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Leigh Highsmith
lah0907@gardner-webb.edu

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Making Training Memorable: Assessing the Impact of Animated Video on Learner Satisfaction, Engagement and Knowledge Retention

by

Leigh Ann Highsmith

A project submitted to the faculty of
Gardner-Webb University Hunt School of Nursing
in partial fulfillment of the requirements for the degree of
Doctor of Nursing Practice

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Submitted by:	Approved by:
_____	_____
Leigh Ann Highsmith, MSN	Candice Rome, DNP, RN
_____	_____
Date	Date

Abstract

Media rich video provides attributes such as animation, narration, and music that can be incorporated into learning modules which have high potential to promote learning. This project evaluated the impact of transitioning a learning module from static PowerPoint slides to animated (media rich) video on employee satisfaction, engagement, and knowledge retention. Learner satisfaction and engagement was measured using a validated survey instrument designed to evaluate the effectiveness, appeal, and efficiency of the animated video about Hospice and Palliative Care. Knowledge retention was measured by comparing post-test scores between the initial and subsequent second post-test. A retrospective design was used to evaluate learner performance between PowerPoint slides and Animated Video. Previous post-test score means of learners who received the traditional learning content delivered through PowerPoint slides were compared to those learners who received the same learning content through Animated Video. Overall, subjects responded positively toward the animated video and subjects strongly supported using animated video to deliver the training content as opposed to PowerPoint slides. Post-test scores between the initial and second post-test scores showed no difference between the two scores indicating that the subjects retained the information. Employee performance on the post-test improved significantly compared to the performance of employees in the retrospective population who received the content from PowerPoint slides. Implementing animated video to deliver Hospice and Palliative Care training to hospital employees resulted in improved employee learning and favorable employee

perceptions about the use of animated video to deliver hospital training to employees.

Keywords: animated video, learner engagement/satisfaction, employee training

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Introduction

Educators in the hospital setting are faced with challenges to develop effective training modalities for busy clinicians that keep the learner engaged in the content. In particular, today's learners are increasingly visually oriented and favor learning modalities that provide content rich graphics. Research shows that animations can increase learner engagement, and dynamic visualizations are better at enhancing learning than static pictures (McElhaney et al., 2014). Learner perception of receiving valuable training is critical for the learner to stay attentive to the training, ultimately increasing retention of information which can then be applied to patient care. As such this project showcases the development and evaluation of content developed as an animated video as a complement to the Palliative and Hospice care training.

Problem Recognition

The current method for delivering mandatory training for employees at a government hospital is through PowerPoint slides accessed through an on-line Learning Management System (LMS). The LMS is categorized by topics and is used for annual hospital wide trainings that are required for large groups of employees from a variety of disciplines. Employees receive the same training modules each year. The modules are only changed if there is new or updated content. Through informal assessments, employees comment on the mandatory training as being uninteresting. Employees state they simply click through the slides without reading the information because it is boring and monotonous. Employees often do not remember what they were taught through the modules, indicating that PowerPoint modules are ineffectively getting the learners' attention, which ultimately may impact knowledge retention. With the technological

advancements in the last decade, keeping learners engaged has become an even greater challenge. Today's learners have changed and prefer to receive information from multimedia such as YouTube (Jukes et al., 2010); therefore, the delivery of education must change to meet the needs of today's learners. Millennial learners place great emphasis on technology with new styles and means of learning.

It has been noted in the literature that research is limited on the most effective method to teach millennial learners (Toohey et al., 2016). However, established educational theories support incorporating multimedia design principles into curricula to promote and enhance learning in the millennial learner (Toohey et al., 2016). The status quo of routine PowerPoint lectures does not meet millennial learner needs (Toohey et al., 2016). In addition, today's learners are immersed in what is known as "rich media narrative" video in comparison to traditional PowerPoint slides that are considered "simple media narratives" (Alpert, 2016). Due to learners increased exposure to rich media narrative, teaching delivery methods such as PowerPoint can often struggle more today than ever to gain and hold a learner's attention (Alpert, 2016). Once learners are exposed to rich media content, the traditional PowerPoint slide format can begin to look old fashioned, low tech, and even less interesting to the today's learner. PowerPoint slides often fail to recreate the dynamic images of content rich media and therefore do not sufficiently create deeper cognitive learning, which results in remembering and using what was taught. As a result, it is now a great challenge to keep learners' attention so that learning or transfer of information can occur.

Technology can be a powerful tool to increase motivation, engagement, and achievement (Park et al., 2009). With the emergence of video design technology, huge

opportunities for innovation and improvement, and use of engaging video is seen as having a big role to play in this new environment. The standard PowerPoint format does not lend itself to learner engagement when compared with the unique experience of watching animated videos. The use of graphics and visuals in videos can make a difference to the learner's judgment of their likely learning performance, attention, interest and engagement levels, and ultimately their learning performance compared with videos with no graphics or visuals (Carmichael et al., 2018). Very little is known about the role of videos in knowledge development and helping critical thinking, and this is identified as a major gap in the research that requires more investigation (Carmichael et al., 2018). The process of re-thinking and re-designing mandatory course content in response to technological changes for a market of learners who have very different experiences and expectations could have a significant impact on improving learner satisfaction, engagement, and ultimately knowledge retention. Today's learner has changed with the advancements in technology resulting in learners being exposed to high levels of rich narrative media that is more auditory and visually engaging because it includes all the senses unlike PowerPoint which is considered simple narrative media. Simple narrative is defined as text and graphic only. Traditional PowerPoint slides contain only text and graphics versus narrative media that contains motion, sound, narrative (storytelling), graphics, and text.

Problem Statement

Required training at a government hospital is currently delivered through simple narrative media (PowerPoint), resulting in learner dissatisfaction and a deficiency in

knowledge retention. It is believed this is due to a deficiency of learner engagement related to the lack of rich narrative media.

Needs Assessment

Population

The project institution of implementation was located in a government hospital in the southeastern United States. The population targeted in this environment was employees that work at the hospital. The population of employees consisted of approximately 2,200 employees who ranged in age from 19 to 78 years of age with multifaceted learning needs that have changed over the last few decades due to the advancement of the technological world. The generation of Baby Boomers are beginning to leave the workforce and Millennials and Generation Y will soon dominate the workforce (Gautam, 2020). This representation was evident in the project institution as the number of employees who are in their 20's has increased in the past five years, and nearly 40% are in their 20's and 30's, which is representative of a generation that has grown up with computers. Employees at the facility were diverse. Ethnicities included white (86%), black (9%), Hispanic (1%), Asian (3%), Native Hawaiian/Pacific Islander (<1%), and American Indian (<1%). Additionally, 38% were female and 62% were male at the time of implementation. The education department at the facility desires to strategically transition the content of mandatory annual training modules from PowerPoint to animated videos so employees are engaged, information is effectively communicated, and employees are best trained to perform their roles. The use of animated video may improve knowledge retention rates with the change from passive

delivery through PowerPoint slides to interactive delivery of materials through animated video.

PICOT Statement

When employees complete online training modules how does viewing animated video modules compare to viewing traditional PowerPoint modules and affect learner engagement, satisfaction and knowledge retention?

Sponsors and Stakeholders

Program directors, subject matter experts of the learning modules, and leaders convey the need for a new way to deliver content in the learning management system (LMS) in order to increase employee knowledge retention rates and improve satisfaction with learning. The Education Specialists who work at the facility often hear from employees that the training modules are too long and boring. Often, they do not read the PowerPoint slides and simply skip to the test. As a result, Education Specialists want to change how content is delivered.

At the time of implementation, the facilities Education Committee was comprised of the Chief of Education, Education Specialists, and representatives from numerous services throughout the facility as follows:

- Administrative,
- Finance,
- Geriatrics,
- Medicine,
- Nursing, and
- Learning Management System Manager.

At a round table discussion during committee meetings the group discussed the need to revamp the modules in the LMS and to lessen the volume that employees are required to take. Ultimately, the goal is to make the modules more interesting in hopes that employees will read the content, remember the information, and apply the information to their jobs. Subject matter experts who are responsible for writing the current content contained within their designated areas often comment that employees do not know critical information when asked even though they have completed the required modules. The subject matter experts have expressed frustrations that the employees do not know key information. Healthcare is fast-paced, highly-technical, and an ever-changing environment often demanding training to inform employees of critical information and changes. Employees need to be able to complete mandatory training modules and remember the information so that the learned information and concepts can be quickly applied to their work.

Organizational Assessment (SWOT)

The facilities education department utilized an online LMS to deliver required trainings to employees. This system was used in all government hospitals and included modules that are assigned to employees based on their job titles and work areas. The modules are categorized by topic and when assigned must be completed within a designated timeframe. Many modules are required to be completed annually. At the time of implementation, the content contained within the modules consisted of PowerPoint slides and then a post-test. Of those modules, none utilize media-rich content such as animated videos containing visual images, storytelling, audio narrative, or music.

Strengths

The Subject Matter Experts, Education Specialists, and Leadership support the integration of video and converting PowerPoint modules into a more engaging format. Anyone in the Education Department can utilize the video editing and animation software via a site-license provided by the institution. This software is easy to learn and allows for the creation of customizable eLearning to fit a variety of audiences. The software allows learner engagement through captivating active storytelling and media-rich communication. The current LMS was well suited for utilization of animated videos as the system will support videos uploaded in a digital media format. During implementation, the Education Department had energetic, passionate educators who were experts in adult learning theory and comfortable learning new technologies. Subject Matter Experts and Education Specialist shared a culture of openness towards innovative technologies and had employees who desire more engaging learning.

Weaknesses

Weaknesses included:

- time for preparing/creating the videos,
- technical challenges,
- variations in learning styles, and
- generational differences with using new technology.

Developing media-rich animated videos requires meeting with Subject Matter Experts and designing the video from start to finish. Some Education Specialist may have difficulty transitioning PowerPoint modules to animated video format initially as this requires learning new software. The development of media-rich animated videos for

future new modules that need to be created will also add to the module creation time. As with any new change, some Education Specialists may be hesitant to create animated videos due to technical challenges or discomfort with learning new software.

Another concern is that once employees are exposed to media-rich animated videos they are going to be even more dissatisfied and reluctant to complete the old modules that are PowerPoint slide format due to exposure to a more engaging media that taps into both visual and auditory senses. There are a large number of learning modules that will need to be transitioned from PowerPoint slide formats to the media-rich animated videos, requiring significant time to complete. The lack of knowledge about the animation and video editing software will require time upfront to train Education Specialists on the software and then time to recreate the training modules in media-rich animated video formats. Finally, the animated videos will need to be 508 complaint which is a requirement for placing videos into the LMS.

Opportunities

Due to recent advancements in multimedia technology, there is opportunity to present training in an engaging manner through use of animated video. Animated video provides increased learner engagement via motion and sound, which could increase the learners' attention. Development of video that is media-rich could potentially increase learner satisfaction with required training modules. There is also opportunity to impact employee behaviors through music, images, and motion graphics within the video. The combined effect of moving pictures, storytelling illustration, and animations could have positive effects on attitude changes because they can deliver stronger messages through use of both auditory and visual senses, resulting in increased compliance with training

content and improving engagement and thus knowledge retention rates. The growing number of millennials in the workforce, and digitally native employees, presents an ideal opportunity to develop training content that is delivered in a more technologically modern method that grabs and retains the learners' attention.

Threats

External threats included technical difficulties, such as ensuring the software had no issues opening and playing in the LMS. Videos that skip or do not play seamlessly would hinder the ability of employees to complete the on-line module and cause problems with completion of required training. At the time of implementation, the network budget supported the license for the software; however, future budget restraints may adversely affect the ability to maintain the software license. Fear of a new software technology may hinder adoption of the new software and further increase the time it takes to fully transition and covert PowerPoint modules to animated videos. Finally, there needs to be consideration for the timeline to fully transition as having the project take a long time could result in the current program becoming outdated as new innovative software programs are developed.

Resources

The facility is part of a larger integrated network of hospitals where the software license had already been purchased for the entire organization. The facility already utilized an LMS that accommodated videos and thus integration of the animated content into the modules. There was one full time employee located within the education department whose title is Communication Specialist at implementation. This role could be dedicated to transitioning the PowerPoint modules to animated videos. The

Communication Specialist already has knowledge and skills of video editing software and is familiar with similar programs. The Communication Specialist was the subject matter expert on video editing software and is positioned to work with the subject matter experts of each module to convert.

Desired and Expected Outcomes

The expected outcomes of this project were as follows:

- implement training using animation and graphics,
- increase learner engagement and satisfaction,
- increase learning and knowledge retention,
- modernize and revitalize a training module through animation,
- create a customized video tailored for learning objectives/outcomes specific for the content resulting in effective training,
- introduce an innovative learning strategy into the mandatory training curriculum at a government hospital using a learning theory, and
- contribute to the evidence supporting the use of animation in the healthcare setting.

Team Selection

The Doctorate of Nursing Practice (DNP) Project Chair was a DNP faculty member at the University. This role provided guidance and recommendations in the development and implementation of the project. This role also reviewed and critiqued the Project Leader's documents and paper.

An Education Specialist working in the Education Department served as the Practice Partner. This individual had a PhD, with a background in training development

and served as a resource for project evaluation and methodology. Additionally, this individual served on the facility's Institution Review Board (IRB) and assisted with communication between the project leader and members of the facility IRB.

Other members of the committee that assisted with the project implementation included the Learning Management System (LMS) Manager, Subject Matter Expert for the training module content, and a consulted design expert. The design expert assisted with video creation and provided input on graphic selection pertaining to color and background schemes. These choices must consider the most appropriate style and color for presenting information, taking into account how best to motivate learners and consideration for leaners' affective state (emotions) in order to facilitate optimal learning. Committee members displayed interests in transforming the current modules into more engaging videos. The Project Committee Members provided guidance and direction in the development and implementation of the DNP Project.

Cost/Benefit Analysis

Creating animated videos requires purchasing of software license for creation of videos. The license subscription for use of the software ranges from $700-$1,000 per year. Under the facilities annual subscription there was an unlimited number of videos that could be produced. However, the facility is part of a network of hospitals in which the license has already been purchased and can be used by the facility at no cost. At the time of implementation, the facility had 21 modules that must be completed annually by all employees. The software could be utilized for these modules as well in the future. The other associated costs are the employees' time to create the video. The Communication Specialists will need to work with a Subject Matter Expert to convert current PowerPoint

modules into animated videos. Successful implementation and results of this project serve to outweigh any associated costs of creating the videos. A proposed budget identified projected expenses including employee time to create the video and subscription costs for the software license in the event that the facility is placed in a position for needing to purchase. Developing training content in a media-rich narrative format is a low risk, low cost enhancement to the existing content that offers high rewards in the form of increased learner engagement, retention, and ultimately application of knowledge to work efforts. The transition from simple narrative media (PowerPoint) to media-rich (animation) can be implemented quickly, easily, and inexpensively. The only associated cost with this transition is employee time to create the video. In comparison, the cost of time for one employee to convert the content from PowerPoint to animated video will have positive impacts and benefit approximately 2,200 employees who will view the training not only once but every year while employed with the institution. The benefits of this proposal are not just about using a new technology, but about increasing the value and quality of the training. Use of animated video is a worthwhile proposal that could enhance the design, delivery and ultimately the success of employee understanding and retention of the information which can then be applied to patient care. Learning enhanced by animation has the potential to reduce training time and therefore training costs as content can be displayed through video in a shorter time than it takes an employee to read numerous words on a PowerPoint slide. This project demonstrates a worthwhile investment as offering effective training to employees through animation will assist in ensuring that they acquire new skills in a timely manner that could potentially result in better learning outcomes.

Scope of the Problem

The traditional teaching approach of using PowerPoint slides is the dominant method of employee annual education in the LMS at the utilized government hospital. Many employees experience difficulties in learning and remembering content that is taught in the current PowerPoint format as evidence by informal assessments. Some of these difficulties have been attributed to decreased learner engagement evidenced by employees verbalizing the PowerPoint formats are boring and they click through them without reading. In addition, employees often do not remember key information from annual training modules. Furthermore, it is critical for employees within a hospital setting to understand pivotal information that is key to employee competence to perform their job and to increase patient safety. This issue of maintaining a learners' attention is also a significant problem in the field of higher education, which is known to significantly affect their learning outcomes. This issue is also critical to many organizations as a survey by Gallup found 80% of millennials report professional development and career growth as very important (Gautam, 2019). There are also human resource implications as research found that 40% of employees with poor training leave their jobs within the first year (Gautam, 2019). Traditional PowerPoint format possesses a challenge as this method has shortcomings due to the inability to present employee education in a format that meets today's generation of learning preferences. Specifically, the Millennial or Net generation, born immediately following the introduction of the personal computer, is a particularly technologically savvy group and as a result it is an even greater challenge to gain and keep their attention. Present-day learners of all ages are exposed to a technology-rich environment with information presented through their smart phone

devices. These devises often display information that is colorful, with movement and digital effects, which can result in today's learner being accustomed to an immersion of content that holds their attention. Because of these factors, the learners' attention span has shortened and they do not respond as well to traditional instruction (De Castell & Jenson, 2004). Consequently, most adults are used to having to read less words than a typical PowerPoint slide contains, finding technology more appealing that scripted text on a slide (Donkor, 2010). Thus, integration of technology into the instructional design of creating learning modules must be considered by educators. In addition to the technology aspect, according to Booth (2007), learners generally retain 10% of what is read, 20% of what is heard, 30% of what is seen, 50% of material from group discussion, 75% of what is learned through practice, and 90% of what they say and do.

Ultimately, designing learning environments to engage learners with a variety of learning styles in an environment saturated with rich engaging media presents great challenges for educators. As a result, educators are faced with the challenge of finding innovative ways to accommodate the growing number of learners who are exposed to learning content in a similar fashion as they view information on their smart devices. Therefore, educators should consider innovative methods to use technology to engage their learners and keep their attention so new knowledge can be acquired and applied. It is critical for educators to follow the rapid technological evolutions and re-consider technologies that could better facilitate the acquisition of knowledge and dissemination of important practical skills.

Video Technology in Learning

Video-based modules offer a promising alternative in delivering the intended learning content that may not be available in the traditional PowerPoint slides. Video-based teaching material is a rich and powerful medium being used in computer assisted learning. Video-based modules provide a unique opportunity to represent detailed events in comparison to text, in a dynamic, visual, and spatial manner which result in excellent venues for focusing the learners' attention on specific details of material. The use of video-based lectures has enriched the educational curriculum in a range of academic fields such as science, medicine, and pharmacology. There are a number of ways in which video can make tangible differences in teaching and learning and many studies have shown videos to be beneficial for gaining clinical skills, changing attitudes, and retaining knowledge (Alpert, 2016). Video is considered to be a successful medium because it links the audio and visual senses together to provide a multisensory experience for the learner (Nugent, 1982). The ability to highlight information visually would be impossible through verbal or written text (Rasi & Poikela, 2016). Based on the visual component being attributed to memory, simultaneous processing of auditory and visual information might aid learning (Zhang et al., 2006). Also, the use of videos has been reported to improve understanding of concepts and have a positive impact on learner motivation and concentration levels (El-Sayed & El-Sayed, 2013). University students report that the use of videos improves their attention and has positive impacts on motivation and concentration levels (Nikopoulou-Smyrni & Nikopoulos, 2010). Literature also supports learner satisfaction with the use of video-based content as greater than compared with the traditional PowerPoint teaching methods (El-Sayed & El-Sayed,

2013). Ultimately, literature supports that learners enjoy videos and report they are enjoyable to watch, motivating, intellectually stimulating, and useful for learning (Alpert, 2016). Thus, video might be superior to PowerPoint modules for teaching employees' complex skills because it can expose them to events that cannot be easily demonstrated with the current method of using PowerPoint.

Animation

A wide range of technologies can be used to increase the learner's attention and presumably the learner's knowledge retention. Emerging technologies such as the use of animation is well documented in the literature, emphasizing the need for educators to adopt and promote their use. Often animations include: storyboards which consists of sequencing pictures and texts used to describe the story in multimedia software; animation using characters with facial expressions and movement; motion graphics creating the motion of rotation of images and/or shapes; and voice-over where a voice is used to narrate a script of the leaning content. Research has produced a number of design principles such as a learner having different channels for processing visual and auditory information and that meaningful learning occurs when the learner is actively engaged in processing information (Clark & Mayer, 2016). When such design principals are followed, more meaningful learning occurs which is characterized by not only storing knowledge in long-term memory but also being able to retrieve and apply the knowledge when needed (Clark & Mayer, 2016). Fostering learner understanding through animation that incorporates educational design principals, can particularly increase the understanding of complex concepts (Lusk et al., 2009). Design principles for multimedia advocate for the use of animation due to the ability to depict details through visual

graphics (Trevisan et al., 2010). Specifically, dynamic visualizations are better at enhancing learning than static pictures such as is displayed in PowerPoint slides (McElhaney et al., 2014). Animation allows for production of videos that are detailed and realistic which research indicates may launch students' problem-solving processes better than videos that students experience as staged or less realistic (Rasi & Poikela, 2016). Armstrong et al. (2011) suggests that the use of animation can be a valuable means to improve learning effectiveness in e-learning environments by comparing knowledge scores from pamphlets versus video groups when educating patients on sunscreen usage. Patients who viewed videos had a significantly greater improvement in knowledge scores but more importantly, greater sunscreen compliance and reported more useful and appealing compared to the pamphlet group. Additionally, consideration for the video format is pertinent as videos that utilize instructors with talking heads and drawing-hand style instructions has been shown to be effective in learner viewing patterns (Stöhr et al., 2019). Furthermore, a study by Moulton et al. (2017), compared the effectiveness of slideware (PowerPoint), and Zoomable User Interface (ZUI) presentations and found that learners favored presentations made with ZUI software such as Prezi, over slideware and rated as more visually compelling and dynamic. More specifically, the study found that the audiovisual attributes of the animations were better at engaging learners because of the panning and zooming functions. This research supports evidence that learners prefer animated media over static media because it facilitates visuospatial processing, conceptual understanding, and narrative storytelling (Moulton et al., 2017).

Learner Engagement

When using educational videos for employee training, another lens to consider is learner engagement. Put simply, if learners do not watch videos, they cannot learn from them. According to Smith and colleagues, engaging the employee in the training has the most direct impact on knowledge retention (Smith, 2017). In addition, whiteboard animations have been found to have a positive effect on retention, engagement, and enjoyment (Türkay, 2016). As a result, choosing the proper tool to engage employees is critical when creating training for the millennial adult learner. When the proper delivery tool is selected to engage employees, they stay more focused on the training, which ultimately increases memory retention (Smith, 2017). The use of multimedia videos has shown to have a positive effect on learner performance which could increase learner satisfaction and engagement. Even from the learners' perspective, media-rich content can be more effective than text because it enhances their satisfaction and motivation during the learning process. The literature provides evidence that the use of technology can greatly increase learner engagement through the use of graphics and video (Kearsley & Shneiderman, 1998). The use of characteristics such as facial expressions, gestures, and human emotions are attractive to learners and therefore can promote learner engagement (Chen et al., 2012). The use of multimedia video in learning has been shown to positively effect change in learner behaviors, and more specifically research shows that animations can increase learner engagement (Putranto & Rostiana, 2017). The combined effect of animation can assist in the delivery of strong messages by combining moving pictures, voice-overs, text messages, sound effects, and musical illustrations that collectively support learner engagement. Additionally, several studies have shown educational

benefits when using animation resulting in the increased use of animation to increase learner engagement and satisfaction (Clark & Mayer, 2016). Furthermore, research has found that learners find the content of multimedia video enjoyable and interesting and therefore it is often considered more relevant and effective by the learner (Cherrett et al., 2009). Adult learners want to be engaged, feel their time is being used wisely, and believe the training is valuable to their job, which is why it is particularly important for training modules to utilize animation when training employees. When employees cannot associate the material with their work environment or if they lack a sense of engagement in the material, the training loses value (Smith, 2017). This is critical because relevant and effective materials could enable employees to acquire specific skills, knowledge, and attitudes needed in their roles. For the above reasons, employee training should be designed to engage employees so they do not respond negatively to their time spent clicking through PowerPoint slides. Providing employee training through animation could assist in revitalizing and modernizing the current annual training modules, increasing engagement and ultimately facilitate deeper learning.

Improving employee training methods to meet the need of current generations will result in improved patient outcomes due to increased understanding and compliance amongst employees. When employees are engaged in learning they are more likely to comprehend the information and put the taught information into practice which can in turn improve patient safety and outcomes.

Mission, Goals, and Objectives

Mission

The mission of this project was to develop a media-rich narrative (animated) video as an innovative instructional alternative for educating employees on Hospice and Palliative Care content within the Learning Management System (LMS). The project utilized animated design principals and multimedia principals to promote engagement, satisfaction, and improve employee knowledge retention. The purpose of the project was to develop an animated video to increase learner engagement, satisfaction, and knowledge retention through dynamic visualizations that are better at enhancing learning as compared to static pictures delivered through PowerPoint slides. The use of animation to create video content has the capacity to display detailed concepts by providing information through verbal, audio, and visual illustrations. The project leader believed that upon implementation of the training method, employees would report increased engagement, satisfaction, and knowledge retention of the Hospice and Palliative Care content by watching the animated video, as compared to traditional PowerPoint, text-only delivery.

Goals

The purpose of this project was to create an innovative educational video using media-rich narrative technology that would positively impact employee engagement, satisfaction, and knowledge retention. The project's goals were as follows:

- Develop an animated video that increases employee satisfaction, engagement, and knowledge retention of training content.

- Implement animated video design technologies into an employee training module contained in the LMS.
- Develop an LMS training module that brings visual and verbal graphic content into employee training on Hospice and Palliative Care.
- Engage learners by presenting information in an innovative and unique context, specifically as animation with visual and audio aesthetics.
- Introduce an innovative educational design strategy in employee education using Mayer's "cognitive theory of multimedia learning" and video design principals.
- Contribute to the evidence supporting the use of animated video in employee training for hospitals and other healthcare facilities.

Objectives

The project's objectives were as follows:

- Convert educational content contained in PowerPoint format into an animated video format using video design technologies and video design principals.
- Create one employee training video using instructional design principals, video graphics, and animation prior to project implementation.
- Increased employee self-reporting in:
    - satisfaction and engagement after watching the animated video.
    - effective learning modality to achieve understanding of module objectives.

- The ability to remember content of the video by passing the post-test two weeks after viewing the video.
- facilitating their learning and deeper understanding of the presented concepts.

Theoretical Underpinnings

Multimedia Learning Theory

Learning theories provide guidance and framework to the creation of multimedia learning by helping to understand human cognitive learning processes. Learning is optimized when multimedia is designed using cognitive learning theory concepts of how people learn and multimedia design principals compatible with human learning processes (Mayer, 2009). Clark and Mayer (2016) assert that the goal of learning is to help learners build the transfer of knowledge and skills to perform their jobs to meet organizational performance goals, and describes learning as a change in the learner's knowledge due to experience (p. 10). Mayer's (2009) cognitive theory of multimedia learning presents a model of designing multimedia instruction that takes advantage of how people learn. The theory is based on three processes: Dual channels, limited capacity, and active processing.

Dual Channels

Mayer's research has demonstrated the human information processing system has dual channels and people have separate channels for processing visual/pictorial and auditory/verbal material (Mayer, 2009). Information presented is first processed through the auditory or visual channels separately and then concurrently through working memory. Mayer has found that people learn best when auditory and visual images are

coupled. Integration of the dual channel theoretical assumption into the design of this animated video will assist in delivering material through both compelling images and words in the form of media rich video thus improving learner understanding.

Limited Capacity

Mayer (2009) asserts that people can only process a few pieces of information in each channel at one time. This limited capacity of cognitive load explains that learners are limited in the amount of information that can be processed at one time and people can generally only think about a few items at any one time (Mayer, 2009). When learners exceed their cognitive capacity capabilities for processing information, the learner must decide which connections can be made using existing knowledge. When too much information is presented a learner may move into cognitive overload thus limiting or preventing information processing (Mayer, 2009). This situation can result in decreased learner satisfaction. Animation can be effective at reducing cognitive load through the use of audio and visual storytelling in which information is presented in a certain order. The video design uses animation techniques to strategically build small amounts of content which can prevent cognitive overload and help support cognitive associations. The ultimate goal of the content design is to minimize the overload of information at any given time.

Active Processing

The active learning assumption is that learners are not passive, but rather actively engaged, and meaningful learning is dependent upon active cognitive processes during learning. In an active learning situation, a learner is selecting new relevant information for additional processing while simultaneously organizing and integrating new

information with existing knowledge (Mayer, 2009). The learner is integrating information into mental models through selecting and organizing relevant words and pictures into coherent representations. Media rich content can encourage learners to engage in active learning by providing an environment for presenting material in both words (text or narrated) and pictures (graphics, whiteboards, storyboards), providing a coherent organization of the material that ultimately promotes the connection of pictorial and verbal representations so mental images can be formed. Mayer asserts that this mental connection between words and pictures engages the learner and supports retention and transfer of knowledge. This process is referred to as generative cognitive processing and explains that when learners can organize incoming information, they can make sense of information and they become more motivated to learn and engage in the content. Adding graphics and animation to the video design will allow learners to make more inferences during learning which will increase psychological engagement by fostering appropriate learning processes.

Managing Limited Cognitive Resources during Learning

The challenge for educators when designing multimedia content is to design content that considers all the learning capabilities for cognitive processing. Techniques for effective content design utilizing Mayer's 12 design principals were used to guide the design of the animated video aimed at improving the effectiveness of the instructional method. Consideration of human learning processes when designing the video, will allow the educator to take advantage of the most effective multimedia designs compatible with the below learning processes.

Minimize Extraneous Processing

When the learner uses so much capacity on processing extraneous information due to poor instructional design, which can include adding objectives that are irrelevant and having too many extraneous text and pictures, there is limited capacity to process and comprehend the relevant material (Mayer, 2009). To limit extraneous processing, the design of the learning content will include removing unneeded material, words or graphics (Coherence Principal). Incorporating only graphics and audio instead of using graphics, audio, and on-screen text (Redundancy Principal) will prevent the visual channel from becoming overloaded and decreasing the mental effort to link incoming streams from both printed and spoken text. Using cues that highlight the organization of the essential concepts (Signally Principal) in the multimedia design will assist in guiding the learner's attention to key elements and building connections between concepts. Appropriately placing corresponding words and pictures close together (Spatial Principal) so the learner does not have to use cognitive resources to visually search the screen, will assist the learner in holding both in the working memory. Finally, incorporating step-by-step demonstrations (Worked Example Principal) will help to decrease extraneous processing.

Manage Essential Processing

When the content of the material is too complex and exceeds the learner's cognitive capacity, the information should be broken up into smaller "chunks" of information which is referred to as the Segmenting Principal (Mayer, 2009). Also, application of the Modality Principle for using audio and using on-screen text sparingly will assist with managing content complexity. Designing media rich content allows for

the selection of graphics and text to work together to accomplish the instructional message. Explaining information through graphics and audio narration rather than text only, and chunking or organizing information, will ultimately reduce the mental workload and increase the opportunity for learning.

Foster Generative Processing

When there is insufficient processing to understand the core concepts of the content, likely due to limited learner engagement and motivation, generative processing is limited (Mayer, 2009). Presenting words and graphics together as opposed to words alone (Multimedia Principal), will assist in deeper processing and promoting learner engagement. In particular, the use of Transformation graphics, which depict changes over time, and Interpretive graphics, which illustrate invisible relationships, will best assist the learner in understanding the information. Appropriate and selected use of these relevant graphics is proven to foster deeper cognitive processing in the learner (Clark & Mayer, 2016). Also, conversation style will be used (Personalization Principal) for presenting information to support learner engagement.

These multimedia design principals were used to guide the video design (Appendix A). The multimedia design of this project aimed to effectively transfer knowledge and enhance learning through the use of rich media content. Incorporating the cognitive theory of multimedia learning into the design of the DNP project video will best allow the learner to build meaningful connections using both verbal and pictorial representations. Rich media video including animation, narration, and graphical texts, were used in the DNP project video design to support learners in understanding content, increase cognitive processing through correlation of images and words, and assist with

building systematic connections (mental models) between word and visual representations. Additionally, application of animation and graphics to the content was used to promote psychological engagement and better support learning by offering opportunities for unique engagement and worked examples in a highly immersive learning environment.

Project Implementation

Project Management and Timeline

The project was implemented by identifying tasks that needed to completed in a specified timeframe. The project leader identified the timeline after collaborating with the LMS Manager and Graphic Designer. The LMS Manager assisted with identifying steps to building the module in the LMS and the Graphic Designer was essential in identifying stages and sequencing of video development. Project implementation took place during the Fall of 2020 and spanned over approximately four weeks. The proposed project implementation required milestones and an established timeline to assure project tasks were completed within set timeframes (Figure 1). A project work breakdown structure with tasks and deliverables served as a guide to monitor the projects progress throughout the implementation phase (Figure 2).

Figure 1

Gantt Chart

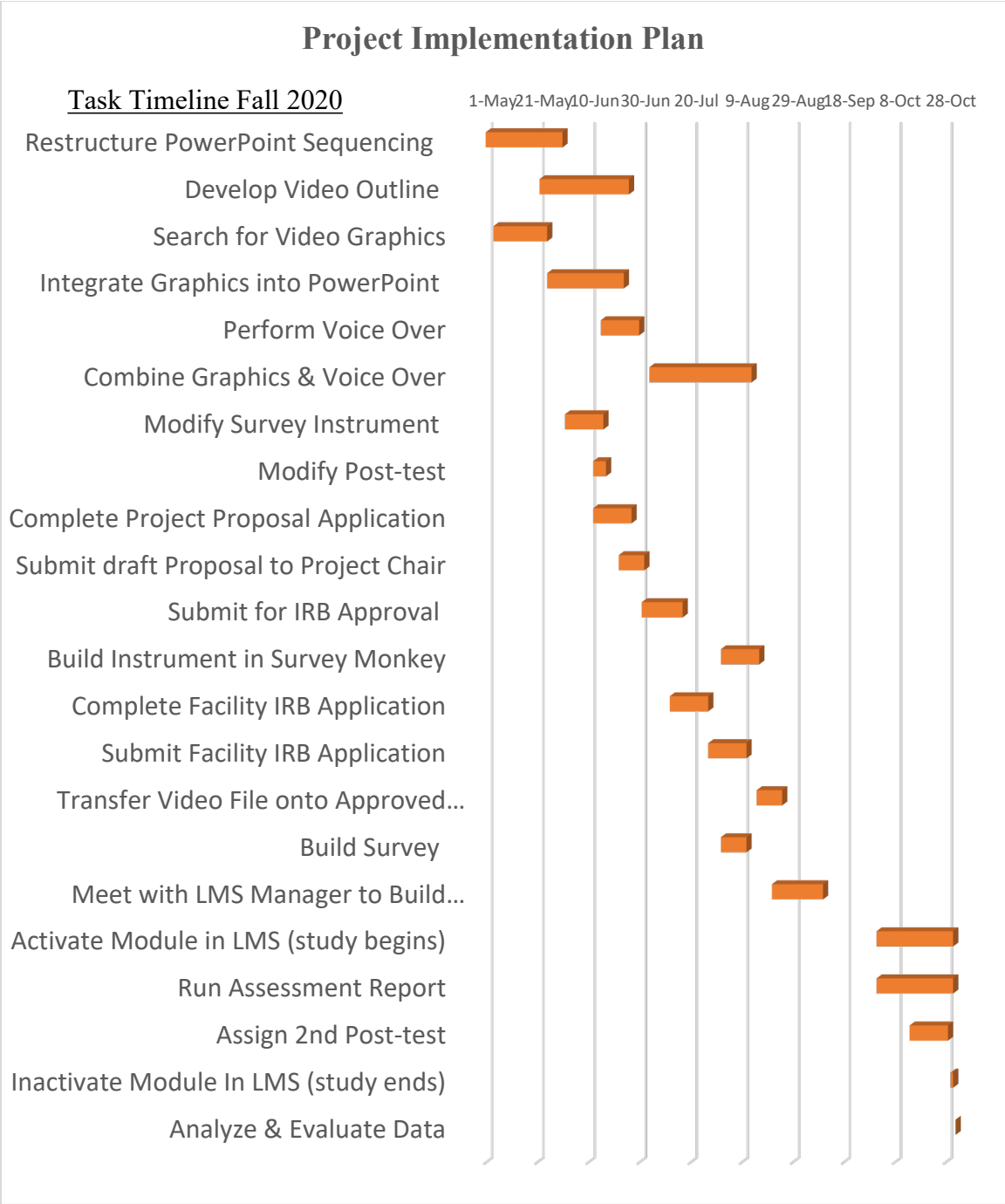
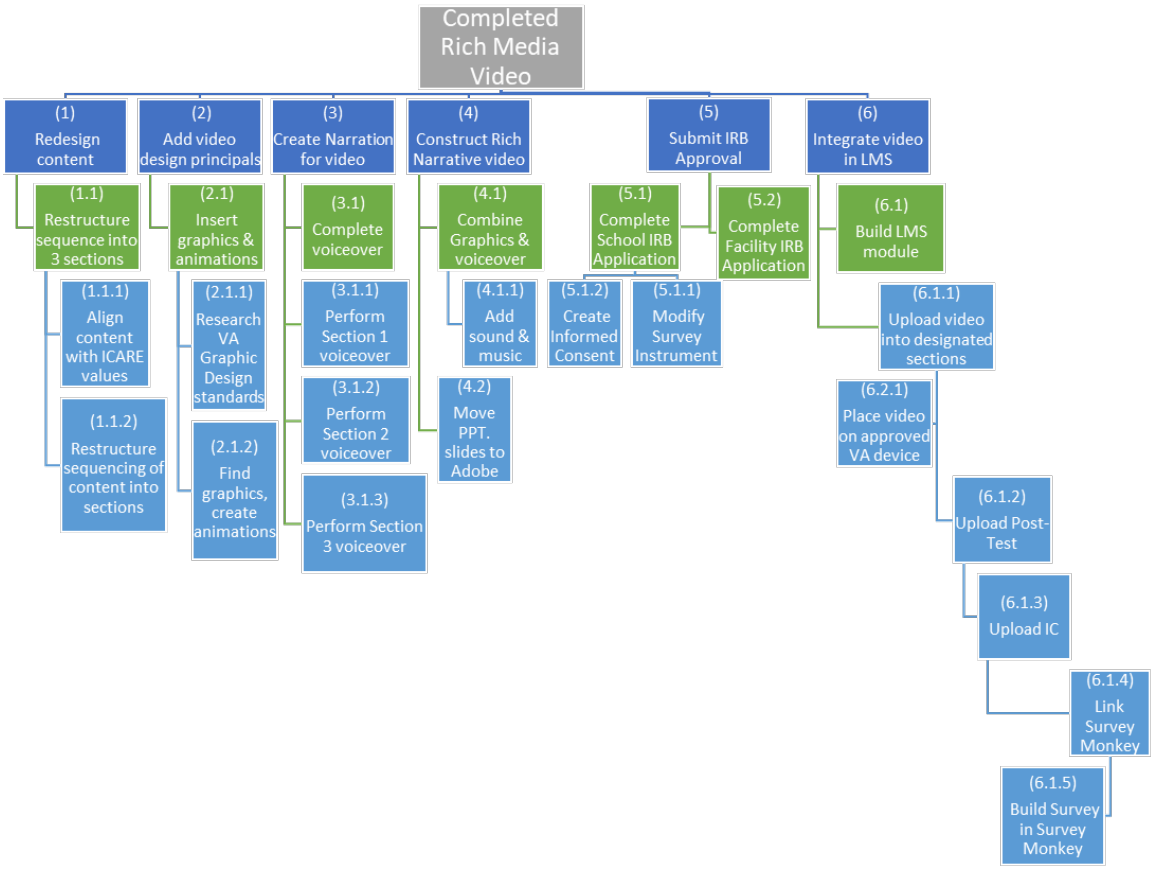


Figure 2

Work Breakdown Structure



Budget

A proposed budget identified projected expenses including the cost of graphic software, and the education staff members time (Table 1). The facility uses an on-line learning management system (LMS) for assigning employee training. The LMS provided the ability to assign on-line learning to employees based on job titles and had the functionality needed to display the video. The project leader was the manager of the education department and approved the LMS Manager's time to upload the animated video and informed consent into the LMS, and run the assessment reports for the project. The LMS Manager's time was equivalent to time spent modifying traditional modules.

Additionally, the module was due for updates as part of the education department's annual review process which would have normally required the LMS Manager to modify the existing content. The LMS Manager only performed duties for this project that were within the position description.

PowerPoint and Adobe Photoshop were used to create the video. Both programs were accessible to the project leader and therefore did not result in any additional costs. The project leader consulted a Graphic Designer for the design, animation and graphical effects in the video. The costs for the graphic designer consultation are listed in Table 1.

Table 1

Proposed Budget

Materials	Cost
LMS Manger time equivalent to traditional module creation time	No additional cost
Software	No additional cost
Graphic Designer Consultation	$1,000
Total	$1,000

Project Evaluation

The implementation of an employee training module using animated video as a strategy for increasing employee engagement, satisfaction, and enhancing knowledge retention was evaluated using quantitative measurements. The primary project objectives were to evaluate learner satisfaction, engagement, and knowledge retention. Additionally, a secondary objective of the project was to compare post-test data of learners who received the content from PowerPoint slide format versus those learners that received the same content in animated video format.

The project objective of increasing employee satisfaction and engagement of the training was evaluated by administering the Instructional Aids Survey instrument previously validated by Conceicao et al. (2007).

Knowledge retention of the module content was evaluated by comparing initial and second post-test scores generated from the Learning Management System (LMS). The initial post-test was completed immediately after the learner viewed the content and the second post-test was completed 2-3 weeks after the training module was completed. The two post-test scores were compared to determine if the second post-test score increased, decreased, or remained the same.

To evaluate the influence of using the animated video format on learner's performance, the cumulative post-test percentage mean from January 2019 - December 2020 were compared with the mean post-test percentages during the project timeframe. The data was compared using a retrospective design to determine if the modality used to deliver the content impacted post-test scores. Specifically, post-test means were used to determine differences.

The project's short-term outcomes included increasing the number of employees who reported an overall satisfaction and engagement with the training module in animated video format, and improved post-test performance compared to previous post-test performance from 2019-2020.

Ultimately, the project's long-term outcome was to enhance the employees' acquisition of knowledge about Palliative and Hospice care for application to clinical practice.

Project Implementation

Design

A Palliative and Hospice Care training module was transitioned from simple narrative media (PowerPoint) to Rich Content Media (animated video). The animated video was developed by the Project Leader using graphic design software and graphics were integrated into the content wherever beneficial utilizing multimedia design principals. The content in the original PowerPoint slide format was divided into three separate video sections and included animation, moving images, narration, and music. The animated video replaced the traditional PowerPoint format which had been the previous delivery method for the Palliative and Hospice Care content. The newly designed training module was then placed into the project site's LMS. The training module, Palliative and Hospice Care, was selected due to the feasibility of integration of animation scenes related to the course content and because the training module was interdisciplinary.

Employees who worked at the project site during the project timeframe were offered the opportunity to participate in the project when completing their annual training requirements for Palliative and Hospice Care. The educational module included the animated video, a post-test and a survey. As part of annual training requirements at the project site, participation in the training module consisting of animated video and initial post-test was mandatory for all employees. Subjects who agreed voluntarily to participate in the project, in addition to annual training requirements, were requested to complete the survey and a second post-test approximately two weeks later. The educational module contained a link to the survey where subjects were able to access the survey. Subjects

who agreed to participate in the project were assigned a second post-test in the LMS, which was completed approximately two to three weeks after completion of the first post-test.

Project Challenges

The first major challenge to this project was using a different animation software to develop the video than originally planned. The graphic designer consultant for the project recommended to change the animation software due to audio, sound, character arrangement, and other design barriers from a graphic design standpoint. As a result, the video was developed utilizing the animation effects in PowerPoint and then converted over to Adobe design software. This change resulted in additional time to create the animation effects and record the video content. The change also meant each animation effect, image and graphic had to be created per scene which ended up resulting in additional time to create the video. Additionally, there was further time required to find graphics for each scene as opposed to using preset templates that were available in the original animation software.

The second major challenge with this project was obtaining the needed report to retrieve the learners' post-test scores within the LMS. The project plan included retrieving a report from the LMS that contained the numerous data needed to compare post-test scores and the number of post-test attempts. At the time of data collection, this particular report was no longer available within the system and as a result, the project leader was unable to get the needed data for the project. The project leader contacted the learning manager at the national level and requested the data to be retrieved. Fortunately, the project leader was able to obtain the post-test data from the LMS after weeks of

correspondence with the national office. These efforts further delayed data collection, analysis, and completion of the data interpretation. Furthermore, the original plan was to compare the number of post-test attempts of subjects in the project population with the subjects in the retrospective population who received the content from the traditional PowerPoint format. Since the number of post-test attempts were unable to be retrieved from the LMS, this unfortunately resulted in the need to remove this data point from the project. Ultimately, this data comparison was unable to be completed and the project lead was only able to analyze the post-test scores.

Project Strengths

The project had 74 employees take the Instructional Aids Survey which resulted in an adequate sample of employees who provided feedback about the animated video. Additionally, 154 employees agreed to participate in the project, which gave a more than adequate sample size to analyze and compare post-test scores. Finally, the project provided an opportunity to improve and enhance a mandatory training module at the facility, which has spearheaded subsequent modules to also be revised using multimedia design concepts.

Methods

The effectiveness of animated video on learner satisfaction, engagement, and knowledge retention was evaluated using quantitative methods. Using quantitative measurement, the project measured learning satisfaction, engagement, and knowledge retention.

Learner satisfaction and engagement was measured by administering the Instructional Aids Survey. Spearman's Rho and the Chi Square test were used to analyze completed survey results using SPSS® Statistics v27.0.1.0 (IBM).

Knowledge retention was measured by comparing post-test scores between the first post-test and the second post-test taken 2-3 weeks later to determine if the second post-test scores increased, decreased or stayed the same. To assess the influence of animated video on learner's performance, the project measured learner performance between the two educational delivery modes by utilizing a retrospective design approach. Previous post-test score means of learners who received the traditional learning content delivered through PowerPoint slides between January 2019-December 2019 were compared to those learners who received the same learning content through animated video during the project timeframe. Post-test questions were multiple choice format and the questions were the same in 2019 and 2020. Both post-tests were completed in the LMS. Post-test scores were obtained from an LMS report which provided raw post-test scores for each subject. Paired *t*-test were analyzed to compare post-test data using SPSS® Statistics v22 (IBM) and Microsoft Excel® 2020.

Subjects

Clinical employees employed at a federal facility who were assigned the annual training within the project implementation timeframe were invited to participate in the project. Project subjects included physicians, nurses, physician assistants, nurse practitioners, social workers, and chaplains. The project consisted of two populations: Current and retrospective.

- Current population: Test scores of subjects who consented to participate in the project (n=154). Subjects who completed the Instructional Aids Survey (n=74).
- Retrospective population: Subjects who completed the training from January 2019 to December 2019 (n=583).

Instruments

The Instructional Aids Survey instrument previously validated by Conceicao et al. (2007), was used to evaluate learner satisfaction and engagement with the training. The original survey was adapted for use in this project. The survey included a Likert-type scale consisting of 15 multiple-choice questions and one open-ended question. The survey choices consisted of (1-star) strongly disagree, (2-stars) disagree, (3-stars) neutral, (4-stars) agree, and (5-stars) strongly agree. Survey questions one and two also included demographic information which included age and gender. Instrument validity and reliability were tested through factor analysis using varimax rotation where three strong constructs were identified for effectiveness, efficiency, and appeal. Effectiveness was defined as how well the animated video helped subjects with their learning. Efficiency was defined as the degree of effectiveness of the content divided by the instruction time. Appeal is the extent to which subjects enjoyed the animated video. The reliability of the survey instrument showed strong factor loading for all questions and a Cronbach's alpha of .89 for reliability (Conceicao et al., 2007).

Post-test scores were used as a formative evaluation tool to measure knowledge retention. Five multiple-choice questions were developed by content experts. The post-test questions were the same for both populations.

Results

Instructional Aid Survey Results

The Instructional Aids Survey was completed in Survey Monkey platform by subjects who agreed to participate in the project (*n*=74). Descriptive statistics for each survey question and response are tabulated in Table 2. Completed survey instruments were analyzed using SPSS® Statistics, and all subjects were included in the analysis even though some questions were not answered by all subjects.

Table 2

Instructional Aids Survey Results on Use of Animated Video as Instructional Aid for Delivery of Educational Content

N=74 Question Note: Q1 & Q2 are demographic questions	5 Strongly Agree	4 Agree	3 Neutral	2 Disagree	1 Strongly Disagree
		Effectiveness			
Q3	45% (33)	45% (33)	9.46% (7)	0% (0)	1.35% (1)
Q4	55.41% (41)	37.84% (28)	5.41% (4)	0% (0)	1.35% (1)
Q5	53.42% (39)	36.99% (27)	6.85% (5)	0.00% (0)	2.74% (2)
		Appeal			
Q6	47.95% (35)	36.99% (27)	12.33% (9)	1.37% (1)	1.37% (1)
Q7	54.79% (40)	36.99% (27)	6.85% (5)	0.00% (0)	1.37% (1)
Q8	51.35% (38)	36.49% (27)	6.76% (5)	2.70% (2)	2.70% (2)
Q9	45.95% (34)	37.84% (28)	12.16% (9)	1.35% (1)	2.70% (2)

Q10	48.65% (36)	40.54% (30)	9.46% (7)	1.35% (1)	0.00% (0)
Q11	47.30% (35)	41.89% (31)	8.11% (6)	1.35% (1)	1.35% (1)
		Efficiency			
Q12	43.24% (32)	33.78% (25)	18.92% (14)	1.35% (1)	2.70% (2)
Q13	36.99% (27)	36.99% (27)	21.92% (16)	1.37% (1)	2.74% (2)
Q14	38.36% (28)	35.62% (26)	21.92% (16)	1.37% (1)	2.74% (2)
		General Satisfaction			
Q15	45.83% (33)	33.33% (24)	16.67% (12)	1.39% (1)	2.78% (2)

Spearman's Rho nonparametric correlation and Chi-square tests were used to analyze the survey data. Significant statistical results were found between gender and how the survey questions were answered. Females answered strongly agreed more frequently than males; however, this was likely due to 80% of respondents were female. There were no significant correlations between age and the other questions in the survey. There were significantly more older subjects that answered the survey (Chi-square=12.7, df=3, $p<0.005$) but this is representative of employee demographics at the hospital. Overall there was no relationship between subject age and perception of the effectiveness, appeal, and design of the animated video for all survey questions.

Based on the Spearman correlation results, there are significant positive associations between all pairwise comparisons of survey questions 3-15 (see Appendix B) at the $p<0.05$ to $p<0.0001$ level. These results indicated the subject's overall satisfaction and engagement with using the animated video delivery method.

The Chi Square results were also highly significant for questions 3-15 (Appendix C). Subjects were consistently positive about the animated video and responded more frequently with strongly agree or agree. Subjects significantly agreed or strongly agreed with the effectiveness, appeal and efficiency of the animated video (Appendix C).

Effectiveness

The survey results showed 45% of employees strongly agreed or agreed that the animated video helped them with understanding the differences between Palliative and Hospice Care. Ninety percent of employees strongly agree or agreed the animated video put meaning to the topics presented in this module. Of particular importance, there was a strong relationship found between questions three and five (r_s =.848, p < 0.0001, N = 73), where subjects that reported the video helped in understanding the difference between Palliative and Hospice Care and agreed that the video put meaning to the topics presented. Additionally, subjects agreed or strongly agreed that the animated video helped in understanding the differences between Palliative and Hospice Care ($\chi 2$ (3), N = 74) = 46.4, p = <.001), and put meaning to the topics presented ($\chi 2$ (3) N = 73) = 50.7, p = <.001).

Appeal

When employees were asked questions related to the appeal of the animated video, they consistently reported being strongly satisfied with the design of the video ($\chi 2$ (4), N = 74) = 75, p = <.001). Importantly, there were highly significant correlations between question 7 and question 6 (r_s =.795, p =0.000, N = 72), and question 7 and question 8 (r_s =.908, p = 0.000, N = 73). Subjects who agreed that the animated video conveyed information clearly and in a logical fashion tended to agree that the video

simulated the content and that they were satisfied with the design of the video. Eighty-four percent of subjects strongly agreed or agreed with describing the video method as being a highly interesting method of teaching compared to the traditional method of PowerPoint slides ($\chi 2$ (4, N = 74) = 62.9, p = <.001).

Efficiency

Subjects answered survey questions regarding the efficiency of the animated videos. Subjects who agreed or strongly agreed the animated video positively influenced their post-test performance (question 13) also reported greater retention of the information from the animated video training (question 14), (r_s =.900, p < 0.0001, N = 72). Subjects significantly agreed that the animated video improved their test performance (question 13) ($\chi 2$ (4), N = 73) = 44.7, p = <.001) and knowledge retention (question 14) ($\chi 2$ (4), N = 73) = 44.8, p = <.001).

Subjects significantly agreed that they learned more about Palliative and Hospice Care from the animated video compared to PowerPoint format (question 15) ($\chi 2$ (4), N = 72) = 53.97, p = <.001). Additionally, there was a highly significant correlation between questions 12 and 15 (r_s =.804, p =0.000, N = 72). Subjects who felt they were able to learn more about Palliative and Hospice Care from the animated video format compared to PowerPoint format also would recommend using animated video as an instructional aid for all mandatory training topics.

Post-Test Results

Project subjects, trained via the animated video, were given an initial post-test and a second post-test two to three weeks later. Initial post-test scores were compared with a subject's second post-test score *(N=40)* to examine information retention (Figure 3). A

paired t-test analysis showed no difference between the two scores indicating that the subjects retained the information between the initial and second post-test scores (Table 3).

Figure 3

Post-Test Means

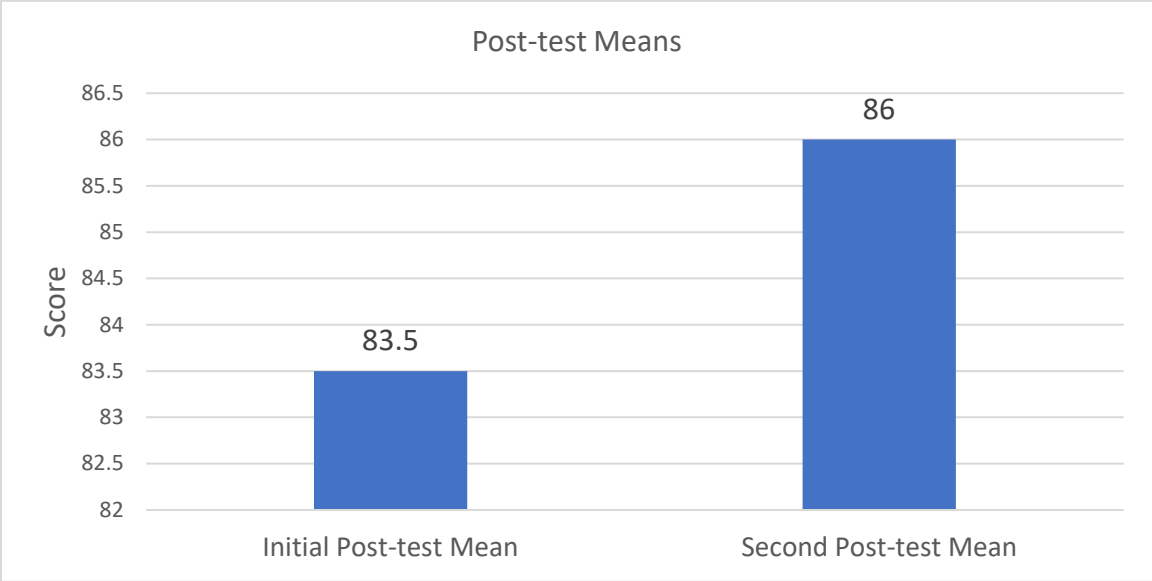


Table 3

t-Test: Paired Two Sample for Means Initial and Second Post-Test Scores

N=40	Variable 1: Initial Post-test	Variable 2: Second Post-test
Mean	83.5	86
Variance	59.23077	86.15385
Observations	40	40
Hypothesized Mean Difference	0	
df	39	
t Stat	-1.30217	
P(T<=t) one-tail	0.100248	
t Critical one-tail	1.684875	
P(T<=t) two-tail	0.200496	
t Critical two-tail	2.022691	

In addition, the post-test scores of subjects that received the traditional PowerPoint slide training (2019 retrospective population, n= 561) were compared to the initial post-test scores of subjects that received the animated video training (2020 current population, n=154). The current population subjects scored significantly higher on the post-test compared to the retrospective population, t(df=444) =11.1, p = 0.001) (Table 4).

Table 4

t-Test: Two Sample Assuming Unequal Variances Current and Retrospective Initial Post-Test Scores

	Initial Post-Test Score: 2020 population	Initial Post-Test Score: 2019 population
Mean	83.24675	74.18895
Variance	54.74917	174.0285
Observations	154	561
Hypothesized Mean Difference	0	
df	444	
t Stat	11.10134	
P(T<=t) one-tail	9.72E-26	
t Critical one-tail	1.648293	
P(T<=t) two-tail	1.94E-25	0.0001
t Critical two-tail	1.965321	

Discussion

Instructional Aids Survey

An animated, multimedia training video was developed in conjunction with administering an instructional aids survey for the purpose of evaluating learner satisfaction and engagement. Overall, subjects responded positively toward the animated video based on analysis of the survey responses. There were multiple, highly significant positive relationships regarding the subjects' overall satisfaction and engagement and the animated training video. Subjects indicated a significant preference for the animated

training video over the traditional training method. Subjects indicated a strong appeal for the animated training method and indicated that it was more efficient and effective than the previous training method.

There were highly significant relationships among questions 3-15, and subjects consistently answered positively about all aspect of the animated video. Subjects tended to strongly agree or agree with using the animated video to deliver the training content. Subjects who agreed the animated video put meaning to the topics presented in this module also agreed the video helped in understanding the differences between Palliative and Hospice Care, supporting the need for the content to be robust to catch the learner's attention. Furthermore, the majority of subjects (74%), strongly agreed or agreed the animated video positively impacted their performance on the post-test and subjects significantly agreed (74%) that they retained more information about this topic from the animated training. Subjects who were satisfied with the design of the video and those who described the video as being highly interesting (engagement) also agreed the video positively affected their test performance and felt they were able to retain more information about the topic. Subjects who described the animated video as being a more interesting method compared to the traditional method also tended to agree the animated video helped convey the information clearly and therefore supported the subject's understanding of the information. This data provides evidence that there is a positive relationship between learner satisfaction, engagement of the learning content and their ability to learn information about Hospice and Palliative Care due to the newly developed animated training video.

Survey questions related to the animated video design showed multiple, important relationships between the animated training method and the subject's learning and success. Subjects were overwhelmingly satisfied with the design of the animated video (87%), and nearly all subjects felt the animated video conveyed the information clearly and in a logical fashion (92%). Additionally, most subjects (90%) positively rated the visual clarity of the video and felt the use of video clips added to the learning content (89%). In particular, the use of animation to convey how to have a crucial conversation with patients and families about Hospice and Palliative Care was strongly supported (85%). This was an important objective of the original training and the current research project. These results support the use of animated video using multimedia design concepts when creating educational videos.

In summary, the survey results indicated a positive reaction from subjects toward the animated video. Subjects in the project were satisfied with using animated video for this topic in all three aspects measured, effectiveness, appeal and efficiency. Subjects highly recommended (67%) using animated video as an instructional aid for all mandatory training topics. Furthermore, it is important to recognize that a large majority of subjects (79%) stated they were able to learn more about Palliative and Hospice Care from the animated video compared to the previous PowerPoint format. This finding, in particular, directly supports the use of animated video in training employees about the differences in Palliative and Hospice Care.

Post-Test Scores

The initial and subsequent post-test scores of the current population subjects was compared to address retention of the animated training module information. There was no

statistical difference between the current population subject's score on the initial post-test and their second post-test. There was a slight, non-significant increase in the scores over the 2-week interval. This result shows that the subjects retained the important training information when the animated video was used to deliver the content.

Additionally, the post-test scores of subjects from the retrospective employee population that received the traditional PowerPoint training were compared to the initial post-test scores of the current employee population. Using the animated video to teach Palliative and Hospice Care content resulted in increased test performance. The current population employees scored significantly higher on their post-test than the retrospective population employees. Employees who received the Palliative and Hospice Care content with the animated video scored significantly higher on the post-test than employees trained with the traditional PowerPoint slide method. This result supports the development and continued use of the animated training modality over previous methods.

Conclusion

This project proposed the use of animated video using multimedia design concepts to increase learner satisfaction, engagement, and knowledge retention when delivering Palliative and Hospice Care content. Results showed that when the learner is more satisfied and engaged in the learning content and experience, learner test performance increases and knowledge retention is high. The majority of subjects supported the use of animated video as an instructional aid when learning about Palliative and Hospice Care, and positively rated the aspects of the instructional aid survey for effectiveness, appeal, and efficiency.

Implications for Practice

Based on the findings in this project, animated video can be a beneficial instructional aid for future use when teaching employees about Palliative and Hospice Care. Incorporating multimedia design theory into video design for educational topics can help bridge the gap between hearing and seeing the content, and understanding the concepts. The subjects' post-test performance improved when animated video was used as the instructional aid compared to previous PowerPoint based methods. The project results provided further evidence that learner satisfaction and engagement of the content can affect the learner's test performance and ability to retain information. Additionally, the project provided further evidence that use of animated video can improve learners test performance, knowledge retention, and overall satisfaction with training modules.

Future Recommendations

This project supports the need for educators to consider using animation and multimedia design concepts when creating training videos to facilitate increased acquisition of knowledge, and increased learner satisfaction and engagement. This project's findings could have implications for designing educational videos and shows that animated videos are an important method when providing hospital employee training.

References

Alpert, F. (2016). “Revitalizing the live lecture class with instructor-created videos”. Sage Open, Vol. 6, No. 4. http://journals.sagepub.com.ezproxy.gardner-webb.edu/doi/full/10.1177/2158244016680686

Armstrong, A. W., Idriss, N. Z., & Kim, R. H. (2011). Effects of video-based, online education on behavioral and knowledge outcomes in sunscreen use: A randomized controlled trial. Ireland: Elsevier Ireland Ltd. https://www.doi.org/10.1016/j.pec.2010.04.033

Booth, A. (2007). In search of the information literacy training half-life. *Health Information and Libraries Journal*, (24),145-149. https://www.doi.org/10.1111/j.1471-1842.2007.00707.x

Carmichael, M., Reid, A., & Karpicke, J.D. (2018). “Assessing the impact of educational video on student engagement, critical thinking and learning: the current state of play”, white paper. Sage Publishing. https://au-sagepub-com.ezproxy.gardner-webb.edu/en-gb/oce/press/what-impact-does-video-have-on-student-engagement

Chen, G., Lee, J., Wang, C., Chao, P., Li, L., & Lee, T. (2012). An empathic avatar in a computer-aided learning program to encourage and persuade learners. *Journal of Educational Technology & Society*, *15*(2), 62-72.

Cherrett, T., Wills, G., Price, J., Maynard, S., & Dror, I. E. (2009). Making training more cognitively effective: Making videos interactive. *British Journal of Educational Technology, 40(*6), 1124-1134. https://www.doi.org/10.1111/j.1467-8535.2009.00985.x

Clark, R. C., & Mayer, R. E. (2016). *E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning.* Hoboken: John Wiley & Sons, Incorporated.

Clark, R. C., & Mayer, R. E. (2016). *E-learning and the science of instruction* (4th ed.). US: Wiley.

Conceicao, S. C., Strachota E., & Schmidt, S.W. (2007). The development and validation of an instrument to evaluate online training materials. https://scholar.google.com/scholar_lookup?title=The+development+and+validation+of+an+instrument+to+evaluate+online+training+materials.+Academy+of+Human+Resourse+Development+International+Research+Conference+in+The+Americas&author=SCO+Conceicao&author=E+Strachota&author=SW+Schmidt&publication_year=2007&

De Castell, S., & Jenson, J. (2004). Paying attention to attention: New economies for learning. *Educational Theory, 54*(4), 381-397. https://www.doi.org/10.1111/j.0013-2004.2004.00026.x

Donkor, F. (2010). The comparative instructional effectiveness of print-based and video-based instructional materials for teaching practical skills at a distance. *The International Review of Research in Open and Distributed Learning, 11*(1), 96. https://www.doi.org/10.19173/irrodl.v11i1.792

El-Sayed, R. E. H., & El-Sayed, S. E. A. E. (2013). Video-based lectures: An emerging paradigm for teaching human anatomy and physiology to student nurses. *Alexandria Journal of Medicine, 49*(3), 215-222. https://www.doi.org/10.1016/j.ajme.2012.11.002

Gautam, A. (2019, 04). The secret to employee engagement using LMS. *Training and Development Excellence Essentials*. http://ezproxy.gardner-webb.edu/login?url=https://search-proquest-com.ezproxy.gardner-webb.edu/docview/2356815462?accountid=11041

Gautam, A. (2020). Workplace learning & technology trends 2020. *Training and Development Excellence Essentials*. http://ezproxy.gardner-webb.edu/login?url=https://search-proquest-com.ezproxy.gardner-webb.edu/docview/2356795032?accountid=11041

Jukes, I., McCain, T. D. E., & Crockett, L. (2010). *Understanding the digital generation: Teaching and learning in the new digital landscape*. Thousand Oaks, CA: Corwin.

Kearsley, G., & Shneiderman, B. (1998). Engagement theory: A framework for technology-based teaching and learning. *Educational Technology, 38*(5), 20-23.

Lusk, D. L., Evans, A. D., Jeffrey, T. R., Palmer, K. R., Wikstrom, C. S., & Doolittle, P. E. (2009). Multimedia learning and individual differences: Mediating the effects of working memory capacity with segmentation. *British Journal of Educational Technology, 40*(4), 636-651. https://www.doi.org10.1111/j.1467-8535.2008.00848.x

Mayer, R. E. (2009). *Multimedia Learning* (2nd ed.). Cambridge: Cambridge University Press.

McElhaney, K. W., Chang, H., Chiu J. L., & Linn, M. C. (2014). Evidence for effective uses of dynamic visualizations in science curriculum materials. *Studies in Science Education*, *51*, 49-85. https://www.doi.org/10.1080/03057267.2014.984506

Moulton, S. T., Türkay, S., & Kosslyn, S. M. (2017). Does a presentation's medium affect its message? PowerPoint, prezi, and oral presentations. *PloS One, 12*(7), e0178774. https://www.doi.org/10.1371/journal.pone.0178774

Nikopoulou-Smyrni, P., & Nikopoulos, C. (2010). Evaluating the impact of video-based versus traditional lectures on student learning. *Educational Research, 1*(8), 304-311.

Nugent, G. C. (1982). Pictures, audio, and print: Symbolic representation and effect on learning. *Educational Communication and Technology, 30*(3), 163-174.

Park, H., Khan, S., & Petrina, S. (2009). ICT in science education: A quasi-experimental study of achievement, attitudes toward science, and career aspirations of Korean middle school students. *International Journal of Science Education 31*, 993-1012.

Putranto, L. S., & Rostiana. (2017). Comparison between the effect of motorcycle safety campaign using animated video and live action video-A preparation stage. MATEC Web of Conferences, 103, 8006. https://www.doi.org/10.1051/matecconf/201710308006

Rasi, P. M., & Poikela, S. (2016). A review of video triggers and video production in higher education and continuing education PBL settings. *Interdisciplinary Journal of Problem-Based Learning, 10*(1) https://www.doi.org/10.7771/1541-5015.1609

Smith, S. P. (2017). Adult learners: Effective training methods. *Professional Safety, 62*(12), 22-25.

Stöhr, C., Stathakarou, N., Mueller, F., Nifakos, S., & McGrath, C. (2019). Videos as learning objects in MOOCs: A study of specialist and non-specialist participants' video activity in MOOCs: Videos as learning objects in MOOCs. *British Journal of Educational Technology, 50*(1), 166-176. https://www.doi.org/10.1111/bjet.12623

Toohey, S. L., Wray, A., Wiechmann, W., Lin, M., & Boysen-Osborn, M. (2016). Ten tips for engaging the millennial learner and moving an emergency medicine residency curriculum into the 21st century. *The Western Journal of Emergency Medicine, 17*(3), 337-343. https://www.doi.org/10.5811/westjem.2016.3.29863

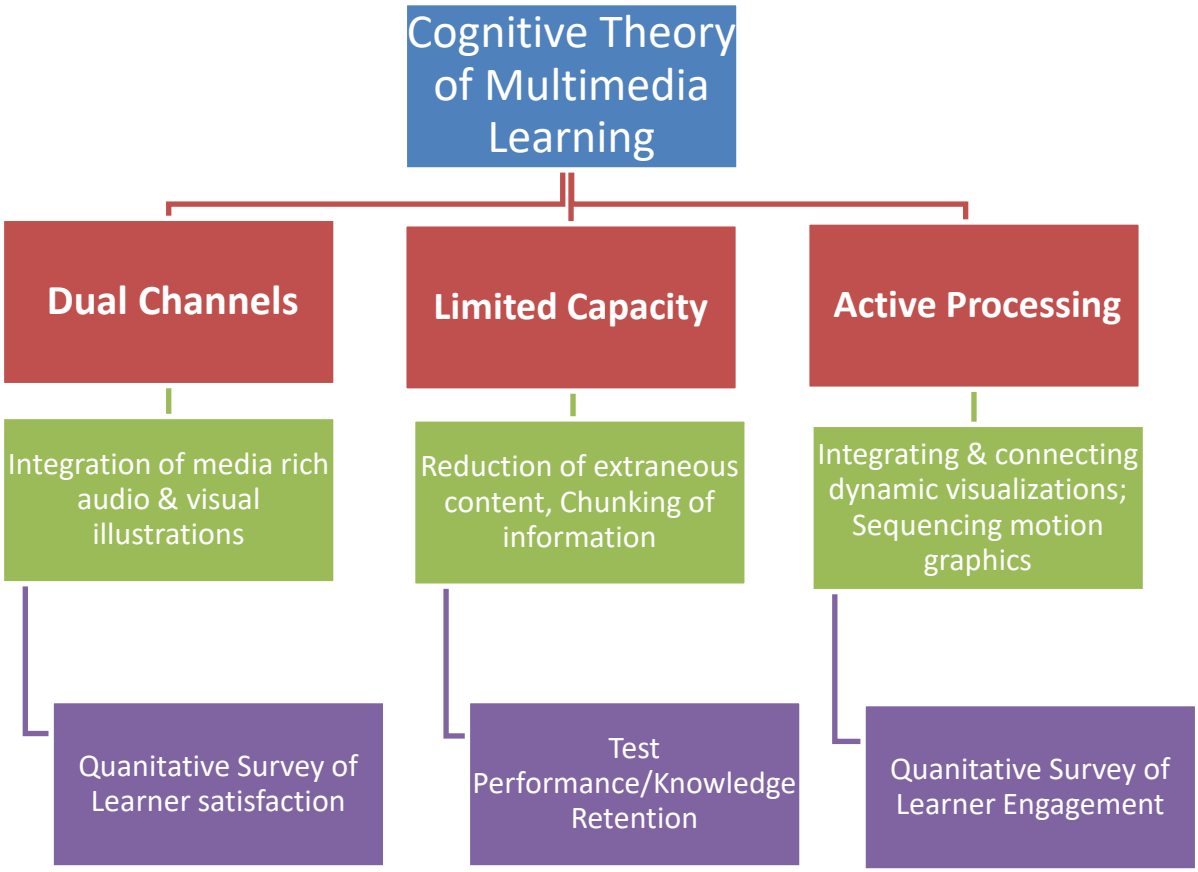
Trevisan, M. S., Oki, A. C., & Senger, P. L. (2010). An exploratory study of the effects of time compressed animated delivery multimedia technology on student learning in reproductive physiology. *Journal of Science Education and Technology, 19*(3), 293-302. https://www.doi.org/10.1007/s10956-009-9200-4

Türkay, S. (2016). The effects of whiteboard animations on retention and subjective experiences while learning advanced physics topics. *Computers and Education, 98,* 102-114. https://doi.org/10.1016/j.compedu.2016.03.004

Zhang, D., Zhou, L., Briggs, R. O., & Nunamaker, J. F., Jr. (2006). Instructional video in e-learning: Assessing the impact of interactive video on learning effectiveness. *Information & Management, 43*(1), 15-27. http://ezproxy.gardner-webb.edu/login?url=https://search-proquest-com.ezproxy.gardner-webb.edu/docview/237026130?accountid=11041

Appendix A

Theoretical Framework Diagram



Appendix B

Spearman's Coefficient Correlation Matrix of Instructional Aid Survey

		Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
Q3	Correlation Coefficient	.840	.848**	.756**	.861**	.815**	.741**	.799**	.782**	.698**	.683**	.701**	.754**
	Sig. (2 tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	74	73	73	73	74	74	74	74	74	73	73	72
Q4	Correlation Coefficient	1.000	.841**	.774**	.883**	.842**	.759**	.771**	.712**	.639**	.577**	.677**	.674**
	Sig. (2-tailed)		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	74	73	73	73	74	74	74	74	74	73	73	72
Q5	Correlation Coefficient	.841**	1.000	.756**	.825**	.739**	.726**	.773**	.796**	.657**	.629**	.596**	.639**
	Sig. (2-tailed)	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	73	73	72	73	73	73	73	73	73	72	72	71
Q6	Correlation Coefficient	.774**	.756**	1.000	.795**	.716**	.701**	.734**	.814**	.738**	.706**	.762**	.677**
	Sig. (2-tailed)	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	73	72	73	72	73	73	73	73	73	72	72	71
Q7	Correlation Coefficient	.883**	.825**	.795**	1.000	.908**	.738**	.783**	.724**	.666**	.645**	.677**	.729**
	Sig. (2-tailed)	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	73	73	72	73	73	73	73	73	73	72	72	71
Q8	Correlation Coefficient	.842**	.739**	.716**	.908**	1.000	.802**	.763**	.684**	.687**	.623**	.701**	.760**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	74	73	73	73	74	74	74	74	74	73	73	72
Q9	Correlation Coefficient	.759**	.726**	.701**	.738**	.802**	1.000	.857**	.789**	.803**	.748**	.804**	.794**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000
	N	74	73	73	73	74	74	74	74	74	73	73	72
Q10	Correlation Coefficient	.771**	.773**	.734**	.783**	.763**	.857**	1.000	.865**	.730**	.761**	.763**	.728**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000
	N	74	73	73	73	74	74	74	74	74	73	73	72
Q11	Correlation Coefficient	.712**	.796**	.814**	.724**	.684**	.789**	.865**	1.000	.821**	.783**	.771**	.753**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000
	N	74	73	73	73	74	74	74	74	74	73	73	72
Q12	Correlation Coefficient	.639**	.657**	.738**	.666**	.687**	.803**	.730**	.821**	1.000	.841**	.826**	.804**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000
	N	74	73	73	73	74	74	74	74	74	73	73	72
Q13	Correlation Coefficient	.577**	.629**	.706**	.645**	.623**	.748**	.761**	.783**	.841**	1.000	.900**	.812**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000
	N	73	72	72	72	73	73	73	73	73	73	72	71

Q14	Correlation Coefficient	.677**	.596**	.762**	.677**	.701**	.804**	.763**	.771**	.826**	.900**	1.000	.875**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000
	N	73	72	72	72	73	73	73	73	73	72	73	71
Q15	Correlation Coefficient	.674**	.639**	.677**	.729**	.760**	.794**	.728**	.753**	.804**	.812**	.875**	1.000
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	N	72	71	71	71	72	72	72	72	72	71	71	72

*Designates significance at p<0.5, ** Designates significance at p<0.01

Appendix C

Chi Square Results on Use of Animated Video as Instructional Aid for Delivery of Educational Content

Question	Total N	Test Statistic	Degree of Freedom	Asymptotic Sig. (2-sided test)
Q1	74	12.7	3	0.005
Q2	-	-	-	-
Q3	74	46.4	3	0.001
Q4	74	60.2	3	0.001
Q5	73	50.1	3	0.001
Q6	73	66.5	4	0.001
Q7	73	56.0	3	0.001
Q8	74	75.1	4	0.001
Q9	74	62.9	4	0.001
Q10	74	47.4	3	0.001
Q11	74	76.3	4	0.001
Q12	74	51.0	4	0.001
Q13	73	44.7	4	0.001
Q14	73	44.9	4	0.001
Q15	72	54.0	4	0.001