 62). In dental and dental hygiene education, case studies have been demonstrated to positively affect a variety of learning outcomes (Abbey, Arnold, Halunko, Huneke, & Lee, 2003; Cragun, et al., 2012; McKenzie, 2013; Richards & Inglehart, 2006).

Although case studies can be narrative, and often are, not all case studies fit into a particular narrative structure. As aforementioned, many scholars defined narrative loosely: something with location, characters, events, and chronology (Bekalu, et al., 2017; Shen, Sheer & Li, 2015). Behind the lens of simple definitions, nearly all case studies would also be defined as narrative or story. Behind the lens of other definitions, most case studies would not fit (e.g., Freytag’s five-act structure or Campbell’s 17-stage hero’s journey).

In an article called, “Case studies for dentistry,” the case studies consisted merely of patient demographics, patient symptoms, a short quotation from the patient, the patient’s medical history, and dental images such as x-rays (Abbey, Arnold, Halunko, Huneke, & Lee, 2003). Although some may argue this case study style fits the broader definitions of a narrative, I believe the general public would find it difficult to define such information as a story, in popular terms. In addition to this, Bruner suggested stories

require elements of connectedness (Bruner, 1991). Again, case studies do not fit any of the narrative structures outlined previously. So, for the purposes of this study, narrative is defined as being distinctive from a case study, especially as it follows a prescribed narrative structure.

Comparable Studies in Other Disciplines

Scholars in other academic disciplines have conducted many comparable experimental studies testing educational video content that can inform this study. Again, most of this research defined story loosely: something with location, characters, events, and chronology (Bekalu, et al., 2017; Shen, Sheer & Li, 2015) or communicating in a “storylike format” (Kim, Ratneshwar & Thorson, 2017). As previously mentioned, three especially effective studies took a more structured approach and defined narrative in terms of Gustav Freytag’s five-act dramatic story arc (e.g., Barraza & Zak, 2009; Quesenerry & Coolsen, 2014). Researchers discovered this fully developed story structure in videos of only a few minutes (Quesenerry & Coolsen, 2017; Quesenerry & Coolsen, 2014). These researchers also found narrative videos can increase oxytocin level and the likelihood of charitable giving (Barraza & Zak, 2009), are associated with higher viewer ratings (Quesenerry & Coolsen, 2014), and associated with significantly more views and likes on YouTube (Quesenerry & Coolsen, 2017).

Much of learning constitutes a change in behavior or amended cognitive ability (e.g., an outlook or attitude change). Although not directly connected to the field of education, it is important to look at how narrative videos have been used and tested in other fields to affect behavior and attitude change. A recent meta-analysis of narratives used in health communication found stories used in videos had a much greater effect on

behaviors, attitudes, and intentions than stories used in text-based counterparts (Shen, Sheer, & Li, 2015). Multiple marketing and advertising studies have shown evidence that video advertisements with a narrative convey a more persuasive message than videos with no stories (e.g., Kim, Ratneshwar, & Thorson, 2017; Quesenberry & Coolsen, 2014). Similarly, research in communication and public marketing have found videos (e.g., videos persuading college students not to drink and drive) are more convincing with stories than without stories (e.g., Barraza & Zak, 2009; Moyer-Gusé, Jain, & Chunk, 2012; Moyer-Gusé & Nabi 2010). Further, in the field of medicine, informational medical videos (e.g., ones persuading patients to make healthier choices) with narratives were more persuasive than without narratives in promoting patients to engage in health behaviors (e.g., Bertera, 2014; Borrayo, Rosales, & Gonzalez, 2017; Hopfer, 2012; Morgan, Movius & Cody, 2007). Moreover, narrative videos may be so influential because they can be a vehicle for implicit persuasion (Kim, Ratneshwar, & Thorson, 2017; Morgan, Moyer-Gusé, Jain, & Chung, 2012; Zhou, & Shapiro, 2017). Specifically, researchers have discovered narrative persuasion can be effective in videos by reducing counterarguing and reactance (Morgan, Movius, & Cody, 2007; Moyer-Gusé & Nabi, 2010). This previous research, not only demonstrated the impact of narratives in communication and learning in other disciplines, it demonstrated how narrative structure (especially Freytag's structure) has been effectively implemented in short online video content, setting a precedent for the use of narrative structure in this research. Understanding this research also sheds light on the previously documented effects of narrative videos that may be expected in this study.

Background

To help inform how to use narratives in this study, it was important to understand how educators have used narratives in curriculum previously. Although not necessarily presented in video form, narrative used in medical education, especially in nursing education, has been used to increase content knowledge (Adamson and Dewar, 2015; Mitchell, Jonas-Simpson, and Cross, 2012), enhance analytical and critical thinking skills (Scheckel & Ironside, 2006), and assist in developing empathy (Adamson & Dewar, 2015; George, Stuckey, Dillon, & Whitehead, 2011; Gidman, 2014). In other fields, instructors use game-like, story-centered curriculum for learning purposes; one study showed stories in games had positive outcomes on learning and motivation (Novak, 2015, p. 440). In K-12 education, “telling stories with a variety of digital multimedia, such as images, audio, and video” (Robin, 2006, p. 1) can be used to engage students (Dreon, Kerper, & Landis, 2011), increase student communication and social skills (Robin, 2008), improve writing and technical skills (Figg, McCartney, & Gonsoulin, 2010), and enhance emotional intelligence (Robin, 2008). This previous research established a foundation that shows us how teachers have used narratives to increase knowledge retention (Adamson and Dewar, 2015; Mitchell, Jonas-Simpson, and Cross, 2012; Novak, 2015) and knowledge retention was likewise tested in this study with dental assisting students. Educators also frequently use narratives to enhance a feeling of empathy (Adamson & Dewar, 2015; George, Stuckey, Dillon, & Whitehead, 2011; Gidman, 2014; Robin, 2008), indicating dental assisting students who are told stories may be more prepared to interact with difficult patients.

Dental Assisting Training

Dental assisting training largely started as a type of apprenticeship with the dentist and other dental assistants in the office (Harden, et al., 2001). Dental assistants learn to assist dentists during oral procedures by handing instruments and materials to the dentist as well as documenting treatments, instructing patients, and helping with many other administrative duties (Bird & Robinson, 2017). Some states in the United States require a certification and some do not, but regardless of whether most of the training occurs in a dental office or in one of the approximately 300 dental assisting programs in the country (Harden, et al., 2001), storytelling is rarely, if ever, a part of the formal training (e.g., Bird & Robinson, 2017). Although telling stories about experiences with previous patients has surely been an informal piece of the training experience, dental assisting curriculum designers do not often use narrative as an educational resource (e.g., Bird & Robinson, 2017). If storytelling has the potential to increase knowledge retention and empathy, as the previous research suggests, it should be tested among diverse populations, such as dental assisting students. Many dental assisting programs do use videos (without stories) and other forms of instructional technology in their training (Brown, et al., 2014; Park & Shin, 2018; LeBlanc, Urbankova, Hadavi, & Lichtenthal, 2004; MacIntyer, Lucaccini, & Podshadley, 1971; Roy, Bakr, & George, 2017).

Understanding how dental assisting training programs use technology was informative to this study. Many dentists, dental hygienists, and dental assistants have been exposed to and use advanced technology during training, such as virtual reality (LeBlanc, Urbankova, Hadavi, & Lichtenthal, 2004; Roy, Bakr, & George, 2017), electromagnetic radiation (Brown, et al., 2014), and three-dimensional printers (Park &

Shin, 2018). Bridgerland and many other dental assisting programs offer course material online. Researchers from North Carolina were some of the first to test online dental assisting course content with a sample of more than thirty participants in 1999 and all participants reported they would take more online dental assisting courses if given the opportunity (Francis, Mauriello, Phillips, Englehardt, & Grayden, 2000). It is important to note, research from more than a decade later found dental assisting students prefer print versions of their textbook to e-books (Parsons, 2014). As far as video is concerned, dental assisting instructors have used video-like media to train dental assisting students since 1971 (MacIntyer, Lucaccini, & Podshadley, 1971). This research makes clear that dental-assistants-in-training are accustomed to educational technology, including the use of videos, which makes instructional narrative videos an ideal fit for this population.

Educational Narrative Videos

The use of videos in education dates back nearly to the inception of motion pictures themselves. Disney developed a ten-minute silent film, coincidentally about dental hygiene, in 1922 called *Tommy Tucker's Tooth*, promoting regular tooth brushing among children (Freeman & Hoefler, 1931). In the 1990s, the makers of *The Adventures of Jasper Woodbury* used narrative videos to introduce a real-life problem that math and science could help solve and then students would have a chance to solve those problems (The Jasper Series as an Example of Anchored Instruction, 1992; Hickey, Moore, & Pellegrino, 2001). A group of 19 fifth-graders were better able to problem solve and interpret data after watching the video series (Hickey, Moore, & Pellegrino, 2001) and a larger group of students from nine states confirmed those results, finding increased problem solving abilities, planning skills, and more positive attitudes towards science and

math (The Jasper Series as an Example of Anchored Instruction, 1992). This research suggested promising results; however, it is not clear whether the narrative element of *The Adventures of Jasper Woodbury* was a major contributing factor to the program's success.

Research results regarding the effect of educational narrative videos on the learning outcomes are not yet conclusive enough to give any kind of definitive answer on the subject. Morgan, Movius, and Cody found viewers of the narrative videos gained a significant level of knowledge on organ donation (Morgan, Movius, & Cody, 2007). However, in a controlled experiment with over 600 people, the group watching the video without the narrative retained more information about influenza outbreaks (Bekalu, Bigman, McCloud, Lin, & Viswanath, 2017). These authors recognized their attempt to edit a fictional full-length movie into a four-minute cohesive story may have influenced their results. In their article, these researchers also pointed out, for a narrative intervention to be effective, it may take more than an hour or two for participants to process the story (Bekalu, Bigman, McCloud, Lin, & Viswanath, 2017).

In order to inform the design of the videos in this study, I examined and applied current academic suggestions and best practices regarding educational video itself. Educational videos should use signaling (or cueing) to draw viewer's attention toward important information (de Koning, Tabbers, Rikers & Paas, 2009; Ibrahim, Antonenko, Greenwood, & Wheeler, 2012; Mayer, 2008; Zhang, Zhou, Briggs, & Nunamaker, 2006), videos should promote and encourage interaction with the viewer (Chi, Kang, & Yaghmourian, 2017; Lawson, Bodle, & McDonough, 2007), videos should not exceed six minutes in length (Guo, Kim, & Rubin, 2014), information presented in the videos should be chunked into distinct segments (Guo, Kim, & Rubin, 2014; Mayer, 2008; Mayer &

Moreno, 2003), unnecessary information should be weeded out of the video (Ibrahim, Antonenko, Greenwood, & Wheeler, 2012), and video hosts/instructors should speak quickly and conversationally (Mayer, 2008; Guo, Kim, & Rubin, 2014). I have produced and edited the videos in this study to conform to these practices.

CHAPTER 3

METHODS

Research Questions

The research questions for this study are as follows:

1. To what extent do narratives inserted into an educational video training affect learning outcomes, such as knowledge retention and procedural understanding, in dental assisting training, specifically in learning how to assist with a composite restoration?
2. To what extent do narratives inserted into an educational video affect student motivation?
3. To what extent do dental assisting students find the video training more or less preferable with narratives?
 - a. Why are they more or less preferable?
 - b. What specific elements do dental assisting students report as being engaging?

Partnership with Bridgerland Technical College

There are eight technical schools within the Utah System of Technical Colleges. Bridgerland Technical College is located in Logan, Utah and provides technical education for the greater Bear River area in the northern part of the state. Bridgerland is accredited by the Commission of the Council on Occupational Education. Bridgerland prides itself on offering a wide variety of “competency-based, employer-guided career, and technical

education to both secondary and post-secondary students” (Who we are, 2018). I was employed by Bridgerland Technical College and commissioned to make videos for their dental assisting students, thus I had access to this unique population of students. In 2018, as an employee of Bridgerland Technical College, I created over 40 videos for the school in various departments; the Dental Department was one of the biggest.

I began this investigation to inform Bridgerland’s Department of Technology Enhanced Instruction on the best techniques for creating future instructional videos. The director of the Technology Enhanced Instruction Department recommended this evaluation and the subsequent research be completed in the Dental Department because of the number of students and the popularity of the program. Dental assisting students are regularly turned away from enrollment in this particular program because of the limited space and resources.

I worked closely with other employees at Bridgerland, including instructors in the Dental Program as well as instructional designers in the Department of Technology Enhanced Instruction. I had access to the course content as well as the building and technology in the building.

Video Production Process

Before video production began, I worked with instructors at Bridgerland to determine what course unit and module I would place the videos. The instructors’ need, feasibility, and evaluation purposes were all factors in determining which course unit to use. The topic chosen was assisting with composite restorations, one of the most common procedures performed to treat cavities and tooth decay. This course content is largely explained in course three, “Dental Assisting 1030.”

Once we selected the unit and module, the video production process began. I created, produced, and edited these videos with help and feedback from instructors and students at Bridgerland. The host of these dental assisting videos (and the provider of the story used) was Rebecca Ali, an instructor at Bridgerland. Not only did she have the most experience on instructing students in this particular procedure, but she also had a background in theater and performance. She reported having been in both stage productions and on film sets in front of the camera. With this background, she was uniquely qualified to both host the videos and tell a story that utilized the dramatic form.

Ali was asked to tell multiple stories from her own experiences about completing composite restoration procedures, especially while working on real patients as a dental assistant. The story chosen to be in the final video was structured and then coded to follow Freytag's five-act structure (Freytag, 1908), as outlined in detail later in this chapter.

The video production process was iterative, drawing on feedback from instructors and students. Students selected to provide feedback on the videos were not selected to participate in the study. Professors at Utah State and instructors at Bridgerland reviewed the narrative and non-narrative videos to ensure each video contained the same educational content and gave feedback on the story and story development.

Site Participants

The dental assisting program at Bridgerland accommodates approximately 100 students at any given time during the academic school year. The number of new students accepted at any given point varies depending on the current number of students in the

program. Students range from 17 to 40 years in age; most students are below the age of 25. Approximately 98% of the dental assisting students are female. Approximately 60% of the dental assisting students are current high school juniors and seniors from Logan, Cache, Green Canyon, Mountain Crest, Ridgeline, and Sky View high schools. Almost all students live in Cache Valley, Utah. Unlike many other schools, Bridgerland's instructors are not assigned to teach a single course. Dental assisting students move through the online course material at their own pace and can complete assignments under the direction of any of the four full-time instructors. Students are responsible to schedule time with the instructors when they need to pass off procedural demonstrations. Students can complete tests and quizzes online without instructor assistance, usually at the computers available at Bridgerland. Half of the high school students come during the first few periods of the day and half come during the last few periods of the day.

Newly enrolled high school students usually start at the beginning of a trimester and not all high school students enroll within the same grade: some enroll as high school seniors and some as juniors. Because Bridgerland Technical College has rolling enrollment and admission and students complete the work at their own pace—some students graduate high school with a nearly completed dental assisting certification and some high school students do not make it through the second course before graduation. A portion of the high school students do not complete their dental assisting certification and do not find themselves working in a dental office.

Overall Research Approach and Design

The aim of this study was to investigate the impact of a five-act narrative included in educational video training on various learning outcomes for dental assisting students. In this study, the five-act story came from one of the dental assisting instructors at Bridgerland about real clinical experiences. I attempted to collect data in two phases: 1) the qualitative data collection done via interviews with open-ended questions and 2) the quantitative portion of the study comparing students' pretest and posttest scores within two groups: students who viewed educational video content with a five-act narrative and those without a narrative.

I explain in more detail below, but the following gives a brief procedural methods outline: the students participating in the quantitative portion of the study took a pretest, were exposed to the video training (either with or without the story), and then took a posttest. Another group of students participating in the qualitative portion of the study watched both video trainings and then participated in an in-person interview.

Recruitment Material

I recruited the entire population of dental assisting students at Bridgerland for the quantitative portion of the study. I recruited 12 students for the qualitative portion. I will explain the rationale for these sample sizes later. Whether or not students consented to allow me to use data collected from them for research purposes, they were still required to complete the coursework and evaluation work as students at Bridgerland. I invited students at random to participate in the interviews for the qualitative portion of the study.

The interviews did take additional time on their part. The data collection process began in November 2018. The data continued to be collected until May 2019.

Because of the unique rolling enrollment and rolling completion experience, it became difficult to assess how many students would complete this study during the timeframe it was open. In addition, the number of anticipated participants in this project was much higher than the number of final participants. Near the beginning, after discussions with several of the dental assisting instructors themselves, it seemed to me they were confident that a majority of their students would complete the coursework with the newly inserted videos for this project by the time we were done collecting data. However, upon completion of the data collection phase, only about 14 completed the quizzes in Canvas and not all of those students completed every quiz. Some students skipped over several quizzes. I was able to obtain consent for 11 of these students.

Informed Consent

I obtained consent information for all students electing to allow me to use their data for research purposes. I informed all participants about the purpose of the study, the procedures, risks and benefits, the contact information of the researchers, the data storage and publishing plan, and confidentiality information (I took every measure to ensure secured confidentiality). All participants had an opportunity to decline allowing me to use their data for research purposes at any time for any reason without consequence to them. The notification appeared in the online portion of their course before that portion of the coursework began in a message from me. This notification linked to the consent forms. Similar information was provided to parents or legal guardians of minors. The parents could also opt out for their minor. In addition, I made myself available in person

with physical copies of the consent form. Finally, the students completing the consent forms (whether or not they chose to consent) were randomly selected to receive one of several gift cards to a local restaurant; this acted as an incentive for students to complete the consent process.

Procedures

Coding for Freytag's Five-Act Structure

As discussed in chapter two, I structured and coded the brief story used in this project after Freytag's five-act structure. The two videos, the one with the story (<https://youtu.be/EtOIhZ1x6J4>) and the one without the story (<https://youtu.be/M3SWK62yfgc>) can both be viewed online. The video with the narrative from Ali is about a little boy who is afraid to go to the dentist. Ali explained this boy had medical problems and had been a patient in the hospital frequently. His experiences contributed to a feeling of fear surrounding medical personnel and needles. Ali attempted to find a way for the little boy to feel comfortable in the dental office. She learned he loved to watch a particular children's television program and used that information to calm him down and get him to comply with the dental procedure. Although the boy was reluctant to willingly participate, Ali continued to use his interests to pacify him during the procedure. He eventually calmed down and began to comply. After the procedure was finished, Ali told the viewer he loved it and even reported he wanted to come back to the dentist again. On screen, the actor portraying the boy was seen with a big smile. This story was coded as following the five-act structure as seen in Table 3-1.

Table 3-1
Coding for Freytag's story structure

Freytag's narrative act	Video time frame	Description
Act I: Exposition	0:10 - 0:31	The little boy is introduced, including his fears of medical personnel and needles. Ali also introduces her involvement in the story.
Act II: Rising action	0:31 - 1:03	The boy does not want to go to the dentist. Ali shows concern and empathy and decides what to do.
Act III: Climax	0:57 - 1:02; 1:03 - 1:39; 3:00 - 3:04; 3:52 - 4:01; 5:20 - 5:30	Ali helps the boy through the dental procedure by catering to his interests, even as he demonstrated heavy resistance. (The resistance can be visually be seen the clearest from 0:57 to 1:02). The climax can also be seen during what Ali describes to the boy as the "final battle" during the dental procedure.
Act IV: Falling action	5:30 - 5:44	The falling action is implied throughout the climax as the boy calms down and begins to comply with the procedure. The falling action can also be heard as Ali explains to the boy that, the bad woman in his teeth "was really gone."
Act V: Denouement	5:44 - 5:52	Ali reports the boy loved the experience and even wanted to come back to the dentist. The boy is seen with a big smile.

Although the video is short, it follows the five-act structure Freytag outlined— from the exposition (the little boy is introduced to the viewer) to the climax (the boy's resistance) to the denouement (the boy loved the experience and wanted to come back to the dentist).

Software

Bridgerland Technical College uses Canvas, a learning management system, to administer the assessments and assignments online. I planned to use IBM SPSS to analyze the data; however, because of the low sample size, I simply reported on descriptive statistics. I extracted the assessment results from Canvas and stored them in a

Box account owned by Utah State University. Transcriptions, coding, and research notes were kept using Microsoft Office (Word and Excel).

Hardware

I used two Canon DSLR cameras and other equipment owned by Bridgerland Technical College to create the educational videos. I used a laptop microphone to record the interviews. The participants used computers owned by Bridgerland Technical College to participate in the study. I used computers owned by Utah State University for data analysis purposes.

Data Collection and Instruments

Measures

One of the first assignments students would see in their online coursework for this study was a motivation questionnaire. I measured motivation with selected (and in some cases modified) questions from the MSLQ: Motivated Strategies for Learning Questionnaire (Duncan & McKeachie, 2005). According to Duncan and McKeachie, the MSLQ is a reliable measure that has been used by hundreds of researchers in multiple languages. The MSLQ has been used for the past quarter of a century primarily in postsecondary education (Duncan & McKeachie, 2005; Holland, et al., 2018). Although there is some debate on whether increased motivation is correlated with increased grades (Credé & Phillips, 2011), previous research demonstrates student motivation leads to student engagement and vice versa (Martin, Ginns, & Papworth, 2017). The questions on motivation I selected from the MSLQ (questions 1-31) entailed the following components measured: intrinsic goal orientation, extrinsic goal orientation, task value, control of

learning beliefs, self-efficacy for learning and performance, and test anxiety (Duncan & McKeachie, 2005).

After completing the pre-questionnaire on motivation, students would move onto the first assessment in their online coursework. Knowledge retention was measured by this first assessment and an identical assessment coming directly after the narrative or non-narrative video. The assessments were written and trusted by the instructors at Bridgerland and covered the content knowledge dental assistants are expected to know within the realm of information covered for this study. Again, these assessments were administered as a pretest and posttest in order to overcome threats to internal validity. The ten assessment questions were either multiple choice or true/false. An example of the type of question used in this assessment entails: “Which hand piece is used first to prep the tooth?” (see Appendix A for the remaining questions).

Finally, the last thing students would see in their online coursework for this study was a “demonstration pass-off.” I measured procedural understanding with an existing practical assessment. These assessments are often referred to by the instructors as “demonstration pass-offs.” Instructors give each student three attempts to pass the assessment. An instructor watches a student complete each step in the dental assisting procedure and gives the student a score of zero, one, or two (zero = did not do/know, one = needed help/reminders, two = no help needed). Dental assisting instructors have tried and trusted these assessments at Bridgerland to test whether students can assist the dentist with the procedure. An example of one of the steps used is as follows: “Gave the patient a full mouth rinse” (see Appendix B).

Apart from anything in their online coursework, I also conducted in-person interviews. The interview questions captured what and why students preferred particular qualities of the videos. The interview questions gave students an opportunity to explain their thoughts and emotions and provide detail that the quantitative measures could not. It is important to note student preference should not be seen as correlating with student learning outcomes (Clark, 1982). The results regarding student preference from the interviews are not necessarily connected to the results from my first two research questions. With that being said, I recorded and transcribed each interview. I used the same interview questions in every interview. Again, I interviewed 11 different students in-person. The students participating in the qualitative portion of the study watched both versions of the video training. I randomly selected half the students to watch the treatment video first and half the students to watch the control video first. I attempted to reach saturation with the number of students I selected to interview; however, I interviewed no more than 12 students in order to have time to conduct the interviews within the time constraints facing this project. The interview questions explored video preference, engagement, likeability, and usefulness (see Appendix C).

Data Collection Process

I randomly assigned all dental assisting students to the control or the experimental group using a random number generator in Microsoft Excel. Because instructors at Bridgerland largely administer and grade course material online, I did not divide students into groups based on an instructor or the time students met; all students, regardless of age or meeting time, had an equal chance of being assigned to the control group or the experimental group. Each student at the appropriate point of course progress completed a

pretest online. After completing the pretest, these students had access to their randomly assigned module with one of the two videos embedded therein. Students were then given access to the posttest. After this point, the students also had access to the “demonstration pass-off” practical assessment via the online course as well.

I also randomly selected 11 students using a random number generator to investigate student preference. These students watched both the narrative and non-narrative video. I randomly assigned half of these students to watch the narrative video first and the other half watched the non-narrative video first. I then interviewed the students about which video they preferred (and why) using the predetermined questions mentioned earlier (see Appendix C).

Data Analysis

Table 3-1 shows each measure, which research question number it correlates with, a brief description of the purpose for the use of the measure, whether it is a pretest/posttest or post-treatment-only measure, and the planned analysis technique.

Table 3-2
Data sources and research questions

Measure/data source	Research question addressed	Purpose	Pre- or post-treatment	Data analyses
Bridgerland Technical College assessments (current canvas quizzes)	RQ1	Test which video training is better at knowledge retention via the assessment questions	Pre- and post-treatment	Descriptive statistical analysis
Bridgerland Technical College	RQ1	Test which video training is better at promoting procedural	Post-treatment	Descriptive statistical analysis

procedure demonstration pass-off		understanding via demonstration pass-offs		
Motivated Strategies for Learning Questionnaire (MSLQ)	RQ2	Determine which video training was associated with higher levels of motivation	Pre- and post-treatment	Descriptive statistical analysis
In-person interview questions	RQ3a RQ3b	Determine what qualities made a video training preferable and why	Post-treatment	Conceptual content analysis (uniquely developed coding book)

Column one in Table 3-2 shows the measure (quizzes, questionnaires, interviews, etc.); column two shows which research question number the measure addresses; column three explains the purpose; column four explains whether the treatment is a pre-treatment, post-treatment, or both; and column five shows which data analysis technique was planned for each data source.

Quantitative Data Analysis

As aforementioned, I planned to use IBM SPSS to analyze the descriptive statistics. However, the amount of data collected justified simply reporting the mean scores of the little data I did collect. I also used some tables to represent the data.

Qualitative Data Analysis

For the qualitative data, I used a conceptual content analysis to examine the patterns and themes in the interview responses. For example, if students preferred the narrative video better because of the story, I coded and counted that information in the transcripts to evaluate the prevalence of this idea. I noted all repetitive concepts and

ideas. I developed a coding book to code the interview transcripts. Intercoder reliability was used by asking one other student to code a portion of the interviews using the same coding book.

To begin this process, after transcribing all the interviews, I chose two of them to begin coding. I only began coding two interviews as to not venture too far into my initial codes without checking my codes with others experienced in coding. Based on the prescribed methods in *The Coding Manual for Qualitative Researchers*, I used a bottom-up coding method for these two interviews and mostly used in vivo codes to capture significant ideas (Saldana, 2015). For example, one of the students, Magda, said, “So, the video that spoke out to me more was the one with the little boy.” I coded this segment “little boy.” This bottom-up in vivo coding allowed the data to speak for itself and made it easier for me to later identify themes without over interpreting the data.

I also noted similarities, differences, and frequency I noticed while coding in analytic memos written to myself, as prescribed by Saldana in his manual. Saldana suggests experienced researchers develop an intuition for what should be ignored and what should be coded carefully; however, for beginning researchers he suggests coding all the data in order to not unintentionally miss something that could have important meaning. Because I had very little experience with coding, I followed his advice and coded everything within the data. In addition, as suggested by Saldana, I did not yet begin to condense and combine codes until further coding had been conducted. I did, however, allow the codes I was using to summarize and condense statements within the interviews without reducing the data (Saldana, 2015).

It is also important to note, Saldana suggests several ways to segment or excerpt the data for coding. I could have excerpted the data by interview question, but some students talked for significantly longer than others after a single question was asked, touching on several varying ideas. Also, occasionally, different follow questions were asked in different interviews. I could have excerpted the data by sentence, giving each sentence at least one code, but that seemed far too granular; too many sentences combined to express a single idea. Instead, I decided to segment the interview into chunks based on new ideas expressed. This took a good portion of time and involved much personal interpretation of the data. I tried my best to capture where one idea ended and another began. Although there was no way for this method to be free of some bias, I was able to apply the same code to succeeding excerpts and told others who helped me with my coding to do the same if necessary, which alleviated some of the potential problems caused by excerpting by idea.

I took the two coded interviews to the Learn, Explore, Design (LED) Lab at Utah State University to receive their feedback. The LED Lab is comprised of graduate and undergraduate student researchers directed by Dr. Breanne Litts. They gave me important feedback on the coding and I made changes accordingly. I also asked Dr. Apoorva Chauhan, a recent PhD graduate from Utah State, to code the same two interviews without referencing my codes. I did this in order to see what additional codes could be added and to gain additional insights about the data I may not have gained without another perspective. I also intended to see how frequently my codes matched up with another person in order to see which patterns were stronger and more recognizable. This all added to the reliability of the final data analysis. After she coded those

interviews, we met to discuss the codes she used and she explained her interpretations to me. Interestingly, 20% of our codes matched up, even without referencing a common coding book. Furthermore, although not an exact match, additional codes also were comparable; for example, she used the code “memorability” and “video duration,” which were similar to my codes, “remembering” and “long/short.” I disagreed with some of the codes she applied, but made several changes to my codes based on her new insights and additional codes. This process helped me greatly to refine my coding before coding the remaining interview data.

I then finished coding the remaining interviews with the codes I had developed thus far. I also developed new codes as necessary, documenting my process in an Excel spreadsheet. Again, additional thoughts were noted in a Word document with analytic memos to myself for future reference, as prescribed by Saldana.

Once I had a spreadsheet with all my codes, I began organizing the codes into similar ideas. This is the point where the coding manual I referenced suggested to start applying additional coding methods, such as thematic coding or motif coding (Saldana, 2015). I had over 75 unique codes (mostly in vivo codes) at this point. I took codes like “more emotion,” “happy,” “upbeat,” “sad,” “fun,” etc. and combined them into one category called emotional engagement. I did this with all the codes and after completing this process, I had 15 major categories, which turned into my descriptive codes, helping me to identify themes and patterns within the interviews. Six in vivo codes remained and I also used several other attribute codes (e.g., every time the video with the narrative was referenced, I applied the code narrative video, regardless of what the students said about the video or the story). I ended up with a total of 27 codes for my final coding book.

Again, as prescribed by Saldana, my coding book mainly included a description of each code and one or two examples of that code pulled from the interviews (Saldana, 2015). After my coding book was complete, I calculated the total word count and page count of all the interviews and randomly selected interviews for another student to code with my coding book until I had selected enough interviews to add up to over 20 percent of the total data. I ended up selecting three interviews that represented 27 percent of the total interview data. I delivered un-coded versions of these interviews to Chase Mortensen, an undergraduate student research assistant in the LED Lab, along with my coding book. He agreed to code these interviews for me in order to establish intercoder reliability. Upon returning his version of the coded interviews, I calculated 90.3 percent of his codes matched with mine. A 90.3 percent match was enough for me to establish sufficient intercoder reliability and I began to analyze the data, noting which codes were used the most frequently in reference to the narrative video or the non-narrative video, counting the total number of codes, and noting patterns.

To see an example of what my coding looked like, the following is an excerpt from Mokosh's interview and then a description of which codes I applied.

I liked the first one [story] Um, cuz' it was longer It just explained it better. I don't know. It's just . . . uh, confusing I liked it more. I don't know Well, for me, I like stuff that explains it and it's longer. Some other people just want the shorter version, but I'm not sure. I like the longer version.

I coded this section with the following codes: narrative video, video duration and pacing, and written or spoken instruction. Again, narrative video was an attribute code to be used every time the narrative video was referenced. The video duration and pacing code was applied every time a student mentioned video length or pacing having a positive or negative effect on the overall video design. Written or spoken instruction was applied

any time students mentioned any part of the explanation (especially text-based or verbal explanation) being useful to the student in any way; in this case, Mokosh said the narrative “just explained it better.”

CHAPTER 4

FINDINGS

Overall, I did not find any consistently significant results on whether inserting a story into a video assists with student learning outcomes. Statistically, I could not find any significant results because of the low number of participants. Even with the little quantitative data I collected, the findings do not turn out to favor the narrative video or the non-narrative video in regards to learning outcomes. I also did not find any significant results in regards to student motivation. I did not even find any consistent results on whether the story inserted into the dental assisting video is preferable overall, as reported directly by students. However, I discovered the students preferred the non-narrative video as a reference for the procedure. I also gained many other additional insights. For example, students found the narrative video to be more emotionally engaging. Students reported the narrative video as preparing them for dealing with real patients. I also found narrative videos may increase empathy. In this chapter, I review all these findings in detail.

Knowledge Retention and Procedural Understanding

Research Question One (RQ1) asked whether the narrative video or the non-narrative video was more effective at producing learning outcomes, such as, knowledge retention and procedural understanding. This section reviews the results for these questions. The total number of students who completed any of the assessments in Canvas and consented to allow their scores to be reported for research purposes was 11 (n=11), but some of the quizzes had as low as four student participants and the quiz with the

highest number of participants was seven. For reasons beyond my control, even the students who completed some of the measures in Canvas, had not completed all the measures assigned to them.

Knowledge Retention

Again, knowledge retention was measured by a pre- and post-quiz created by the instructors at Bridgerland Technical College. The quiz had 10 questions. The mean pre-quiz score for all students was 82 percent (or 8.2 out of 10 questions correct). The mean post-quiz score for the group who watched the narrative video was 80 percent. The mean post-quiz score for the group who watched the non-narrative video was 88 percent. The range of individual quiz scores varied from 40 percent to 100 percent.

At first glance, it appears the group who watched the non-narrative video improved the most from the pre- to post-quiz. However, when controlling for the pre-quiz scores of the two groups of students, this is not the case. The students in the narrative group had a pre-quiz score of 77 percent and the students in the non-narrative group had a pre-quiz score of 90 percent. This makes it appear as if the non-narrative group's scores actually decreased from pre- to post-quiz. However, again, many students skipped over the pre-quiz in Canvas. I cannot safely draw any significant conclusions about how the narrative affected knowledge retention. Part of this may have been the case was the story chosen was not intentionally structure in such a way to increase knowledge retention and remembering. It seems clear there are many techniques used to increase retention: repetition, chunking, the use of acronyms, music, rhymes, etc. Story could be one way to increase retention, but the narrative used in this study was not

specifically intended to assist with memory specifically, but to teach a basic overview of the topic.

It may also be the case that non-narrative videos are superior in promoting knowledge retention in most cases. It could be argued here, based solely on the post-quiz scores or without controlling for the difference in pre-quiz scores between the two groups, that the non-narrative group performed better in regards to knowledge retention. Although this would not be conclusive without further data, if that were the case, that may be because the non-narrative video is more explicit in its approach. It seems obvious that teaching to the test is the best way to increase test scores, but it may not be the best way to assist in another important facets of learning and understanding.

Procedural Understanding

RQ1 also probed at whether inserting a narrative into a video would affect students' procedural understanding. As mentioned in chapter two, procedural understanding was quantified by a post-treatment-only measure called a "Demonstration Pass-Off." Students were measured on how well they completed the procedure. A total of five students completed this assessment and also consented to allow their scores to be used for research purposes. The mean score for both the narrative and non-narrative group of students was exactly 97.8 percent (or 45 out of 46 points). There was no difference in mean scores between those who watched the narrative video and those who did not. The results may have differed with a larger sample size. Either way, the interview data shows there were other important differences between the narrative and non-narrative groups. These results may demonstrate using stories to teach students steps of a procedure may not be the most effective use of narrative. However, educational

videos themselves (with or without narratives) seem to lend themselves well to this task as demonstrated by the interview data, which will be further discussed.

Student Motivation

The findings on student motivation was a direct answer to RQ2. Student motivation was measured by the MSLQ. The results are summarized in Table 4-1.

Table 4-1
MSLQ pre- and post-questionnaire scores

Measure components	Non-narrative pre score	Non-narrative post score	Change in non-narrative scores	Narrative pre score	Narrative post score	Change in narrative scores
Intrinsic goal orientation	6.17	6.19	0.02	6.00	6.17	0.17
Extrinsic goal orientation	5.67	5.50	-0.17	5.19	4.92	-0.27
Task value	6.87	6.60	-0.27	6.35	6.60	0.25
Control of learning beliefs	6.33	6.13	-0.21	6.19	6.00	-0.19
Self-efficacy for learning and performance	6.33	6.31	-0.02	6.28	6.12	-0.16
Test anxiety	3.47	3.55	0.08	3.05	3.13	0.08

There were no significant results among the seven students who took the pre- and post-questionnaire as far as differences between the students in the narrative and non-narrative groups. None of the motivation measure components showed any substantial difference. The biggest difference between pre- and post-questionnaire scores was 0.27

points on a seven-point scale. The mean difference between pre- and post-questionnaire score was 0.04 points. Storytelling appears to have no significant effect connected to student motivation. Again, some of this may be due to the low samples size and lack of data. For example, many students reported the narrative video as better preparing them for handling real patients; such findings could have an effect on student motivation in the long term, but further research would need to be conducted to test this. For now, there are no significant findings on motivation to report.

Student Preference

RQ3 specifically probed at whether students found narratives inserted into the video training as more or less preferable. Preference was examined with the interviews. Students were directly asked which video they preferred and in direct answer to RQ3a. Students were specifically asked which video they preferred overall, which video they preferred to see inserted into the course, and which video they preferred as a reference for the procedure. Table 4-2 shows the results.

Table 4-2
Student-reported video preference

Preference type	Narrative video	Non-narrative video
Overall preference	6	5
Preference for the course	5	5
Preference for procedure reference	2	9

Overall preference for either the non-narrative video or the narrative video was split nearly evenly: about half the students interviewed expressed an overall preference for the narrative video and half for the non-narrative video. Students were also asked which video they would prefer to see permanently inserted into the course; those answers were split evenly as well. However, when asked, “Which video would you prefer to have as a reference for the procedure?” (see Appendix C), students much preferred the non-narrative video to the narrative video. According to the interviews, this was because while reviewing what to do for the procedure, students did not feel they needed to re-watch the story about the little boy. For example, Lexy said, “Just because when I’m referring back to it, it’s shorter. I don’t want to have to listen to the story again and again.” Again, it is important to note student preference, especially connected to student enjoyment or other similar concepts, is not necessarily correlated with student quiz performance or acquiring the procedural skills (Clark, 1982). A student may prefer one video to another, but that does not necessarily mean that video helped that student’s learning performance. With all that being said, the narrative video was still consistently associated with other positive attributes, such as emotional engagement, empathy, and working with real patients in a dental office.

Additional Interview Findings

Other interesting findings were discovered through analysis of the interview data. Students reported the narrative video as more emotionally engaging. Students also seemed to feel the narrative video better prepared them to work with real patients. Students reported the brevity of the non-narrative as a positive feature.

Out of the students interviewed for evaluation purposes at Bridgerland Technical College, 11 gave consent for their interviews to also be used for research purposes. As a reminder, all the names were changed and none of the names reported in this chapter (or anywhere connected to this research) are authentic.

Emotional Engagement

Most students found the narrative video as more emotionally engaging. Overall, emotional engagement was coded when students reported the video as having “more emotion,” or being, “happy,” “sad,” “upbeat,” “touching,” or “fun.” These segments from students on emotions were connected to the story, the instructor’s voice, or the music.

When reporting on emotional engagement with the videos, the students almost exclusively referred to the narrative video specifically and never reported an emotional response when referring the video without the five-act narrative. Eight total students reported 13 instances (i.e., the 13 instances I applied such codes) of the narrative video or some element of the narrative video being more emotional in some way.

For example, Lexy said, “The one that was more emotional is the one with, like, the Power Rangers and the story.” Not only does Lexy report on elements of the story being “more emotional,” but she used the word “story” in this instance.

Magda said, “Rebecca, on the [narrative video], seemed more, like, happy and stuff. And, it like, like I said, it stood out to me more.” Magda was not the only student who expressed the instructor was happier in the narrative video. Norma and Magda, for example, both said they thought Rebecca was “into it” more in the narrative video. It is

important to note, no students reported this was the case for how Rebecca looked, acted, or felt in the non-narrative video.

“The storyline,” Livia explained, “it’s, like, more touching because of the boy in it and his life experience. So, like, you wanted to pay attention more.” The word “touching” suggests some sort of emotional connection was made and this emotional connection seemed to make it easier for Livia to focus on the video content.

Emotion can be used to facilitate human connection and influence decision making—narrative persuasion (Morgan, Movius, & Cody, 2007; Moyer-Gusé & Nabi, 2010). Again, no such emotionally connected words were used to describe the non-narrative video. Instead, students described the non-narrative video as “simple,” “short,” and “straight to the point.”

Enjoyable and Engaging

Other important words and phrases indicated emotional engagement as well. Elisabeth said the story of the little boy was, “more enjoyable” and Carlene and Lauryn described the narrative video as “entertaining” because “there is a story behind it.” When someone says they enjoy something, they are expressing delight or a state of being pleased; within the word enjoyment is the word “joy.” Students reporting enjoyment or entertainment are reporting on an emotional state.

Elisabeth specifically said, “I think the different, main difference, was they tried to make it like more enjoyable.” As described by Elisabeth, this emotional state was not only a difference between the narrative and non-narrative video, but in her opinion the “main difference” between the two videos.

“The [narrative video], it’s kind of more entertaining,” Lauryn said. “So, there is a story behind it versus just information getting thrown at you like in the [non-narrative video].” Not only is Lauryn reporting on an emotional state, but she is specifically referencing the contrast with the lack of emotional engagement in the non-narrative video. Again, no one described the non-narrative video in emotionally connected words. With all this being said, the narrative video being reported as emotional was not the end of the emotional experience reported; empathy was also a concept strongly identified in the videos.

Empathy

Empathy is broadly understood as being able to connect to, understand, or know what it is like to be in someone else’s shoes. Students reported the narrative video specifically as helping them to develop empathetic skills. They mentioned, “caring more,” “connecting,” “getting to know” the patients, or understanding the “background information” of the patients.

Five of the students mentioned concepts connected with empathy, sympathy, or understanding patients better in some way. These five students brought these ideas to the surface in 11 distinct instances (again, 11 excerpts were coded in this way). Ten of these 11 interview segments were also referencing the narrative video in some way. The one instance that was not in reference to the narrative video was a student discussing how she felt both videos helped her see things from the point of view of the dentist as well as the dental assistant.

In reference to what she learned from the story in the narrative video, Elisabeth explained, students should “. . . look at, like, different patients and see which way you

could connect with them, make it more enjoyable for them.” Connecting with patients is a major empathetic skill. It is clear the narrative video made an impact on helping Elisabeth understand the importance of empathy.

Carlene insightfully explained the following while referencing the story of the little boy:

Every single person has been through a different situation. And so you never know any underlying stressors that your patient may have . . . cuz’, like I said, there are so many different people out there in so many different instances that you're gonna run into in this line of work . . . and so, just knowing to, just knowing the background information.

This time the concept of “knowing the background information” was an attempt of Carlene to explain how important it is to develop empathy. At least one important way to relate with another person is to understand what they have been through in the past.

These and many other examples demonstrate the narrative video was associated with developing empathy. Contrastingly, several students described the non-narrative video as “plain.” Such comments highlight the lack of emotional engagement, including empathy. In connection to the concept of empathy, students also reported the narrative video as a guide to working with real patients.

Working with Patients

Many students expressed the importance of learning to work with patients. In their program, students work most frequently with mannequins or on other students. This pattern was very often identified in the interviews, maybe because many of the students have not yet worked with patients and are anxious to understand what that is like. In the

data, working with patients included ideas about working with difficult patients, handling different situations, developing people skills, patient interests, etc.

Working with patients was the theme most frequently referenced by students in the interviews with a total of 23 instances referenced by eight different students. In 21 of the 23 instances working with patients was mentioned in the interviews, they specifically referenced how the narrative video helped them with patient skills. In the remaining two instances, the students were not necessarily referring to one video over the other, but to both videos in general.

Mokosh said, “I like it [the narrative video] because, like, it shows how to handle it, like, when a patient's having troubles and stuff like that.” Mokosh would not have learned “how to handle . . . patient’s having troubles” without the story of the little boy. Because the non-narrative video did not specifically reference working with difficult patients, this kind of learning did not happen for students who did not watch the narrative video.

Norma said, “I feel like the [narrative video] would be really good to help you with your people skills.” Soft skills such as communication or helping patients feel at ease may not directly help the students learn the procedure, but are surely just as important, if not more important, in a job or career.

No students described learning these types of skills or working with patients in connection to the non-narrative video specifically. Instead, students described the non-narrative video as simply “explaining the procedure” (Norma) and merely as “a tutorial” (Lexy). In connection to the narrative video, students not only mentioned working with patients, but working in a dental office as well.

Dental Office Experience

Near the end of the program, students must gain experience working in a dental office before they receive their dental assisting certification. A few of the students had prior experience in a dental office before they entered the program (although some dentists require it, a dental assisting certification is not required by law in the state of Utah). However, the majority of students interviewed had no experience in a dental office at the point in the program they were exposed to these videos. Dental office experience is what they are working towards and is what they are missing at this point in their training. It then may come as no surprise this concept was talked about frequently in connection to working with patients.

Almost exclusively, when students mentioned something about being prepared to work in a real dental office, the students were referencing the narrative video. In 16 out of the 19 total instances of dental office references, this was the case. In the other three instances, the students were not specifically referring to one video or the other.

Tatenda insightfully explained, “We just practice on each other and we're not really scared, you know? Cuz', we're . . . It's what we're all doing . . . Um, but there's gonna be a lot of people that are scared.” Tatenda sheds light on the gap between simply learning a procedure and really understanding how to do it real life. It is clear the narrative video helped her see this gap.

Mark, who mostly reported preferring the video without the narrative, said, “[The narrative video] just helps you, like, realize, like, what could possibly go on in an office, so that you can always be prepared.” Even a student who greatly expressed preference for the video without the narrative overall, still expressed the importance of the story

preparing students for work in a dental office. Also note, Mark's comment was not merely a connection to a dental office, but being "prepared" to work in a dental office someday.

Age-Appropriate Treatment

Students did not stop at talking about working with patients or working in a dental office, but students also discussed the importance of learning to work with patients of different ages. This is an important skill to master in any dental office, but especially a pediatric dental office. The skills to work with children especially do not always come naturally and often must be honed.

When talking about the importance of age-appropriate patient treatment, students may have referred solely to the narrative video because the video surrounds a story about a little boy. Ten of the 11 instances about age were connected to the narrative video.

Lauryn told me the narrative video helped her learn, "How to deal with a little boy versus someone who is, like, grown, and knows how to sit in a dental chair correctly." Several other students mentioned this same idea in different ways, but the idea of working with patients in age-appropriate ways was essential component of what all of them said.

For example, Lexy said the following:

I guess when you're doing it, like, for Pediatrics, that could be useful because you have to know, like, you know this is a very real situation that happens all the time on pediatrics. Like having to deal with kids who are, like, nervous.

Pediatric dental offices are often children's first experiences with dentists. They may be more likely to be frightened because it is a new experience. Learning to relate to

children specifically is something the narrative video unwittingly hit at that the non-narrative video did not.

Tatenda started to make a similar distinction in regards to age, but then insightfully corrected herself by explaining that all ages could face anxiety about going to the dentist.

If you had a boy or a child come in (or not even a child, anyone come in) who was scared of, or nervous, [the story of the little boy helps with] different ways to deal ... handle those situations.

This contrasting statement regarding age shows the narrative video not only stimulated a conversation about working with frightened children, but helping all people through their anxiety, regardless of their age.

The only one of the 11 instances about age discussed specifically in regards to the non-narrative video was spoken by Norma. She first explained she felt the narrative video was targeted towards children or dental assistants working with children and then said, “And, the [non-narrative video] is more, like, for adults.” Other than that, age was not specifically referenced in connection to the non-narrative videos.

Video Duration and Conciseness

Video Duration

As a reminder, the video with the story was a total duration of five minutes and 52 seconds in comparison to the non-narrative, which was only three minutes and 58 seconds. Regarding video length and pacing, most of the comments made were directly about the shorter video without the narrative. Students generally explained the shorter the video, the better it was in some regard.

Seven of the 12 comments on this topic were specifically referring to the non-narrative video and only two were in reference to the narrative video. Even when in reference to the narrative video, only one of the two comments assigned positive attributes to the longer length.

Examples of students referring to how much they enjoyed the two minutes less in video included Carlene: “I really liked how, like, when you were watching the [non-narrative video] it was kind of short and simple.” Norma also said she liked the video without the story “because it's more, it's like quick. Like I said, quick to the point . . . just, kind of like, quick.” These comments demonstrate shortness and brevity were positive attributes of the non-narrative video.

Livia specifically referenced how fast-paced the non-narrative video seemed: “It just went to the explanations right away. It was more fast-paced.” She used the word “fast-paced” twice during the interview in reference to the video with no narrative. It is important to note students not only liked the non-narrative for its shorter length, but for how quickly it seemed to move in comparison to the video with the story. In this case, it appears the story slowed down the overall perceived pace of the video.

There was only one comment positively discussing the longer length of the narrative video. Mokosh said, “I liked the [narrative video] . . . cuz’ it was longer . . . I like stuff that explains it and it's longer. Some other people just want the shorter version, but I’m not sure. I like the longer version.” It is clear some students may prefer a longer explanation; however, by the numbers, this clearly was the exception not the rule.

In contrast, Mark talked about how the longer length of the video with the story was a negative element of the video. He said, “The [narrative video], like, it did explain

like Power Rangers and stuff, but because that took longer to explain everything.” He frequently referred to the video without the story as being more concise in some way and specifically referenced preference to the non-narrative video overall. Other students expressed the narrative elements getting in the way of what they wanted to learn, which is discussed in more detail later in this chapter.

Conciseness and Simplicity

In connection to being short, students also reported simplicity as a positive attribute in the non-narrative video. In this context, simplicity can be understood in terms of an ease of understanding and/or a conciseness with language used in teaching. Students used words such as, “straight to the point,” “simple,” and/or “plain.” For the ten students who made a point about conciseness, many of them spoke of it in a positive light.

When referencing conciseness and simplicity, students were nearly always referring to the non-narrative video: 17 out of the 19 total instances of this type of reference were in connection to the non-narrative video. The remaining two instances were in reference to both videos generally, not one video over the other.

Carlene may have summed up students’ feelings when she said, “Um, I really liked how, like, when you were watching the [non-narrative video] it was kind of short and simple And so, I really liked how there was more of, like, a basic, straight to the point.” Interestingly, phrases such as, “straight to the point,” “to the point,” or “right to the point” were used 12 different times by seven different students. It seems clear students enjoyed conciseness and simplicity. This may have been because some students

felt the narrative got in the way of learning the procedure; in other words, the story may have contributed to students' extraneous cognitive load.

Cognitive Load

Cognitive load refers to the way the human brain processes stimuli from the physical environment (de Koning, Tabbers, Rikers & Paas, 2009; Ibrahim, Antonenko, Greenwood, & Wheeler, 2012; Mayer, 2008). If the amount of stimuli is too great, extraneous cognitive load can negatively affect our ability to learn. Some students reported the story in the narrative video as distracting them from learning the material or otherwise contributing to cognitive load. There were at least seven instances discussed by six different students reporting this was the case.

In her own language, Magda said, "When you're, like, watching it, you probably, like, don't want to hear, like, 'Oh, well there's this little boy when he came in and stuff.'" Magda implied the story was not something she wanted to hear while attempting to focus on learning the composite restoration procedure.

Elsabeth said, "The [non-narrative video] . . . It just caught my attention more. It kept my attention rather than my mind wandering off . . . I was able to, I guess, to focus more. Like, what they were saying." She seemed to be saying the narrative video caused her mind to wander off or she had a hard time focusing on the narrative video. This also hits at the idea of the narrative contributing to extraneous cognitive load.

Other students also highlighted similar ideas when they said things like, "I just want to remember how to do the procedure" (Lexy). Or, "the extra little bit [the story elements]" made the video difficult to focus on (Carlene). These students clearly

expressed the story may have distracted them from learning what the video was intended to teach them.

It may be tempting to easily think stories inserted into educational videos will nearly always increase extraneous cognitive load, but four of these same students reported the story also helped them pay attention, remember the content of the video, or helped them focus better. There were at least nine instances reported by six students of the video helping them focus, pay attention, or remember.

Livia said, “I feel like the [narrative video] I watched was more memorable. Just cuz’ it had, like, a storyline to it . . . Like, more memorable . . . So, you remember how to do stuff because of the topics coming up.” It could be the story actually helps some students remember the course content (maybe especially in the long term), even if the story does temporarily add a bit to the extraneous cognitive load.

Regarding the narrative video, Norma said, “You pay attention more. You know what I mean? . . . Just cuz’ it’s, it’s more attention grabbing. Like, you know? It’s more . . . It’s easier to focus on too.” Here, Norma points out the story may not only assist students in remembering the concepts in the long term, but the story actually assists with focus. Although some students felt the story made the concepts harder to focus on, Norma and other students felt the story actually made the video easier to focus on. Some students may be drawn in and kept in by a story.

Lauryn even went as far as to say too much information was “getting thrown” at her in the non-narrative video. She said, “Just, the [narrative video], it’s kind of more entertaining. So, there is a story behind it versus just information getting thrown at you like in the [non-narrative video].” In this case, this student implied the non-narrative

video was the one with the extraneous cognitive load. For her, the story made the educational video more palatable.

Overall, narrative may certainly add to extraneous cognitive load and distract learners from what they are learning, but the evidence in this study alone is not consistent. Stories may enhance the ability to focus for some students. This probably depends more on the context of the learning, the learner, the story itself, and the storytelling or storytelling methods.

Onscreen Text and Visual Cues

The story was not the only element that may have affected cognitive processing. I believe it is important to report on finding regarding visual cues. Visual cues, such as on-screen text or close-up shots, seemed to help students learn the information in the videos. There were 12 instances of six students that specifically mentioned visual cues in some way.

Carlene said, “I also liked how it had the subtitles of what tools she was using.” In both videos, text briefly describing each step in the procedure was inserted at the bottom of the screen. Carlene went on, “Like, what was being shown in the video was also being shown at the bottom so you could refer back to that.” Carlene was not the only student to mention this. Lexy also said, “I think that was good to be able to read it and hear it.” This onscreen text acts to signal or cue the viewers attention to the appropriate step in the procedure and students obviously find them valuable.

Two students also mentioned close-up shots. Magda said, “I like how, like, zoomed you guys were in.” Tatenda said, “Showing you how you do it like right up close.” It is important to realize visual cues overall were a positive feature of the videos,

even though it did not influence whether they liked the narrative video or non-narrative video better.

Background Music

Visual cues were not the only additional video feature students reported as positive. Although background music was included in both videos, it is important to note students appreciated the background music.

Tatenda said, “A little bit of music in the background . . . For me, it helps me tune in more. If it's, just, like this, like, it just makes be more interesting.” Some may argue background music also adds to extraneous cognitive load. It is clear from Tatenda’s statement, it may actually help students focus in certain contexts.

Magda similarly said the following:

The background music . . . So, I like that, cuz’ it . . . I feel like when there's something in the background, when they're not even, like, talking and stuff, it, like, catches my attention . . . I think it was cuz’ a sound . . . You know how most people are, like . . . sound, you know, catches you.

No students had any negative feedback or insights regarding the background music. It was only reported to be useful. It is clear background music is a positive feature, whether there is a narrative or not.

Separating the Story from the Instruction

I also think it is important to note there was one student who expressed they felt the story of the little boy should be separated from the instructional elements of the video. There was another student who expressed having both elements together was positive.

For example, Tatenda said the following:

Maybe have like a separate video about that kind of situation. And, that way, you can focus mostly on, like, the composite. And, then, you can have that situation and you can focus on learning how to deal with kids who are scared.

Contrastingly, Carlene said the following:

I feel, like, to kind of summarize how to work with a difficult patient and do a composite restoration. I feel like, you know, you hit two birds with one stone . . . So you kind of, just, it kind of hits both points with that . . . Like I said, you kind of get the two birds with one stone and not just . . . It's better to add a couple of minutes versus having a lot of completely different video of how to work with a difficult patient.

In the context of this study, it is clear the story inserted into the narrative video did not necessarily increase learning outcomes among dental assisting students. It also is not totally clear if having the story in the video has a negative or positive affect on cognitive load. It is not clear from this research whether combining a story within an instructional video or keeping a story separate from the instruction is best.

Overall, the findings from this study were not conclusive on whether inserting or not inserting a story into an educational video affects learning outcomes or student motivation. However, I did discover students prefer the non-narrative video as a reference for the procedure. Students also liked the non-narrative video for its brevity and conciseness. In contrast, although not necessarily directly connected to overall preference, other students reported the narrative video as more emotionally engaging (including in regards to developing empathy) and that it prepares students for dealing with real patients. This is important for teaching patient care and preparing students for communicating with and comforting patients, an essential skill in dental assisting, dental hygiene, and other medical-related fields.

CHAPTER 5

DISCUSSION

In this chapter, the findings will be discussed in more depth. The limitations and delimitations of this research will be explained. Suggestions for future research will be discussed, and, finally, general conclusions will be made.

Discussion

Emotional Engagement and Empathy

Consistent with what Freytag said about his five-act story structure being intended to elicit an emotional connection with viewers (Freytag, 1908), this study also found this to be true; students found the narrative video to be more emotionally engaging. As many scholars indicated in the previous literature, stories indeed seem to assist students in developing or eliciting empathy as well (Adamson & Dewar, 2015; Barraza & Zak, 2009; Collins, 1991; Gidman, 2014). So, why would it be important to elicit empathy or any other emotion in an educational video?

Barraza and Zak found a narrative video (using the five-act structure) increased empathy and therefore promoted participants to donate money (Barraza & Zak, 2009). It is clear storytelling can positively influence decision making and behavior. It also seems clear that increasing empathy (and other emotional responses) can facilitate greater human connection. For example, students in this study reported increased empathy and overall emotional engagement and then recognized the importance of working with people. Again, much of learning consists of engaging learners in behavioral change

(maybe especially behavioral change in connection to other humans). If emotional engagement can be used to influence behavioral change, it follows it can be used positively in affecting learning.

Please note, it is unclear if the reason Rebecca was specifically reported as being happier and more engaged was because the story she told helped her to appear that way to the students or if she really was happier and more engaged because she was telling a story. Regardless, no students reported these emotions associated with Rebecca in connection to the non-narrative video. It also may be important to note that some instructors may not have the same experience, ability, interest, or talent in storytelling. Some instructors may not enjoy telling stories and may not necessarily appear happier while telling a story. Students also come with their own bias and preconceived notions about stories; some students may have been raised with many stories in their lives and some may not. The story and story context surely has an influence on this as well.

Cognitive Processing

Previous research suggests, educational videos should use signaling (or cueing) to draw viewer's attention toward important information; this may include using onscreen text, arrows, circles, close-up shots, etc. (de Koning, Tabbers, Rikers & Paas, 2009; Ibrahim, Antonenko, Greenwood, & Wheeler, 2012; Mayer, 2008; Zhang, Zhou, Briggs, & Nunamaker, 2006). This research unwittingly validated and corroborated this other research. Even though it was not central to the research questions, I discovered students indeed appreciate videos with onscreen text and visual cues.

Other researchers have rightfully pointed out the importance of attempting to control for cognitive load when creating an educational video (Chi, Kang, &

Yaghmourian, 2017; de Koning, Tabbers, Rikers & Paas, 2009; Ibrahim, Antonenko, Greenwood, & Wheeler, 2012; Zhang, Zhou, Briggs, & Nunamaker, 2006). Interestingly, students in this study did not agree with each other on whether storytelling mixed with instruction increased or decreased cognitive load. To me, it seems apparent whether stories increase cognitive load or not has more to do with the learning context, the topic of the learning, the relevance of the story, the storytelling techniques, and other similar factors. For example, while watching any of the narrative-style TED-Ed YouTube videos (TED-Ed, 2019), I do not find the stories detracting from the learning. Similarly, I doubt most children or parents find narrative educational television shows as distracting to learning, but rather an enhancement to the learning. The skill of the storytelling team must be imperative to the results.

Speaking of cognitive load, some scholars may suggest background music adds to cognitive load and distracts students from learning in many cases. However, in this study, without even being asked about the music, several students I interviewed reported the opposite. None of the students I interviewed reported a negative effect of the music. Some may argue, the fact they commented on the music is a sign they were distracted by it; they could very easily have been thinking about how they liked the music rather than the concepts in the videos themselves. However, whether background music helps or hurts may have more to do with the type of music and the way the background music is applied to the video. For example, while watching an educational documentary or listening to a well-produced educational podcast, I am hardly ever pulled away from the content because of the music, even when I note how much I like the song. For me, music seems to enhance my attention and focus. Admittedly, I have also watched

amateur videos where the music overpowers the narration or the music seems to strike some sort of emotional dissonance, making it more difficult to become engaged with the content. I believe whether music adds to extraneous cognitive load has more to do with the music choice and the way in which the music was edited into the media.

Video Length

Shorter total video length was viewed as a positive feature. This causes me to conclude that in this context, stories that significantly increase the duration of the video instruction are often going to be viewed negatively; the shorter an educational video's length, the better it seems to fair with students. It may be wise to keep the story brief or to separate the video into two or more segments. This is consistent with some researchers who have demonstrated online courses with videos of shorter durations are more effective than online courses with longer videos; specifically videos should be under six minutes long (Guo, Kim, & Rubin, 2014).

Functions of Storytelling

There appears to be many useful purposes of storytelling in general. Narrative is not only a way for human minds to process and catalog data, but stories also provide a means to empathize with others, as discussed previously. Stories assist to signal to others the emotions one has had or is experiencing and the unseen intentions and motivations connected to a person's behavior. Empathy, however, is not the only emotional response elicited by storytellers. Narrative can be an important medium for one group to maintain a rhetoric of discrimination and bias; it can elicit the exact opposite of empathy. Whether the feeling is compassion or anger, narrative seems to be one of many direct avenues to

communicate emotion, which can be used to drive action and facilitate interaction. Stories also seem to keep audiences engaged because of our craving to know the ending. Narratives transport learners into the “real world” without requiring the students to step foot out of the learning environment. Narrative appears to be a popular avenue for self-improvement and personal growth; one can easily compare the protagonist’s experiences to their own and think how they might act like or dislike them in similar contexts. Stories can even be used to divert others from important information, to deceive, or to hide another important piece of data. Hearing and telling stories can be used as one of many tools to move important information to long-term memory; so many seem to remember stories better than historical dates or mathematical equations. Further research should be conducted to report the other diverse implications for storytelling.

Whereas stories may not necessarily increase knowledge retention in the sense of assisting students in providing the correct answer for a test, stories do seem to possess many other important functions. Within the context of this study, it seems evident narrative can have a direct effect on improving learning about patient care. One of the major purposes of education is to prepare learners for real-world experiences. If narratives help students prepare for dealing with real patients, including handling patients of various ages, stories should not be discounted as unimportant to the overall goals of learning in any given context. The fact the stories also may increase emotional engagement should not be disregarded, especially because it seems clear from this research that some students reported being better able to focus when they are emotionally engaged.

Limitations and Delimitations

Limitations

Statistical Significance

As has been mentioned several times previously, the amount of collected quantitative data from this research was much lower than anticipated. Because of this the quantitative data cannot and should not be considered statistically significant. Future research could replicate this study with a larger sample size to see if the results change.

Time After Treatment

Most students in this study completed the quizzes and other assessments within a couple weeks from the time they began the section of the course with the videos. The overall effect of narrative on learning may not be clear for months, maybe even years, after watching a video with a narrative. For example, students who watched the narrative video may be better at retaining the information contained in the video long term. The video with the narrative may also simply be more memorable long term, regardless of whether the learning content is retained: in years from now, students may remember watching a video about a story with a little boy, but may not remember very many of the other videos they watched. The time constraints on this research do not allow such probing. Future research may examine such ideas.

Student Age

Only one of the consenting students was a minor. This may have been because it was a larger hassle for minors to remind their parents or guardians to complete the process. The remaining consenting students were over the age of 18 (some of which were high school seniors). This being the case, this research cannot fully examine how

narrative videos may affect dental assisting students of varying ages. Future research should be conducted to examine this.

Personal Bias

My personal bias and prior experience could have influenced the results. In an attempt to be forthright and upfront regarding my personal bias, I will declare my own bias as best as possible. I personally believe storytelling can greatly enhance teaching. I believe a big portion of this comes from listening to speakers in church while growing up and being much more engaged with those sermons than speakers who did not use stories. I love that Jesus Christ told stories to teach principles and I love reading and hearing those stories. I also love that the sacred texts of my church, The Church of Jesus Christ of Latter-day Saints, seems to be almost completely comprised of stories. I also loved it when my teachers in school told stories in class to illustrate a point or to engage us in the concepts being taught. I felt more engaged in the content when this happened.

I find it encouraging to realize that although I surely brought a certain level of my own bias into this research, my bias did not influence the results I intended and expected to see. I did not find any evidence that storytelling positively or negatively affected student learning. Nor did I see any significant results regarding student motivation. This causes me to believe the results I discovered that I did not intend to find must not have been too significantly influenced by my bias.

Delimitations

The sample size for this study was limited to students at Bridgerland Technical College in Northern Utah. The results of this study fit within the context of this sample size and should not be too broadly generalized.

The videos and research were done to fit within the context of dental assisting education. These results should be tested and validated in other contexts, including other technical education settings.

Suggestions for Future Research

Areas for Future Research

Hopefully, it is clear by this point that the question of whether a narrative video impacts student learning, motivation, and preference is more complicated than merely inserting a story. There are so many variables to consider: the narrative structure, the way the story is told, the story chosen, the skill of the storyteller, the emotional response of the viewer, and more. It now seems clear, to claim stories increase or decrease student learning, motivation, and preference is by itself is too simplistic a claim. To say a story impacts learning is like saying a toolbox builds a birdhouse. Can a toolbox be used to build a birdhouse? Yes. Is every tool in a toolbox used to build a birdhouse? No. Storytelling is set of tools that can be used to influence student learning; the intent and skill of the storyteller seems to have a huge influence on the results.

The reason I point this out here is because I think questions on whether stories impact learning (or human attitudes and behaviors in general) is too broad a question. Future research should narrow the examination by studying specific elements of story structure and various types of story structure. Also, future researchers should look at what types of understanding, facets of learning, and teaching practices lend themselves well to storytelling. For example, how does the hero's journey story structure influence peer tutoring? Or, how does the petal story structure influence overall course design? Or,

does in medias res add to extraneous cognitive load? Looking at narrower questions like these may help to uncover what sorts of knowledge or teaching practices lend themselves well to varying aspects of narrative. Besides looking at pre-existing narrative educational video content or interviewing such content creators, the best way to answer questions like these may simply be to experiment with them.

With that being said, another idea may be to analyze existing narrative videos (e.g., videos on YouTube or in children's educational television) to evaluate and catalog in what contexts certain stories and story structures are used. This would be helpful to see what works and in what contexts narratives could be inserted into videos effectively.

Collaboration

Working with the staff at Bridgerland Technical College was a wonderful experience. Everyone was kind and supportive; however, the dental assisting instructors did not seem to have the same level of enthusiasm about the evaluation and research as I did. They were eager to have videos made for their courses and plan to use these videos in future years. However, they did not seem as eager about the findings of the evaluation. This may be because of how busy the dental assisting instructors are. On a day-to-day basis, it appeared most of their work revolved around working one-on-one with students. Students are required to schedule time with their instructors for pass-offs because of how busy the instructors are working with students. Little of the instructors' time is spent on curriculum design.

Because the instructors were not as enthusiastic about the project, it seems as if the instructors did not set a strong expectation for the students to complete the video quizzes in the course. Some students completed a portion of this material and some

students seemed to skip over this portion of the curriculum altogether. Finally, a couple of the measures I inserted into Canvas were ungraded and did not show up at all under the grades tab. I worked with instructors to fix this problem, but it was not resolved early on in the data collection phase.

For future researchers and evaluators, I would suggest finding a way to help instructors or other necessary stakeholders directly benefit from the evaluation and/or research being done. There seems a need for some tangible benefits to help with the study or some tangible consequences for withdrawing or not helping.

Rolling-Enrollment Programs

I have learned that before completing evaluation or research work (or any type of data collection) with a prescribed number of participants, it is valuable (and maybe even necessary) to base the expected number of participants on historical data instead of relying on other sources of information. In my case, I do not believe anyone involved was purposely trying to mislead me. In fact, although several of the dental assisting instructor continually ensured me I would see more students engaging with this particular section of the curriculum, the department head consistently told me she was unsure about the exact number of participants I would end up seeing complete the necessary course work. Although somewhat difficult to dig up, it may have been possible for me to gain access to the number of students that had completed this much of curriculum in a comparable amount of time in the previous years. However time consuming it would have been to find that out, it would have been a better indicator of the actual level of participation I could have anticipated. I suggest to future researchers and/or evaluators working with rolling-enrollment and -completion programs, to look at the actual

historical data before making decisions or assumptions regarding the numbers participants.

Conclusions

Although I did not find any significant outcomes on whether narrative educational video training affected student learning, student motivation, or overall student-reported preference, the results of this study uncovered other interesting findings. Dental assisting students at Bridgerland Technical College reported the narrative video as more emotionally engaging. The narrative video seemed to assist them in developing empathy. Students reported the narrative video prepared them to work with patients, including working with difficult patients, working in a dental office, and exhibiting age-appropriate behavior. In contrast, dental assisting students preferred the non-narrative educational video as a reference for the procedure. They also reported conciseness and simplicity in the non-narrative video as positive attributes. Future research should focus on particular elements and differing types of narrative structure and how they lend themselves to specific types of understanding and knowledge retention. Future researchers with a rolling-admissions and rolling-enrollment organization, should be careful to rely on historical enrollment and competition data before deciding to proceed with a study.

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APPENDECIES

Appendix A. Composite Quiz

1. What does the matrix strip do?
 - a. Keeps the curing light focused
 - b. Keeps the teeth from getting stuck together*
 - c. Keeps the composite from running
 - d. None of the above
2. How long is the first cure of the bonding agent?
 - a. 5 seconds
 - b. 10 seconds*
 - c. 15 seconds
 - d. 20 seconds
3. How long should each surface be cured?
 - a. 5 seconds
 - b. 10 seconds
 - c. 15 seconds
 - d. 20 seconds*
4. What surface does the finishing strip smooth?
 - a. Interproximal*
 - b. Buccal
 - c. Facial
 - d. Lingual
5. Which hand piece is used first to prep the tooth?
 - a. Slow speed latch
 - b. Slow speed straight
 - c. High speed*
 - d. None of the above
6. What is the purpose of the etch/primer/bonding step?
 - a. To create a smooth tooth surface for the composite to bond to
 - b. To roughen up the surface for the composite to bond to*
 - c. To neutralize the PH of the tooth surface
 - d. To clean and sterilize the tooth surface
7. True or False: You can never over cure composite
 - a. True*
 - b. False
8. What order are the finishing discs used:
 - a. Purple, black, pink, green
 - b. Pink, green, purple, black
 - c. Black, purple, green, pink*
 - d. Black, purple, pink, green
9. When is the floss used?
 - a. After the bite is checked
 - b. After the finishing strip is used*
 - c. Before the final cure
 - d. Before the black disc is used
10. What is used to shape the composite material?
 - a. Condenser
 - b. Burnisher
 - c. Carver
 - d. Plastic filling instrument*

Appendix B. Demonstration Pass-Off

Student's Name: _____

DENA 1071 – Dental Assisting VII

Dental Assisting Program/BTECH

Assisting during an Composite Restoration**Demonstration:** Schedule 2 Instructors for 40 minutes. We will be working on #24, IV-MI1st stpo: #25, IV-MI 2nd stpo: #24, IV-MI 3rd stpo: #24, V-F**Pass-Off:** Schedule one instructor for 40 minutes. We will be working on #25, IV-MI**Materials Needed:** Instruments listed in the procedure binder, typodont, PPE

2 points = No help needed

1 point = Needed help/reminders

0 points = Did not do/know

PROCEDURE STEPS	1 ST	2 ND	3 RD
1. Assisted in administration of local anesthetic.			
2. Gave the patient a full mouth rinse			
3. Assisted with the selection of the shade of composite material, and placed a rubber dam			
4. Transferred the mouth mirror and explorer to the operator. We will be working on tooth #25, IV-MI			
5. During cavity prep used the HVE and air/water for retraction & maintain moisture control.			
6. Rinsed and dried the preparation.			
7. If indicated mixed and placed any cavity liners or bases as necessary.			
8. Passed etchant to the operator. Let etchant set for the manufacturer's instructions.			
9. Correctly rinsed the etchant off and dried the tooth.			
10. Correctly placed the matrix.			
11. Assisted in the placement of primer and bonding resin. (if needed light cured the resin)			
12. Transferred the composite material along with the composite placement instrument to the operator. Made necessary transfers back and forth.			
13. Assisted with the curing of the composite material and removed the matrix strip			
14. Assisted with transfers as the operator uses the finishing discs, burs or diamonds to contour the restoration.			
15. Transferred the finishing strips for smoothing the proximal surface.			
16. Transferred floss to check the contacts and removed the rubber dam			
17. Placed articulating paper to check the occlusion. Adjustments were made as necessary.			
18. Assisted while operator uses polishing discs, points, and cups.			
19. Gave the patient a full mouth rinse			
20. POST OPERATIVE INSTRUCTIONS <ul style="list-style-type: none"> • Instruct the patient not to eat or drink till the numbness wears off. • The patient is not to use this tooth as a tool anymore (use in cutting fishing line, biting into hard food like apples or carrots) • That site may be hot and/or cold sensitive, if it is they need to place their tongue over it to dull the sensitivity, and if the discomfort continues to get worse then they need to come in and see us 			
21. Used proper techniques when sterilizing and disinfecting.			
22. Performed a "fast checkout" and entered a patient initial payment of \$16			
23. Entered in an insurance payment of \$64			
TOTAL POINTS			
INITIALS			
DATE			

INSTRUCTOR EVALUATION

100% required when passing off with an instructor.

Score: ___/___ Attempts: 1st 2nd

COMMENTS:

Instructor's Signature: _____ Date: _____

Appendix C. Interview Questions

1. What do you recall about the videos I showed you?
2. Did you notice a difference between the videos you watched?
3. What was engaging about the videos? Why?
4. Which video did you like better? Why?
5. What type of video would you prefer to see in the course? Why?
6. Which video would you prefer to have as a reference for the procedure? Why?
7. How do you feel the story video prepared you for assisting with a composite restoration?
8. Which pieces of each video made it useful?