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Effect of Narrative Structure of Animated Movies on ESL Learners' Recall and Comprehension of Stories

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**Effect of Narrative Structure of Animated Movies on ESL
Learners' Recall and Comprehension of Stories**

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Dissertation submitted
to the College of Education and Human Services
at West Virginia University

in partial fulfillment of the requirements for the degree of

Doctor of Education in
Instructional Design and Technology

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Keywords: narrative structure, ESL

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ABSTRACT

Effect of Narrative Structure of Animated Movies on ESL Learners' Recall and Comprehension of Stories

Noriza Abu Hassan Shaari

This study aimed at expanding the examination of a narrative structure by using short 2D short animated movies in an ESL learning (L2) environment. Employing an experimental design, this study investigated whether there was an effect of narrative structure that was sequenced in a linear, a simple non-linear and a complex non-linear manner on ESL learners' recall and comprehension of stories. The independent between-groups ANOVA yielded a statistically significant effect on recall and comprehension. As a summary, the result of this investigation found that there was an effect of narrative structure on ESL learners' recall and comprehension of stories, which showed that the information that followed a linear (sequential) order of narrative structure was better recalled and comprehended than those that were not linear.

Keywords: narrative structure, ESL

DEDICATION

This dissertation is dedicated to my parents, my children Sasha Elisa, Sabreena Natasha, Syafiq Aqim and Sara Qistina, and their nanny Rochimah Prihatina, and my family, without whom this dissertation would have been impossible. A special thank you to Dr. Zaira Abu Hassan Shaari and Dr. Amirul Syafiq Sadun.

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CHAPTER I

INTRODUCTION

Narrative and Story

Narrative is the architecture of story, and an integral element of human culture and expression (Barthes, 1975; Chatman, 1978; Phelan, Kellogg & Scholes, 2006). It is deeply embedded within us, and in our society and culture. Barthes (1975) illustrated that "...under this almost infinite diversity of forms, narrative is present in every age, in every place, in every society... All classes, all human groups, have their narratives... Caring nothing for the division between good and bad literature, narrative is international, transhistorical, transcultural: it is simply there, like life itself" (p. 237). Narrative is one of the ways we communicate, connect, organize, understand and make sense of everything around us. Sarbin (2005) stated, "human beings think, perceive, imagine, and make moral choices according to narrative structures" (p. 8). Storytelling and listening to stories are essential parts of human nature, culture, and instincts.

Every culture tells stories. Historically, storytelling began with oral traditions in the forms of myths, legends, fables, anecdotes, etc. They were told, retold and passed down from generation to generation. In telling a story, real or fictional, we narrate and relate events of the past. We are "storytelling organisms who, individually and collectively, lead storied lives . . . and tell stories of those lives" (Connelly & Clandinin, 1990, p. 2). Ryan (2004) added that storytelling is a verbal act of "someone telling someone else that something happened" (p. 14). Similarly, Tammi (2006) explained that "...in a standard narrative the act of telling takes place only after something happened" (p. 23).

Chatman (1978) described that "story is the content of the narrative expression" (p. 23). Phelan et al., (2006) added that story is a type of narrative that can be emotionally compelling

and engaging to capture the imagination of the audience, and that it can become alive and real when narrative elements such as context, emotion and meaning are added to it. All of these researchers agree on one common characteristic -- narrative is something that is told or narrated in the form of a story, a tale or an account of a set of events or happenings that are related and interconnected (Barthes, 1975; Chatman, 1978; Connelly & Clandinin, 1990; Phelan et al., 2006).

We tend to conflate the notion of narrative and story, and there are many arguments for their distinction. However, according to McQuillan (2000) and later Denning (2011), we seldom differentiate the use of narrative and story in our everyday speech since we often use these two terms synonymously. On this basis, this study used the terms narrative and narrative structure, and story and story structure as synonyms. The following section describes the basic elements of a story and its structure or organization.

Story Elements and Structure

Prominent literary theorists such as Roland Barthes, Joseph Campbell, Northrop Frye and Vladimir Propp discussed that all human narratives or stories have certain common characteristics, elements and structures. According to a review by Cohn (2013, p. 418), the various theories of narratives share some commonalities when describing story elements -- that they consist of a setting (time and place), characters (protagonist and antagonist), and a plot.

In describing the elements of narrative, Bal (1997) explained that a narrative text is organized into three separate layers. They are: (a) the elements, or series of events, (b) the story (aspects of story, e.g., arrangement, sequence, point of view), and (c) the text (words). Similarly, Stein and Glenn (1979) proposed that a story consists of a primary setting (with a main character), a setting (time and place) followed by one or more episodes.

In describing elements of a well-rounded story, Schmidt (2005) stated that it consists of a theme, a scene, plots, characters, a conflict or suspense, a climax, and an ending. Frank and Sandra (1971) and later Schmidt (2005) added that plot strategies such as viewpoint, flashback, transition, and revision are also elements of a well-rounded story.

In describing plots, Aristotle in *Poetics* talked about plot (mythos) as the center point of any literary work. A plot describes the events that make up a story, which focuses the audience's attention on the important characters and their functions or roles in the story. It is also everything that happens in the story -- what different actions occur, by whom, how, when and why. He further explained that plot organizes or sequences the story events in a logical or temporal manner. The events, however, must relate to one another in a pattern and arrangement. Cobley (2013) added that story and plot are interconnected, and can sometimes mix, creating a pleasing story. At a general level, a story typically consists of story elements such as a setting, a theme, characters and a plot (Alexander, 2011; Bal, 1997; Chatman, 1978; Schmidt, 2005).

In describing narrative structure, a basic pattern for story events or plot sequence is based on Aristotle's story arc: a beginning, a middle, and an end (Alexander, 2011; Chatman, 1978; Cohn, 2013; Schmidt, 2005). Another typical plot development is based on Freytag's Triangle (Freytag, 1908), which divides a story into five parts. They are exposition (of the situation), rising action (through conflict), climax (the turning point), falling action (events that happen as a result of the climax), and denouement (resolution or clarification). This describes that within a simple narrative, the structure begins with setting and character development, and the story rises to a conflict and then falls to a conclusion. It also illustrates that the plot organizes or sequences the story events in a logical or temporal manner, indicating a linear structure. However, although story events happen in chronological order, they can be told and retold in any order, not

necessarily in the order that they happened. The following section describes the basics of a narrative structure.

Narrative Structure: Linear and Non-linear

Aristotle, a Greek philosopher, wrote that a narrative has a beginning, middle, and an end. Colby (2013) added that a narrative is “the movement from a beginning point to a finishing point” (p. 8). At the very basic, it is defined as “a sequence that is narrated” (Cobley, 2003, p. 7). Ryan (2004) further added that it is “the mental or textual representation of a causally linked sequence of events involving individuated and humanlike agents” (p. 14). Brenner (1997) explained the concept of story schema or story structure, and its use as a guideline to mentally organize a story from the start to end. He elaborated that children use it to aid in recall and listening comprehension. These various definitions and descriptions highlight two important aspects of narrative structure. They are: (1) structure of story events, and (2) the sequence (order) in which they appear. Both structure and sequence have been found to be important elements of recall and comprehension (Way, 1988).

The view of narrative structure indicated that the direction of a story’s sequence of events moves in a linear way through time. However, a story does not necessarily obey the laws of balance, time and space (Alexander, 2011; Schmidt, 2005). The logical or temporal manner or linearity of narrative structure can be fractured to meet the storyteller’s intent and purpose. In order to obtain a more thorough understanding of narrative structure, this study manipulated the narrative structure of an animated movie and examined how this impacted how the story was recalled and comprehended by learners in an ESL classroom.

Benefits of Using Story in Language Learning

A unique feature of story is its power to allow us to remember, entertain, teach, inspire, and create (Isbell, Sobol, Lindauer & Lowrance, 2004). Cortazzi and Jin (2007) suggested that using stories in a curriculum would be beneficial because it may help the students' "linguistic and metacognitive development" (p. 646). Similarly, Weinstein (2006) suggested that using personal stories can encourage language learning. Nicholas, Rossiter, and Abbott (2011) inserted that telling and writing effective stories in a language learning classroom can help learners increase their vocabulary and improve their knowledge of grammar.

English as a second language (ESL) instructors are integrating the aural, visual, tactile, and kinesthetic modalities into their teaching. Using different modalities are beneficial; they increase classroom engagement, promote initial learning, and improve long-term retention and transfer of knowledge (Miller & Glover, 2002). This can help facilitate learners' initial recognition and recall to comprehension of information. Herman (2013) and Ryan (2004) added that instructors must provide ample learning opportunities for learners by using several modalities in their teaching. Animated movie is one of the methods that instructors can use in their classroom. The following section describes digital storytelling, media and presentation format.

Storytelling, Digital Media, and Presentation

Today, we can use different forms of media and technology to express and record our real-life stories and to share our knowledge and cultural values across the world. Ryan (2004) stated that storytelling could be sparked and spread by many different types of media and technology. Alexander (2011) pointed out, "...no sooner do we invent a medium than do we try

to tell stories with it” (p.5). With technology, we now can create our narrative and story process with technology driven gadgets, and we can use various platforms that offer new pathways for spreading information, creativity, and self-expression.

Digital narratives and storytelling genres are spreading – and just about every digital device imaginable and platforms are being used to tell stories: *Vimeo*, *Twitter*, *Google+*, *Facebook*, *Instagram*, *Snapchat*, *YouTube*, etc., and social bookmarking tools: *Delicious*, *Diigo*, *Dragdis*, *Ember*, *Kippt*, *Pinterest*, etc. Story content is easily and swiftly distributed across multiple sites and media. However, as technology continues to infiltrate our lives, educators must ensure that whatever choice of media and platform used to convey the instructional material, the learner will always receive a clear understanding of the author’s message (story) (Herman, 2013).

Films and movies are powerful storytellers, and they are considered as modern-day storytelling instruments. Animated movies can be engaging and powerful delivery tools. They have also become increasingly important to the edutainment industry (Wang, 2012). Their popularity is apparent when looking at box office hits like *Shrek*, *Kung Fu Panda*, *Princess and the Frog*, *Ice Age*, *Frozen*, *Minion*, *Inside Out*, *Finding Dory* and *The Secret Life of Pets*, to name a few. Undoubtedly, stories using animated movies can be attractive to audiences (Wang, 2012; Ward, 2002). They can play an important role in delivering knowledge and information and can enhance the effectiveness of instruction and learning. Stories that are told and narrated using animated movies can take learners on a captivating and interesting journey, and at the same time can instill in them educational topics such as history, social, cultural, moral values and religion (Yang, 2009; Zhao, 2005). Studies that investigated the use of animated movies in the classroom found that there is a positive effect on students’ learning process in a variety of

subjects and fields (Barak, Ashkar, & Dori 2011; Parlett, 2012; Rosen, 2009; Surani, Rao, Khimani, & Subramanian, 2014).

Another important aspect of animated movie or film is the presence of digital and visual effects. Effects such as sound, color, and camera angles or other innovative film/movie technologies add the “wow” factor to the story (Alexander, 2011; McClean, 2007; Wang, 2012). There are, however, criticisms that digital and visual effects are distractions from the actual story. Effect artists explained that technology effects are always derived from story -- they are a part of the story development process and a part of the story crafting process (McClean, 2007; Paul, 2005; Ward, 2002). McClean (2007) pointed out that an unsuccessful film/movie says more about the weakness of the story or flaw in the story design than the strength or problem of the technology employed.

In the context of education, learning through lessons that are effectively and appropriately enriched with multimedia provides learners with the opportunities of mentally processing the information and retaining it for future use. Therefore, it is important that instructors carefully design multimedia learning materials that meet their learning objectives (Mayer, 2011b). According to Mayer (2011b), it is not the media that causes learning; instead, it is the methods of instruction, and instructional design. Therefore, an understanding of how the mind processes and stores information is vital to instructors as they plan for instruction such as selecting learning objectives and methods of effective instruction (Lutz & Huitt, 2003). The following section describes recall and comprehension processes.

Recall and Comprehension

Theories of information processing describe that both recall and comprehension contain cognitive operations such as selecting, attending, memorizing, retrieving, and reasoning.

However, comprehension involves a higher-level of cognitive processing as well as recovery and interpretation of the story (message) as compared with story recall (Bransford & Johnson, 1972; Lutz & Huitt, 2003). They involve two different cognitive processing of information. According to Titone et al., (2000), comprehension typically involves interpreting actions, plots and motives or guessing cause and effect relationships from the content of a story, while recall typically involves recall of facts about a story. As such, the types of questions asked to measure story comprehension are different than the type of questions asked to measure recall (Titone et al., 2000).

In summary, although story recall and comprehension are related, they involve two different cognitive processes. More precisely, comprehension questions would be slightly more challenging and would require a higher level of cognitive processing than questions involving recall of facts about a story. Therefore, each can be assessed separately by asking different types of questions. This study distinguished between recall and comprehension, and drew upon concepts, principles, and assumptions associated with cognitive information-processing. Chapter II discusses recall and comprehension in more detail.

Problem Statement

The use of stories is a vital pedagogical approach and an important strategy to effective learning and to examine how people remember and retain information, and it also serves as a powerful means of exploring language (Lalas, 1983). Stories provide a rich source of instructional materials for language classrooms, and allow learners to become more involved with the target language. Additionally, they open opportunities and possibilities for gaining insights into different cultures and language use (South, Gabbitas & Merrill, 2008). However, a review of past research on narrative structure shows a greater focus on the examination of stories

derived from texts and static visuals (Amer, 1992; Cohn, 2013; Cohn, Paczynski et al., 2012; Nicholas et al., 2011; Weinstein, 2006), in hypermedia (Kordaki, 2014; Lowrey, 2004), in interactive media (Laurillard et al., 2000; Mesbah, 2006; Nuutinen et al., 2010; Plowman, 2005) and in static visuals (Gary, Robert, & Kevin, 1997; Lin et al., 2006; Pagan, 2006). Additionally, in the context of the ESL learning environment, the study of narrative structure of animated movies has received little attention from researchers. It is to the best of the researcher's knowledge that there is inadequate guidance for selecting a narrative structure of animated movies that works the best in a second language (L2) learning environment. A thorough understanding of the potential effect of narrative structure of animated movies on ESL learners' recall and comprehension of stories is needed.

Purpose of Study

The study aimed at expanding the examination of narrative structure of a short 2D animated movie in an ESL learning environment. Employing an experimental design, this study manipulated the narrative structure of an animated movie, and examined how this impacted how the story was recalled and comprehended by learners. Gathering information from these perspectives can help obtain a more thorough understanding of narrative structure, and allow ESL instructors or instructional designers design a storytelling activity that can enhance learners' recall and comprehension of stories. It is important that ESL instructors consider the narrative structure of an animated movie for use in L2 learning environment to ensure that the learner will receive a clear understanding of the information or message of the story (Herman, 2013), and that meet the learning objectives (Mayer & Moreno, 1998; 2007; Sweller, 2005; Serin, 2011).

Research Question

In order to examine the potential effect of different narrative structures on learner's recall and comprehension of stories, the following research question was formulated:

Is there an effect of narrative structure of animated movies that is sequenced in a linear, a simple non-linear and a complex non-linear manner on ESL learners' recall and comprehension of stories?

Definition of Terms

The terms used in this study are defined as the following:

<u>Term</u>	<u>Definitions as they apply to the current study</u>
ESL	English as a second language
Intermediate level	Learner has completed one basic course at a college level, first-year foreign language course and has at least been exposed to most of the basic grammar (Gaskill, 1979)
Narrative structure	A sequence of events of a story

Significance of the Study

The findings of this study can be important to ESL instructors as they plan for instruction (selecting instructional materials and methods of effective instruction), and for choosing a narrative structure of an animated movie that works the best for use in a second language learning (L2) environment. Furthermore, the results of this study can be helpful for multimedia instructional designers in designing and developing effective animated movies by focusing on incorporating a narrative structure that contributes and increases learners' recall and comprehension, and achieves learning outcomes.

Summary

Chapter I provides a description of narrative or story that are characterized as consisting of (a) elements (e.g., setting, plot, etc.) and (b) structure (e.g., temporal, event or causal sequence, etc.) typically found in stories. It also provides background information for animated movies as the instructional media in a second language learning (L2) environment. While narrative structure serves as the framework for the research's materials (stories and structures), cognitive theory accommodates this research, either as a function of narrative strategies or processing pathways to recall and comprehension cognitive processes. Chapter II discusses these theoretical frameworks in more detail.

CHAPTER II

LITERATURE REVIEW

This chapter provides an overview of the relevant psychological foundations related to recall and comprehension. An examination of research in the field of information processing can better explain these cognitive processes. This theoretical framework is chosen because: (1) it is the most prevalent model of human learning, and (2) it is more familiar to researchers who study learning using narratives and multimedia (Cohn et al., 2012; Herron et al., 2002; King, 2002; Kordaki, 2014; Ogasawara, 1994).

Recall and Comprehension Processes

When asked to answer questions about the information we have learned, our brains search our memories to retrieve the information. Memory processes help organize our memories and knowledge, and keep that information in a handy mode for later recall. In this sense, cognitive psychology sees our brains as processors of information resembling that in computers. Schunk (1996) illustrated that we:

1. Receive information from events in our surroundings;
2. Encode and make sense of the information and relate it to our existing knowledge in our memory;
3. Store new knowledge in our memory, and;
4. Retrieve it as and when we need it.

Norbury and Bishop (2002) asserted that there is a strong relationship between story recall and comprehension. For the purpose of this study, it is important to differentiate between recall or memory, and comprehension or understanding of the information contained in a story.

This is because although these two processes are highly interrelated, they are actually of two separate cognitive functions (Woodall, Davis, & Sahin, 1983). In discussing recall, Coon (1998) firstly differentiated between recognition and recall. According to him, recognizing means previously learned material is correctly identified from a given selection, while recalling means reproducing the facts or information within a story (Coon, 1998). This implies that recognition can be considered an easier task than recall task.

In contrast, comprehension, or understanding involves a higher-level of cognitive processing to retrieve and interpret the information (Bransford & Johnson, 1972). It involves an interaction between new incoming information and knowledge that has already been stored in memory (Findahl & Hoijer, 1985; Lutz & Huitt, 2003). In their study, Findahl and Hoijer (1985), found that the participants remembered information that they did not understand, and that they understood a concept without necessarily remembering the details of it. Woodall et al., (1983) asserted that it is vital in studies of recall and comprehension that researchers keep these two processes separate, and make clear differences between measures of comprehension and recall because each requires a listener to participate in two different cognitive processes (Titone et al., 2000).

The understanding of how the mind processes, stores, and retrieves information is valuable to instructors as they plan for instruction such as selecting learning objectives and methods of effective instruction (Lutz & Huitt, 2003). The following section describes cognitive information processing that is involved in how the mind processes and stores information.

Information Processing

Information processing theory view learners as active information seekers and processors of information (Lutz & Huitt, 2003; McLeod, 2009). The essence of the information processing

is that it labels mental processes as the recipient of incoming information. This new information is then modified by our senses (McLeod, 2009). More precisely, the information can be stored, retrieved and altered using our mental processes.

A summary of many versions of information processing theory that are used by experimental psychologists listed at least five key components: a sensory store, short-term memory, long-term memory, a doer, and a goal specification (Lutz & Huitt, 2003; McLeod, 2009). According to Lutz and Huitt (2003), the sensory store gathers all of the information that an individual received and briefly store them, making it available to the senses. Next, through the process of attention, some of the information from the sensory store may enter the short-term or working memory store where information that is being used is processed. The short-term store can hold information for a longer period of time than the sensory store. Finally, information of human memory is stored in the long-term memory, which is sometimes divided into two levels, episodic and semantic. Episodic memory represents memory for specific events (including their temporal sequences), while the semantic memory is more general and abstract (Lutz & Huitt, 2003; McLeod, 2009).

Many cognitive psychologists believe that once information is successfully stored, or encoded in long-term memory, it remains there -- it is never lost. According to Lutz and Huitt (2003), poor retrieval strategies such as storage deterioration is the cause for problems in remembering or recalling of stored information. Successful retrieval of information from long-term memory, therefore, is dependent on two points. They are: (1) the quality of initial encoding of information into long-term memory, and (2) the retrieval methods (Lutz & Huitt, 2003; McLeod, 2009).

There are many different theories that focus on various aspects of recognizing, remembering and reasoning, but they all agree that elaboration (through the process of attention and deep processing of information) is vital for permanent storing of information in a way that enables quick retrieval when needed. In this context, instructors must ensure that new information is processed in such a way that it can be stored and retained in long-term memory. To integrate new information, the long-term memory, and short-term memory must be dynamic, flexible and actively communicate with each other (Lutz & Huitt, 2003). Bloom et al. (1956), and Anderson and Krathwohl (2000) both offer excellent guidelines and recommendations that instructors can use to encourage and increase elaboration among learners.

It can be assumed that using animated movies can provide instructors with an elaboration strategy to convey information to learners for more detailed, in-depth processing of instructional material. In this context, to remember a story, learners must use episodic memory (memory for specific events) processes that can prompt and make connections to all the elements of the story, and also hint the story's sequence or structure (Lutz & Huitt, 2003). Using stories may increase recall because it is organized in such a way that can draw learners to the connections between and among ideas and concepts, therefore providing them with opportunities to process information deeply (Lutz & Huitt, 2003).

Dual Coding Theory and Multimedia Learning

The principle of Paivio's Dual Coding Theory is that it supports the idea that we learn by connecting new knowledge to our prior knowledge and experience, and that we learn better when the learning materials use related verbal and pictorial information compared to only a verbal material or pictorial material. This indicates that information presented through the verbal and pictorial channel is more significant -- it is better remembered than information presented

through the verbal channel alone (Clark & Paivio, 1991; Najjar, 1998). For example, pictures would have a greater opportunity to be dually coded than words alone because images have both visual and verbal elements.

The Dual Coding Theory stipulates that long-term memory consists of two distinct and yet interdependent codes: verbal and visual (Clark & Paivio, 1991; Paivio, 1990). There are two separate types of memory coding -- in a verbal system and an image system. According to this theory, verbal information is encoded only in the verbal system, while visual information is encoded in both the verbal and image systems. As pointed out by Najjar (1998), visuals (graphics) offer many advantages to the process of knowledge acquisition that is far beyond just a mere memory effect.

Dual Coding Theory makes two assumptions concerning the effective use of visuals in delivering instructional material. The first assumption is that learners are more likely to remember information that is both visually and verbally coded than when each is coded separately. This indicates that the chance of information being stored, and the retrieval of that information is higher when it is dually coded (Rieber, 1996). The second assumption is based on the premise that visual material is likely to be coded visually and verbally, while the verbal material is less likely to be coded visually (Lin, et al., 2006). This assumption supports the use of visuals since doing so activates both verbal and visual information processing systems. Also, providing internal stimuli, in this case through the use of animated movies, activates both systems during the learning process. This is believed to reduce cognitive load and free some capacity of short-term memory for learning (Rieber, 1996).

Deriving from Paivio's Dual Coding Theory, Mayer (1999, 2005a) outlined a framework to interpret the cognitive processing of information, presented both visually and verbally. This

framework describes three types of mental processing: (1) visual material is used to form a visual representation mentally, thus forming a connection between the external visual element and the internal visual representation; (2) verbal material is used to create a verbal representation, thus creating a verbal representational relationship; and (3) the learner builds referential connections between the visual representation and verbal representation (Mayer, 1991, 2005a).

In the context of this study, when using animated movies in instruction, instructors must be aware that learners are actively processing information, have dual coding channels and limited capacity. Figure 1 displays a summary of learners' recall and comprehension processing and meaning construction.

Figure 1. A summary of learners' recall and comprehension processing.

Recall and Comprehension of Animated Visuals

Animation, like any picture, should aid recall and comprehension when it illustrates highly visual facts, concepts, or principles (Rieber, 1990). Animated graphics are probably better

at illustrating concepts or ideas involving changes over time because of their ability to show motion. On the other hand, static visuals would be sufficient for tasks that only require learners to visualize information (Rieber, 1990). Considering the Dual Coding Theory (Paivio, 1986, 2007), it can be predicted that animated images could facilitate memory. The theory suggests that since long-term memory consists of both a verbal and visual coding mechanism, information that is coded by both methods is more likely to be remembered. Information stored through dual coding stays with us longer; if one memory trace is lost (whether visual or verbal), the other is still available (Rieber, 1990) to help us remember. Past research has shown support for the idea that visual aids can facilitate learning with regards to an instructional material (Kobayashi, 1986).

The superiority of using animation and animated movies for memory and comprehension tasks is explained by dual coding theory two important assumptions. The first assumption is that the two codes produce extra effects -- the chances of retrieval is doubled if information is coded both visually and verbally (Kobayashi, 1986). The second assumption is that the ways in which images and words activate the two codes are different. Images are believed to be stored both visually and verbally. Words, on the other hand, are less likely to be stored visually. We can twice as likely retrieve information that is dually coded when needed. If one memory is lost or not remembered (either verbal or visual) the other is still available. Naturally, having two codes are better than just one when it comes to recall and comprehension (Mayer, 1991, 2005a; Lutz & Huitt, 2003). The theory, in principle, stipulates that recall or comprehension is enhanced when information is presented in both visual and verbal form. This means that in this context, learners' ability to recall and comprehension of a story will be more advanced if the story is presented in an audiovisual manner.

For the purpose of this study, an understanding of the internal structure of stories, and the relationships among the parts of the stories and linking this to the essence of the information processing theories is essential. The next section of this chapter describes story grammar, story schema, and visual narrative grammar.

Story Grammar, Story Schema, and Visual Narrative Grammar

The story grammar theories are the largest group of story understanding theories in psychology (Black & Wilensky, 1997). Story grammar, which is also often referred to as story structure, is a story's internal structure consisting of its important elements and the relationships and patterns among them (Lalas, 1983). In the words of Mandler and Johnson (1977), "The story grammar is designed to represent the structure of simple stories" (p. 4). According to Cohn (2011), these grammar rules define and arrange the different parts of a story in a pattern, and the rules specify how they are connected or related to each other. Additionally, story grammar involves an expression of the character's conflict, a description of attempts to solve the conflict, and an examination of the chain of events that lead to resolution of the conflict (Dimino et al., 1990). In a study, Mandler and Johnson (1977) found that children used their knowledge of how stories are structured to help them remember essential details of the stories. Dymock (2007) described story grammar as a framework for unfolding narrative text structure, where the elements within it connect to each other to generate a well-formed story. Cooper (1986) concluded that the reader could understand a story by identifying elements of story grammars. A description of some prominent versions of story grammars are:

1. Mandler and Johnson (1977) divided the story into four elements – setting, beginning, development, and ending. Their grammar is applied to a simple story that has a single protagonist. It can also accommodate multi-episode stories.

2. Stein and Glenn (1979) categorized the grammar into two basic parts: setting, where the protagonist is introduced, and episode in which there are five categories of events.
3. Cooper's (1986) model composed of several different "episodes", each consisting of "a setting, characters, a problem, action and resolution of the problem" (p. 270-271).

Story grammar models proposed by Mandler and Johnson (1977), Stein and Glenn (1979), and Thorndike (1977) are the most prominent versions of story grammar models. Over the years several researchers have refined and advanced several more story grammar models. All of them agree that a well-formed story contains: (1) A setting, a beginning, a development and a resolution; and (2) A theme and plot (a plot can be of one or more episodes) (Cohn, 2013; Schmidt & O'Brien, 1986).

Numerous researchers used story grammar as a guide to enhance students' comprehension of stories. Dymock (2007) concluded that students having a thorough understanding of the narrative structure showed better narrative comprehension. Rumelhart (1975), and later El-Koumy (1999) confirmed that increasing students' understanding of story grammars may improve their comprehension of stories. Other examples of this evidence can also be seen in Baumann and Bergeron (1993) use of story mapping; Faggella-Luby, Schumaker, and Deshler's (2007), and also Zahoor and Janjua (2013) use of story structure analysis; Kordaki (2014) use of story creation tool; and later Nuutinen et al., (2010) use of computerized meta-level storyboards, and a multimedia tool to facilitate story creation.

Story grammar research initially focused on identifying the structure of a narrative story and its' impact on recall and comprehension by exploring two aspects of narrative structure: (a) which categories were better recalled to determine what were the structurally important categories; and (b) the necessary temporal direction of these categories. Research that studied the

use of story grammar in memory and comprehension have generated a variety of findings. Some of the important ones are:

1. Information derived from a story grammar is more comprehensible than information that cannot be derived from a story grammar (Thorndyke, 1977).
2. The sequential order of information that follows the structure of a story grammar is often better remembered than those that are not (Mandler, 1987; Thorndyke, 1977).

Mandler (1987) differentiated story grammar and story schema. According to her, readers use their existing knowledge to guide their comprehension of a story and the relationship among those parts of the story as prescribed by the story grammar. However, Mandler (1987) cautioned that story grammar is not the same as story schema, which is “a mental structure consisting of general knowledge about the way in which stories proceed” (p. 2). She stated that a story is not all about structure alone. It is a combination of structure and story schema that facilitate comprehension. Hence, more recent story grammar models are based on the assumption that reading is an interactive process between the reader and text. More precisely put, meaning is constructed from the information presented in the text as well as the existing knowledge the reader brings to the text. A combination of the two help supports learning. What this means is that story structure makes it easier for the learners to adjust new information with their existing knowledge. The logical structure of the story is related to one’s cognitive structure in that readers learn the main ideas and add details to them (Mandler, 1987).

According to Gordon and Pearson (1983), content can be more important than structure because memory is viewed as a process between existing cognitive interactive structures and incoming information. What this means is that story grammar can guess or predict what units or categories we will tend to remember and which we will forget, and it can explain what stays on

and becomes a part of our memories (Gordon & Pearson, 1983). According to Thorndyke (1977), recall is better when the information is higher in the hierarchical structure; however, within the structure, all top-level information may not be remembered equally well. He explained that a less well-structured story might be equally well-remembered because it combines with existing schema during encoding. The use of story grammar helps the reader to process the story more quickly and recall more information. Schema theory predicts that well-formed stories are better remembered than poorly formed ones. As a summary, the story grammar can be seen as a part of readers' schema for a story because the story was remembered within story grammar categories (Mandler, 1987; Thorndyke, 1977).

Visual stories are a powerful direct method of conveying information, ideas, and cultural wisdom. Images tell stories using elements such as visual cues or signs that are combined into patterns that transmit messages to the viewer (visual communication). Cohn (2011) suggested that visual narrative grammar could complement the story grammar structure, thus recognizing the importance of both text, visual and the reader.

For the purpose of this study, the story grammar provided the theoretical background for the notion of narrative (including all its' elements) and its' structure and sequence. However, an important focus of the investigation is centered on the effect of the structure of a narrative on recall and comprehension, not the grammaticality of the story (story grammar). Figure 2 shows a summary of guidelines for building a narrative structure of an animated movie for this study.

Figure 2. A summary of guidelines for building a narrative structure of an animated movie.

Narrative Structure and Degree of Linearity

A narrative can be identified as about two things: the content of a story and the structure used to tell the story and the necessary temporal order -- its sequence of events (Alexander, 2011; Cohn, 2013; Schmidt, 2005). Nearly every story follows a similar plot sequence, pattern of events, or narrative structure sequence (Cohn, 2013). Since a story does not necessarily obey the laws of space and time, it can be constructed in varied and infinite ways without directly changing the story or plot. There are often numerous plot twists and surprises that keep the audience intrigued with storylines (Alexander, 2011; Cohn, 2013; Schmidt, 2005). For example, the narrative of the television series such as, *12 Monkeys*, *Castle*, *CSI* and *Lost* follow a sequence of events that is non-linear; jumping back and forth between the present and future, and flashbacks and flash forwards to the events leading back or up to it (Alexander, 2011; Cohn, 2013; Schmidt, 2005). Similarly, Christopher Nolan's *Memento* (2000) is an absolute mind-bender as it is told in reverse chronological order.

The narrative structure sequence of events can be in a linear manner, where the story is told in a chronological, sequential manner or the narrative structure sequence of events can be fractured, making it non-linear in manner. The linearity of a story can be fractured by inserting plot strategies such as dream sequences, repetition, flash-forwards, and flashbacks, or framed -- story within a story, point of views, etc. (Alexander, 2011; Chatman, 1978; Cohn, 2013; Frank & Sandra, 1971).

Schmidt (2005), and later Alexander (2011) suggested that non-linear narrative structure can provide a deeper and more interesting and intriguing sequence of events. These types of narrative structures can maintain or increase interest by allowing development of conflict, and constructing themes. The reader usually identifies the distinctive parts and sequence of story inferentially (Cohn, 2011). Duchan (2004) added that awareness of narrative structure helps students predict the flow of stories, which as a result facilitates the comprehension of narratives.

Based on these descriptions and for the purpose of this study, linearity was achieved by developing the story and its plot in a chronological and sequential manner. On the other hand, non-linearity was achieved by employing a variation of plot strategies that modified the degree and complexity of non-linearity:

1. Plot strategies such as dream sequences, repetition and flashback were used to achieve a simple non-linear structure.
2. More varied plot strategies such as dream sequences, repetition, flashback, flash-forward, story-within-a-story, and point of view (Alexander, 2013; Chatman, 1978; Schmidt, 2005) were used to achieve a more complex non-linear structure.

Lydia Plowman (1996) quoted Aristotle, who once stated that “narrative must be so arranged that if any one of them is differently placed or taken away the effect of wholeness will

be seriously disrupted. For if the presence or absence of something makes no apparent difference, it is no real part of the whole” (p. 92). The view of narrative structure indicated that the direction of a story’s events moves in a linear way through time, and an interference of that direction substantially changes the original semantic meaning of the story (Cohn, 2013; Laurillard, Stratfold, Luckin, Plowman, & Taylor, 2000). This means that story structure is linked to cognition and understanding (Laurillard et al., 2000; Mandler & Johnson, 1977, Plowman, 1996; Stein, 1978; Thorndyke, 1977). According to Plowman (1996), “if a text does not conform to expectations because it is structured in an unfamiliar way there is likely to be some degree of cognitive disturbance” (Plowman, 1996; p. 92). In another study, Mandler and DeForest (1979) concluded that adults too experienced difficulties when asked to recall stories in a non-schematic method. In this context, it is cautioned that a narrative should not just be seen as something that only present an appealing or ecstatic value because it is fundamentally linked to cognition and understanding (Laurillard et al., 2000). Plowman (1996) cautioned that a strong narrative could be motivational and contribute to the dynamic of the text, but it can also detract from the real learning content. Plowman (1996) further asserted that:

Children’s concepts of a narrative are so fundamental to comprehension that if a text does not conform to expectations because it is structured in an unfamiliar way, there is likely to be some degree of cognitive disturbance. Children construct a mental model of the main features of the narrative such as situation and actions, building a network of causal connections among story events and tending to remember the model rather than the text itself. Thus, narrative is both dependent on, and assists, memory and a break in the primary thread of events can have severe consequences for story comprehension. (p. 92)

Research conducted by Mandler and Johnson (1977); Rumelhart (1975); Stein and Glenn (1979); and Thorndyke (1977) confirmed that there is a relationship between story structure and recall and comprehension. They posited that the syntax of story grammar is a key ingredient for recall and comprehension – the more a story conforms to an ideal structure, the better recall should be. According to Mandler (1987); and Thorndyke (1977) stories are better recalled when the temporal order of information is consistent with story grammar and comprehension is lessened when stories are not in their ideal order or sequence. In fact, Mandler and DeForest (1979) posited that ideal order is so important to the reader that learners' recall protocols adjust and reorganize themselves to conform to the typical story structure when stories are not in agreement with these grammar rules. According to Mandler and Forest (1977); Mandler (1987); and Stein (1978) young children is especially reliant upon the standard order in story structure; however, the need for emphasis on story structure decrease with age.

According to Lutz and Huitt (2003), in order to make new information meaningful, elaboration and connection must happen between previously learned memory and new information. Instruction must be delivered in a way that learners can easily access and connect to previous learning and experiences with the new information. What this means is that the more deeply information is processed, and the more connections are made between new and existing information and memory structures, the more it will be stored in long-term memory and the longer time they will stay in our memories.

Learning English as a Second Language (ESL)

ESL is the term often used to refer to English taught to speakers whose native language is other than English. For the purpose of this research, the characteristics of the target population

are described as intermediate level ESL students. Gaskill (1979) pointed out the characteristics of the intermediate level ESL student as follows:

The intermediate level student has completed one basic course similar in content to a college level, first-year foreign language course and has at least been exposed to most of the basic grammar. The student has learned to read in the second language but probably has read very short or simplified selections. Although the student makes many mistakes and has real difficulty in participating in native English conversation, the student can make himself/herself understood in the classroom, but unable to consistently produce a well-organized English paragraph. (p. 144)

The intermediate level served as a baseline (standardization) for language proficiency level in this study. This was set to understand the actual learning outcomes in the L2 environment better, and to ensure that the results of the research were not influenced by language issues -- in this case the language proficiency level.

For decades language teachers have been using films, videos and animated movies in their English as a second language (ESL) classes because they are an excellent teaching and learning tools. They are motivating, enjoyable, give visual context, provide real-life English language input, and can provide variety and flexibility to the language classroom. Visual and auditory cues provided by the video and film further encourage students to think in English (Baltova, 1999) and they provide the opportunity for them to learn a sense of the language context as they learn to observe, practice and understand real spoken English.

Learning English involves more than just learning formal aspects of language elements such as grammar, syntax, and pronunciation. It requires other important considerations as well. According to the National Standards in Foreign Language Education Project (1996), a learner must “know how, when, and why to say what to whom” (p. 11). Knowing these elements will allow them to have a sense of context that will enable them to use the language more effectively. According to King (2002), films, videos, and animated movies can help motivate ESL learners to develop all four language and communication skills (listening, reading, speaking and writing), and that they are invaluable teaching resources. He added that “they can present colloquial English in real life contexts rather than artificial situations, and they expose learners to a wide range of native speakers, each with their slang, reduced speech, stress, accents, and dialects” (p. 2). This suggested that viewers are quite motivated and interested in understanding what is shown and said in films as they provide audio and visual support of what learners are experiencing. For example, in movies and video, there is the presence of extra-linguistic features such as facial expressions and gestures, and language authenticity that may reinforce understanding of the story (Curtis, 2006). Besides, they can also present a story that is in the appropriate cultural context and, therefore, can be an effective means of providing more appropriate use of language that can help prevent cross-cultural misunderstanding (Herron et al., 2002).

Rinvoluturi (2008) described storytelling as the oldest technique in the second language (L2) learning. He further elaborated that learning through media such as animated movies, music, films, videos, etc. is one of the best ways to learn a new language as they allow learners to observe, practice and understand real spoken English. Language teachers need to capitalize on

the fact that learners are increasingly engaged with multimedia and especially social media, as new storytelling modes.

Many researchers studied stories as a pedagogical approach to effective learning and a way of serving as a powerful means of exploring language (see El-Koumy, 1999; Fang-O, Pao-Ta, & Wei-Hung, 2013; Hsiang, Hung & Juite, 2009; Hsiao, 2013; Ko, Schallert, & Walters, 2003). It is an important part of language teaching (Jones, 2001). For example, Palmer, Harshbarger, and Koch (2001), and later Tsou, Wang, and Tzeng (2006) discussed the benefits of using storytelling for learning and developing language utilization and literacy skills for both first and subsequent language learning contexts. They explained that stories and storytelling can be used in languages classrooms in many ways and for various objectives such as improving language use, increasing literacy in the target language, and introducing target language literature. Morgan (2012) explored the significance of storytelling to language learning and proposes a few ways to approach storytelling use in the languages classroom.

Isbell et al. (2004) conducted a study to see how storytelling and story reading effect the language development and story comprehension of young children. The result indicated that both storytelling and story reading were found to produce positive gains in oral language in that the children who heard the stories showed improvement in story comprehension, while children in the story reading group showed improvement in their language complexity.

Although all kinds of authentic materials are commonly accepted as helpful for language learners, watching animated movies in English might be one of the richest ways of presenting authentic and natural input since it can be the combination of these mediums: aural, visual, and textual (Barak et al., 2011; Ogasawara, 1994; Smith, 2000). Technology has made it possible for instructors and instructional designers to develop instructional materials that incorporate

multimedia such as sound, graphics, and various kinds of visual and special effects. In an animated movie (audiovisual presentation), the narration functions the same way as narrative structures presented in text. Gagne (1977) indicated that a “much broader reason for the use of objects or pictures in instruction is that they are the means by which the learner can acquire the visual images that are presumed to be a very important type of memory encoding and storage” (p. 297). Mayer (2009) posited that for some learners information that is presented aurally is not comprehended as well as information presented in a multimedia format. Additionally, Moreno and Mayer (2007) emphasized that learning environments that combine both verbal and non-verbal representations of the knowledge and that use mixed-modality presentations are the most productive learning environment. It can be summarized that the use of audiovisual materials and the use mixed-modality presentations are important and are found the most effective learning environment.

Summary

The first section of Chapter II discusses information processing theories in general and then focused on Dual Coding Theory (Clark & Paivio, 1991; Paivio, 1986) and Multimedia Learning Theory (Mayer, 1998). The theory, in principle, stipulates that recall or comprehension is enhanced when information is presented in both visual and verbal form. This means that in this context, learners’ ability to recall and comprehension of a story will be more advanced if the story is presented in an audiovisual manner.

The second section of Chapter II describes the story grammar theory in general. Story grammar becomes the guiding framework for the instructional material: story and narrative structure. A description of the ESL and language learning environment is also included.

CHAPTER III

METHODOLOGY

This chapter presents a discussion of: (a) research design, (b) sample size, (c) research question, (d) variables, and finally (e) method for data analysis that comprehensively addresses the research question and objective. A summary concludes the chapter.

Research Design

An experimental research design was determined to be an appropriate design for the study and was believed to be able to yield convincing data to answer the research question (Moore, McCabe, & Craig, 2009). To determine if there is a difference between these groups, an analysis of variance (ANOVA) was implemented. The ANOVA was appropriate for testing statistically significant differences between the three independent groups (Moore et al., 2009).

Variables

Two tests (dependent continuous variable) for recall and comprehension provided measures for the Dependent Variable (DV), while the narrative structure (Independent categorical variable) was the Independent Variable (IV). The IV had three levels: a narrative structure that was sequenced in a linear manner, a simple non-linear manner, and a complex non-linear manner.

The three short 2D animated movies told the same story (content), were designed the same (characters, plot, graphics, voice-over, voice-acting, props, etc.), used the same language proficiency level (intermediate), and served the same purpose (learning outcome). The only difference was its narrative structure. Each of these conditions constituted the following details:

1. The first animated movie told the story in a linear (chronological) manner. Its narrative structure was not fractured.
2. The second animated movie told the story in a simple non-linear manner. Its narrative structure or sequence of events was fractured in a simple manner using simple plot strategies such as dream sequences, flashback, and flash-forward.
3. The third animated movie told the story in a complex non-linear manner. Its narrative structure or sequence of events was fractured in a more complex manner using more complex and varied plot strategies such as dream sequences, flashback and flash-forward, story-within-a-story, point of view, and repetition.

Research Question

In order to examine the potential effect of different narrative structures on learners' recall and comprehension, the following research question was formulated:

Is there an effect of narrative structure of animated movies that is sequenced in a linear manner, a simple non-linear manner, and a complex non-linear manner on learners' recall and comprehension of stories?

Participants

Participants came from a major university located in the South East Asia with an enrollment of about 16,500 learners who studied engineering, science and technology. A total of 1,252 were selected to participate in the research. Approximately 20% of the population or 250 learners met the intermediate English proficiency level, which was determined by the participating university's English placement test scores. The intermediate level served as a baseline (standardization) for language proficiency level (Bernhardt & Kamil, 1995). This was

set to ensure that the results of the research were not confounded by language issues -- in this case the language proficiency level.

Participants were somewhat homogeneous with regards to age; they were between 19-24 years old. They had the same number of years exposed to the English language. The minimum formal English language learning for the participants is 11 years with a continuation at the tertiary level (Darmi & Albion, 2013).

Sampling

This research considered several factors when calculating the sample size for the study. They were: power, effect size, and the alpha level, or level of significance. A priori power analysis (Gpower: Faul and Erfelder, 2009) indicated that a sample size of 66 would be sufficient to detect a significant interaction effect with a power of .95 and an alpha of .05 (see Fig. 3; see also Appendix G).

Figure 3. A priori power analysis graph.

Instructional Materials

A panel of Subject Matters Experts (SMEs) was set-up to minimize potential biases and to ensure reliability and validity of instructional materials and methods of assessments (see Appendix A). The first SME was an ESL professor at a major university in the eastern part of USA and the second was an ESL professor at a university in South East Asia, both with more than 25 years of experience in teaching ESL. An English language editor, a retired English teacher, was also included in the panel of SMEs. Also included in the panel of experts were two experienced senior instructional designers (IDs) who were also producers of animated movies for a South East Asian television network and multimedia content production industry. In addition, three ESL graduate student volunteers served as the scorers for the recall tests. One volunteer was a native English speaker, while the other two were not native speakers of English.

Selection of story. The story selected for the study was adapted from the novel, *Lord of the Flies* by William Golding. It was selected based on the following criteria: (1) It is considered as an example of good literature, and (2) It is a good model of narrative structure, character development, and symbolism for use in the English classroom (Frank, 2010). The educational merit of the story was determined meeting the overall suitability and perceived level of interest and appropriateness for the participants. The panel of SMEs approved the selection of the story.

Story scripting and storyboarding. In order to keep the experimental sessions to a reasonable length (12-13 minutes), the story was abridged from the original novel, adapted and re-titled, *Lord of the Flies – from the Eyes of the Missing Boys*. An abridgment was done by removing certain portions of the story. It was to the researcher's judgment that such an abridgment did not obstruct or compromise the story lines, elements or events of the story. The panel of SMEs approved the adapted and abridged version of the story.

In order to produce good scripts that are both engaging and appealing, the researcher took the following actions to ensure successful translation of the scripts into a compelling multimedia format (animated movies):

1. Followed an established technique for generating a good story and story sequence. The narrative structure and plot sequence of the story was designed following the Freytag's Triangle (Freytag, 1908), which consists of (a) an exposition (of the situation), (b) a rising action (through conflict); (c) a climax (the turning point); (d) a falling action (events happen as a result of the climax); and (e) a denouement (resolution or clarification) (see Table 1).

Table 1
Narrative Structure Guideline

Plot Description	Plot Diagram
The plot begins at point A, progresses through events which build towards a climax B, and then finally reaching point C.
The plot presents the audience with multiple paths from point A to point C.
The plot presents the audience with more varied and multiple paths from point A to point C.

2. Used varied plot strategies to sequence the plot of the story (Alexander, 2013; Chatman, 1978; Schmidt, 2005). Plot strategies were employed to achieve linearity or non-linearity of narrative structure (see Table 2).

Table 2
Plot Strategies Guideline

Narrative structure	Plot strategies
Linear	Chronological, Sequential
Non-linear	Fractured – dream sequences, repetition, flashback, flash-forward, framed - story within a story, point of view

Linearity was achieved by developing the story and its plot in a chronological and sequential manner. On the other hand, non-linearity was achieved by employing a variation of plot strategies that modified the degree and complexity of non-linearity:

1. Plot strategies such as dream sequences, repetition and flashback were used to achieve a simple non-linear structure.
2. More varied plot strategies such as dream sequences, repetition, flashback, flash-forward, story-within-a-story, and point of view (Alexander, 2013; Chatman, 1978; Schmidt, 2005) were employed to achieve a more complex non-linear structure (see Table 3).

Table 3
Narrative Structure Design Framework

Type	Method or plot strategies
Linear	Sequential (time and logic)
Simple Non-linear	Fractured – dream sequences, flashback, flash-forward
Complex Non-linear	Fractured – dream sequences, flashback, flash-forward Framed - story within a story, repetition, point of view

3. Tested the story with a sample audience to see if the storyline appeared interesting to them. A cultural group consisting of three Japanese, three Malaysians, and a Korean who were intermediate level ESL college level learners in West Virginia read the final scripts. This was conducted to ensure they were able to follow the plot, interpret the key characters and relationships, and could relate sufficiently to the story and characters. Their feedback was collected for revisions and amendments of the final scripts.
4. Ensured that the script met its pedagogical goals by having the storyboard reviewed by the panel of experienced SMEs and instructional designers.
5. Ensured that the language proficiency level (intermediate) was reviewed and confirmed by the panel of SME (ESL and content experts) who reviewed the scripts and storyboard.
6. Ensured that the animated movies did not compromise the learning goals and pedagogical content. Also ensured that unnecessary “noise” or distraction risks were minimized. A panel of SMEs and IDs reviewed the animated movies.
7. Worked together as a production team. When necessary, the story writer (the researcher), subject matter experts (SME and reviewers) and instructional designers (reviewers) worked together on problematic parts of the dialogue, narration, animation and sound effects until all parties involved in the production were satisfied -- that the pedagogy was correct, and the language and actions presented remained true to the characters and the needs of the plot and story, and narrative structure or sequence of the story.

Animated movie design and production process

The animated movies were produced based on the design and development process, ADPE (Analysis, Design, Production, and Evaluate). The cyclical design framework, adapted from the ADDIE (Analysis, Design, Develop, Implement, and Evaluate) model (Dick & Carey,

1996), served as a guide for creating effective animated movies. Employing ADPE allowed the researcher to conceive, design and build the animated movies, and managed its primary development activities as shown in Fig. 4.

Figure 4. Cyclical instructional design framework.

Review and sign-off. At different stages (Analysis, Design, and Production stages), reviews and revisions (amendments) process took place. After each cycle, the ID reviewer signed-off for the next process to take place. The greatest number of reviews were at the construction stage where all the multimedia elements were put together. The majority of amendments that were required centered on multimedia elements of functionality and synchronization. The animated movies were reviewed by the panel of SMEs and instructional designers.

Production resources (software and equipment). The technical design strategy for the project used Toon Boom Storyboard Pro, considered the leading animation and storyboard software for animation studios and media publishers. The software was selected due to its vast

capabilities: powerful, efficient and versatile in terms of allowing design creativity.

Final products (animated movies). Three short 2D animated movies were successfully constructed, rendered and published. They were converted into the .mov file format, which is playable on QuickTime, the default media player. The length of the Complex Non-linear movie was the longest among the three types; perhaps due to its more complex structure and varied plot strategies (see Table 4).

Table 4
Movie Length and Size

Animated Movie	Length	Size
Linear	12.13 minutes	4.34 gigabytes
Simple Non-linear	12.14 minutes	6.54 gigabytes
Complex Non-linear	12.30 minutes	6.61 gigabytes

Test Instruments

Although story recall and comprehension are related, they involve two different cognitive processes; therefore, each can be assessed separately by asking different types of questions (Titone et al., 2000). More precisely, story comprehension questions would be slightly more challenging and would require a higher level of cognitive processing than questions involving recall of information or facts about a story.

In the recall test, the participants were asked to recall the sequence of the main events of the story and describe the main events as they recalled them. Recall scoring was conducted qualitatively. A set of scoring guidelines is described in detail in the next section. Measures were also taken to ensure the reliability of scoring recall test.

Multiple Choice Question (MCQ), also referred to as an objective test, is one of the test techniques used in language testing where learners are typically asked to respond by giving one correct answer from the available options (Hughes, 2003). It is an effective and efficient way to assess learning outcomes. MCQ's benefits lie in its high reliability, accuracy for receptive skills, practicality, quick scoring, and versatility -- the ability to include many question items (Hughes, 2003). MCQ has both strengths and weaknesses (Brown, 2001; Currie & Chiramanee, 2010; Hughes, 2003). However, there is no universally correct or best method in language teaching; similarly, in language testing, there is no one best test technique for different situations (Brown, 2001). For the purpose of this research, the MCQ type of format to assess comprehension was judged a suitable test tool, particularly as it is used to test comprehension of information more than the ability in language skills itself. The panel of SMEs approved the comprehension test format and content.

The following steps were also taken to ensure the reliability and validity of the instruments:

1. The Bloom's cognitive taxonomy was used as guidance for constructing the MCQs used to assess the comprehension level of learning outcomes.
2. A guideline was followed to design a well-balanced and well-written instrument (Woodford & Bancroft, 2005). The panel of SMEs was consulted to confirm and approve the test format and content suitability and difficulty level of the questions.
3. In order to ensure the accuracy of measurement, the MCQs were tested with a sample audience consisting of three Japanese, three Malaysians, and one Korean who were intermediate level ESL college level learners in West Virginia to see how well the test tool

actually measured the learning outcomes. Their scores and feedback were collected for revisions and amendments.

4. Participant responses were then scored objectively and analyzed statistically for impartial, reliable and valid diagnostic information about their intended learning outcomes.

Reliability and Validity

The panel of experts reviewed and approved all materials used in the research. Each reviewer was asked to evaluate the content, narrative structure, language proficiency level, technical functionality, and the effectiveness of the animated movies. The evaluation was completed on a 5-point scale. The results indicated that:

1. Content

The panel of SMEs confirmed that the animated movies told the same story (content), was designed the same (characters, plot, graphics, etc.), used the same level of ESL language proficiency (intermediate), and served the same purpose (learning goals and outcomes).

2. Narrative structure

The panel of SMEs confirmed that there were three different narrative structures: linear, simple non-linear, and complex non-linear.

3. English language proficiency level

The panel of SMEs confirmed that the proficiency level was appropriate for the intermediate level. Language review was conducted on the storyboard, the tests (instructions and test items), survey (instruction and items) and the animated movies.

4. Technical functionality

A review of the technical functionality and usability confirmed that the animated movies (videos) worked, without technical glitches.

The research considered both reliability and validity of its test instruments to ensure the credibility of its experimental results. Since transparency enhances credibility, both instructional materials and test instruments are described in detail. The instruments used for this research were examined and reported, or references cited, for each test instrument used to measure study outcomes. Evidence can be found in various sections of this chapter that described instructional content (materials) and tests, design and development, guidelines and scoring process, and relationships to other variables.

As a part of the test of validity, this research also considered the reliability of the instruments used to assess whether a test instrument gave the same results each time it was used in the same setting with the same type of participants. This ensured results that were consistent and dependable. The analysis of variance (ANOVA) was performed to generate a generalizability coefficient as this model looked at the overall reliability of the results. Nunnally (1978) stated that a reliability coefficient of .70 and above is desirable and that low-reliability coefficients of .50 or .60 are tolerable in early stages of research. The reliability coefficient of .85 to .89 are very good (Nunnally, 1978). Based on these figures, the reliability coefficients of .868 and .78 were desirable for this research.

Data Collection

Two tests: recall and comprehension served as the data sources. A demographics survey was also collected. The following describes the data collection guidelines and procedure in detail.

For recall test, three ESL graduate student volunteers scored the test. Prior to scoring the recall test, the scorers were asked to follow these tasks:

1. They were first asked to watch the animated movies.

2. Next, they determined and agreed on major sequence and events, and listed the elements for main details and sub-details of the main events. The number of main events and sequence and the number of correct story elements (details) were counted and formed as a scoring protocol. The recall protocol is based on Meyer's (1975) system, a protocol that includes hierarchically-based content structures. The panel of SMEs approved the selection of recall protocol.
3. The panel of SMEs reviewed, discussed and approved the recall scoring protocol. Corrections were made after the SME review.
4. They were then trained to score following the reviewed and approved guideline and recall scoring protocol.
5. Each volunteer scored the test individually. Inter-rater scoring reliability was conducted and is reported in Chapter IV.

The recall scoring guideline included recall in the form of: (1) number of correct sequence (in order) of main events recalled, (2) number of main events identified (not necessarily in the right order), and (3) number of story details/elements identified. Dividing the story recall into smaller units allowed for the identification of specific problems or difficulties the participants might have that might not otherwise be found if only one measure of recall was used and as such showed a more holistic understanding of the participants' recall of stories.

Additionally, to meet the intended objective of the research, the scoring of the recall protocols focused on content (information); therefore, deficiencies in expression were ignored. Grammatical, language errors and spelling mistakes were not penalized. This was true as long as they did not affect the essential or central meaning in the experimental story.

The participants answered one recall question (see Appendix B). The total possible points each participant could obtain for this test was 100. The following is the recall scoring guideline:

1. Recall of five major events in the right sequence (ten points per correct sequence for a total of 50 points)
2. Recall of five major events, not necessarily in the right sequence (five points per correct event for a total of 25 points)
3. Recall of details to the five major events (one point per correct answer for a total of 25 points)
4. The recall protocols were scored for the presence or absence of idea at each of the three hierarchical levels.

For the comprehension test, participants answered 12 multiple choice comprehension questions (see Appendix C). The total possible points each participant could obtain for this test was 12. The answers were coded in the following manner:

1. The correct answer was scored as 1 point
2. The incorrect answer was scored as 0 point

A simple survey, which consisted of both Likert scale and open-ended items (see Appendix D) was conducted after the two tests to assess the participants':

1. Demographic profile and data
2. Exposure, if any, to the story, "*The Lord of the Flies*" by William Golding
3. Impressions and preference for the use of animated movies and its story, language use, and quality.

Data Collection Procedure

This section describes the data collection process to ensure that data gathered are both defined and accurate, and that the following findings are reliable and valid.

Random Assignment. In order to ensure that each participant had an equal chance of being placed in any group, and to ensure that any differences between and within the groups were not seen as an error at the outset of the experiment (Elmes, Kantowitz & Roediger, 2012), a computer randomization programming system was used to randomly assign participants to groups. Each participant received a web-link that directed him or her to one of the three animated movies (see Table 5).

Table 5
Group Random Assignment

Narrative structure	Group
Linear	Group 1
Simple Non-linear	Group 2
Complex Non-linear	Group 3

For ethical considerations in compliance with IRB, the participants were informed about the following: (1) that their participation was voluntary and no incentives or credits were offered, and (2) that consent forms were given to them. The participants read, signed, and returned the consent forms. For other considerations of observations, the study considered the following:

1. The research was conducted in three different computer rooms to accommodate the number of participants. Each was equipped with the facility to watch the animated movies. The instructor gave approval for the use of their computer rooms for this study.
2. Each student was assigned to a computer and watched his or her assigned animated movie independently. Headphones were provided so as not to disturb other participants. The

workstations were spaced out so that the risks of interactions or discussions amongst them were controlled. They were also asked to refrain from discussing or interacting with each other during the research session. Additionally, an instructor monitored each session.

3. The animated movies were pre-determined as a non-interactive learning environment.

Therefore, the students were informed that functionalities such as pause, replay, and forward were disabled.

Data Collection Activity. Each participant watched either an animated movie that was structured in a linear manner, a simple non-linear manner or a complex non-linear manner. Before viewing the animated movies, each participant was given a consent form, which was read, signed and returned. This was followed by an instruction on how the research was being conducted. Each animated movie lasted between 12 – 13 minutes. Immediately following this task, the participants completed the recall test (see Appendix B). Next, they completed a 12-item MCQ comprehension test (see Appendix C). Finally, the participants completed a demographic survey (see Appendix D). A breakdown of the time spent in data collecting activities is summarized in Table 6.

Table 6
Data Collection Activities

Step	Activity	Time
1	Instructions/consent form	5-7 minutes
2	Viewing of animated movies	12-13 minutes
3	Recall test (test 1)	10-15 minutes
4	Comprehension test (test 2)	8-12 minutes
5	Demographic survey	5-8 minutes
	Total	40-55 minutes

Data Analysis

The data analysis used in this study consisted of descriptive and inferential statistics; each of these analyses was conducted in SPSS Version 23®.

Descriptive Statistics. The descriptive statistics were described, summarized, and illustrated in tables and as visual forms.

ANOVA. In order to determine if there was a difference between the three groups, analyses of variance (ANOVA) was conducted. The ANOVA was appropriate for testing statistically significant differences between the three independent groups (Moore & McCabe, 2006). The following assumptions were considered:

1. The assumption of independence, where the following steps were taken to make sure each participants' response was his or her own, and that they were not shared with others, and that they did not interact with each other during the experiment.
2. The assumptions of normality and homogeneity of variance were assessed. Normality assumed that the scores were normally distributed (bell-shaped).
3. Homogeneity of variance assumes that all groups had equal error variances and was assessed using Levene's Test for the Equality of Error Variances.

Summary

This study employed an experimental design to investigate if there was an effect of narrative structures on learners' recall and comprehension of stories. Chapter III describes its plans for statistical analysis: descriptive analysis, and ANOVA. They were selected because they were the most appropriate methodologies for testing the research question. This chapter also discusses the source of the data, research question, data collection activities, and data collection procedures. Chapter IV discusses the data analysis and results.

CHAPTER IV

RESULTS

The study asked the following research question: Is there an effect of narrative structure that is sequenced in a linear, a simple non-linear, and a complex non-linear manner on students' recall and comprehension of stories? In order to answer the research question, the dependent variables (DV), recall and comprehension were measured by two tests. Two statistical procedures were used to analyze the data: descriptive statistic and inferential statistic.

This chapter provides the results related to this research. It presents data, describes the process of data analysis, and gives related results based on the process detailed in the prior chapters. Methods used during this study are summarized, and findings are presented and described. Figures and analysis tables are used to display results of data. Relevant information derived from the demographic survey in the study are reported anonymously.

Participants

Participants came from a major university located in South East Asia with an enrollment of about 16,500 students who studied engineering, science and technology. A total of 1,252 were invited to participate in the research. Approximately 20% of the sample or 250 students met the intermediate English proficiency level, which was determined by the university's English placement and entrance tests. From that total, 155 consented to the study and completed the recall and comprehension tests. All participants were randomly assigned to one of the three experimental groups. The initial random assignment: Group 1 (Linear) consisted of 50 participants, Group 2 (Simple Non-linear) consisted of 53 participants and Group 3 (Complex Non-linear) consisted of 52 participants.

However, upon further analysis of the demographic data, five students within the sample indicated that they were familiar with the original novel, *Lord of the Flies* by William Golding; thus, they were excluded from the study because it was believed that participants' familiarity with the story might confound the results of the study. The final sample consisted of 150 ESL students whose language proficiency was at the intermediate level. This level was set to understand the actual learning outcomes better, and to ensure that the language proficiency level did not confound the results of the research.

Data Collection

The primary sources of data for Dependent Variables were collected using a recall and a comprehension test. These tests were used to measure the acquisition of content (story) information by the participants after experiencing one of the experimental narrative structures: linear, simple non-linear and complex non-linear story presentation. The recall test (see Appendix B) was scored based on two major areas: recall for the correct sequence of main events and recall for the main events. The comprehension test (see Appendix C) consisted of twelve multiple choice questions. The survey (see Appendix D) contained questions intended to collect demographic information, and familiarity with the original novel, as well as information about how the participants felt about the story and animated movie. All participants' responses are presented anonymously in compliance with IRB guidelines.

A computer randomization programming system was used to randomly assign participants to groups. This is to ensure that each participant had an equal chance of being placed in any group and to make sure that any differences between and within the groups were not seen as an error at the outset of the experiment (Elmes et al., 2012). Each participant received a web-link that directed him or her to one of the three animated movies. The research was conducted in

three computer rooms to accommodate the number of participants. Each participant was assigned to a computer, and watched his or her assigned animated movie independently. Headphones were provided so as not to disturb other participants. The workstations were spaced out so that the risks of interactions or discussions amongst them were controlled. They were also asked to refrain from discussing or interacting with each other during the research session. Additionally, an instructor monitored each session. Each animated movie lasted between 12 – 13 minutes. Immediately following the movie, the participants took a recall test, followed by a comprehension test. Finally, they completed a demographic survey.

Descriptive Data

The participants' gender frequency and percentage by experimental groups are shown in Table 7. Across groups, 56% of the participants were male, and 44% were female.

Table 7
Frequency Distribution of Gender by Groups

	Males	%	Females	%
Group 1 (Linear)	26	52	24	48
Group 2 (Simple Non-linear)	28	56	22	44
Group 3 (Complex Non-linear)	30	60	20	40
Total	84	56	66	44

All participants were at least 19 years old, with 41% of the sample being 19 to 20 years old, and 59% being 21 to 24 years old (see Table 8).

Table 8
Frequency Distribution of Age

Age	N
19	25
20	21
21	31
22	29
23	18
24	26
Total	150

Ethnicity/racial composition of the participants was varied. Distribution of ethnicity/race was reflective of the current demographic of the participating institution. About 69% of the sample was Malays, whereas 17% was Chinese. This was followed by Indian 9% and other races 4% rounded to the nearest whole number (see Table 9).

Table 9
Frequency Distribution of Race/Ethnicity

	Malay	Chinese	Indian	Other
Group 1	36	8	4	2
Group 2	32	10	6	2
Group 3	36	8	4	2
Total	104	26	14	6
Percentage	69%	17%	9%	4%

Note. Other includes: Iban, Kadazan, Melanau, and Thai

Two variables, family backgrounds such as origin and socio-economic status, might have an effect on how English was learned, exposed to or language skills gained and experienced. Fig. 3 shows that each group contained relatively similar numbers of participants across type of

background or origin (See Fig. 5). The majority of participants (50%) were from suburban areas, while 37% were from an urban area. Only 13% indicated that they were from a rural area.

Figure 5. Sample frequency distribution of family origin.

Figure 6 shows that each group contains relatively similar numbers of participants across the socio-economic background. When describing their socio-economic status, 85% of the participants self-reported that they were from a middle-income family, 13% from a low-income family, and 3% from a high-income family.

Figure 6. Sample frequency distribution of socio-economic background.

Descriptive data on the participants' preference for the animated movie (in terms of interest in the story, narrative structure, language, and quality of the animated movie) were also collected. The survey indicated that the entire sample was unfamiliar with the novel, *Lord of the Flies* by William Golding.

When asked to rate the statement, "I like learning English as a second language." The results indicated that 11% of the sample strongly agreed, while 25% somewhat agreed with the statement. This is followed by 33% who were neutral, 24% somewhat disagreed, and 7% strongly disagreed that they like learning English as a second language (see Fig. 7).

Figure 7. Participants' interest in learning English.

Next, the participants were asked to rate their preference in learning using animated movies based on the statement, "I am interested in learning using animated movies." The results indicated that a quarter or twenty-five percent of the participants strongly agreed, whereas 36% somewhat agreed that they were interested in learning using animated movies. Another 27% was neutral, while 8% somewhat disagreed and 4% strongly disagreed that they were interested in learning using animated movies (see Fig. 8).

Figure 8. Interest in learning using animated movies by groups.

Participants were asked to answer the survey item, “Rate your interest (in terms of plot, characters, etc.) in the story, *Lord of the Flies – From the Eyes of the Missing Boys*”. Results for the survey item indicated that the majority 50% of the sample had some amount of interest in the story, while 8% had a good amount of interest and 6% had a great amount of interest. About 24% had a little amount of interest, and 11% had no interest in the story at all (see Fig. 9).

Figure 9. Participants' interest in the story.

Figure 10 shows that Group 3 who rated chronological order more highly desirable than the other two groups from the survey item, “Rate your preference for a story that is told in chronological order (in the time *order* it happened).” On a scale 1-5, 1 being the least and 5 the most desirable (preferred), results indicated that 13% rated “5,” which means they most preferred a story told in chronological order. Another 33% rated “4”, 37% rated “3”, followed by 11% rated “2” and 3% rated “1.” The participants generally preferred the events of a story be told in chronological order.

Note. On a scale of 1-5 where “1” means the least and “5” means the most preferred

Figure 10. Interest for chronological sequence of story.

In rating for the quality (in terms of audiovisual elements: graphics, color, sound) of the animated movie, the results showed 9% of the participants thought the quality was excellent, while 46% of the sample thought it was as good. Another 42% thought it was fair, and only 3% thought that the quality was poor (see Fig. 11).

Figure 11. Rating for the quality of animated movie by group.

Effect of Narrative Structure

This section of the chapter reports the descriptive data for the recall and comprehension tests. The recall test consisted of two parts: recall for the sequence of major events, and recall for the major events. The recall scoring guideline included recall in the form of the 1) number of correct sequence (in order) of main events recalled, and 2) number of main events identified (not necessarily in the right order) and the number of story details/elements identified. Dividing recall into two parts allowed for smaller measures to show a more complete and holistic understanding of the participants' recall, such as identification of specific problems or difficulties the participants might have that might not otherwise be found if only one measure of recall was used. Chapter III described the scoring procedure for the recall test in detail. Inter-rater reliability for scoring recall for the sequence of events was high with .98 and the scoring for recall for main events was high with .97 (See Table 10).

Table 10
Intraclass Correlation Coefficient (Scoring for Sequence and Main Events)

	Intraclass Correlation ^b	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
Single Measures	.946 ^a	.930	.959	53.236	149	298	.000
Average Measures	.981 ^c	.975	.986	53.236	149	298	.000
	Intraclass Correlation ^b	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
Single Measures	.914 ^a	.889	.934	32.899	149	298	.000
Average Measures	.970 ^c	.960	.977	32.899	149	298	.000

Table 11 shows the scores in recall of sequence of main events between the three groups. Group 1 (Linear) recorded the highest means score ($M = 33.30$), while Group 2 (Simple Non-linear) recorded the lowest means score ($M = 26.20$).

Table 11
Scores in Recall of Sequence of Main Events between Groups

		N	Mean	Min	Max
Sequence of Main Events	1	50	33.30	25	40
	2	50	26.20	15	40
	3	50	26.50	20	35
	Total	150	28.67	15	40

Figure 12 illustrates the frequency of scores in recall of sequence of main events between the three groups.

Figure 12. Frequency of scores in recall of sequence of main events between groups.

Table 12 shows the scores in recall of main events (not necessarily in the right sequence) between the three groups. Group 1 (Linear) recorded the highest means score ($M = 34.60$) while Group 2 (Simple Non-linear) recorded the lowest means score ($M = 30.50$).

Table 12
Scores in Recall of Main Events between Groups

		N	Mean	Min	Max
Recall of Main Events	1	50	34.60	28	43
	2	50	30.50	23	40
	3	50	30.78	20	38
	Total	150	31.96	20	43

Figure 13 illustrates the frequency of scores in recall of main events between the three groups.

Figure 13. Frequency of scores in recall of main events between groups.

Table 13 shows the scores in comprehension between the three groups. Group 1 (Linear) recorded the highest means score ($M = 7.76$) while Group 2 (Simple Non-linear) recorded the lowest means score ($M = 6.46$).

Table 13
Scores in Comprehension between Groups

Groups	N	Mean	Min	Max
1	50	7.76	4	11
2	50	6.46	3	11
3	50	6.66	3	11
Total	150	6.96	3	11

Figure 14 shows the frequency of scores in comprehension between the three groups.

Figure 14. Frequency of scores in comprehension between groups.

The ANOVA Results

Prior to conducting both ANOVAs, the assumption of homogeneity of variances was tested and was found tenable $p > .05$ using Levene's Test. For recall $F(2, 147) = .945, p = .391$ and for comprehension $F(2, 147) = 1.223, p = .297$ (see Table 14).

Table 14
Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Recall	.945	2	147	.391
Comprehension	1.223	2	147	.297

The assumptions of normality were evaluated and determined to be satisfied as the three groups' distribution was associated with skew and kurtosis less than $|.22|$ and $|1.1|$, respectively (Schmider, Ziegler, Danay, Beyer, Buhner, 2010; see Table 15).

Table 15
Distribution Associated with Skew and Kurtosis

		N	Mean	SD	Skew	Kurtosis
Recall	1	50	67.90	6.692	-0.10	-1.25
	2	50	56.70	8.488	0.91	0.22
	3	50	57.28	7.602	0.07	-0.45
	Total	150	60.63	9.171		
Comprehension	1	50	7.76	1.858	-0.10	-1.01
	2	50	6.46	2.092	1.23	-0.93
	3	50	6.66	1.722	0.99	1.05
	Total	150	6.96	1.969		

The assumption of normality was also evaluated using histograms and was found roughly normally distributed for all groups. The recall test data was a little skewed and kurtotic, but they did not differ significantly from normality. Therefore, it is assumed that the data were approximately normally distributed in terms of skewness and kurtosis (see Appendix E).

For both ANOVAs, the independent variable included three groups ($N = 150$). For average recall, Group 2 (Simple Non-linear) had the smallest mean scores ($M = 56.70$), and Group 1 (Linear) had the highest mean scores ($M = 67.90$). For average comprehension, Group 2 (Simple Non-linear) had the smallest mean scores ($M = 6.66$), and Group 1 (Linear) had the highest mean scores ($M = 7.76$) (see Table 16).

Table 16
Descriptive Statistics

		N	Mean	SD	SE	95% Confidence Interval for Mean		Min.	Max.
						Lower Bound	Upper Bound		
Recall	1	50	67.90	6.692	.946	66.00	69.80	55	80
	2	50	56.70	8.488	1.200	54.29	59.11	40	78
	3	50	57.28	7.602	1.075	55.12	59.44	40	73
	Total	150	60.63	9.171	.749	59.15	62.11	40	80
Comprehension	1	50	7.76	1.858	.263	7.23	8.29	4	11
	2	50	6.46	2.092	.296	5.87	7.05	3	11
	3	50	6.66	1.722	.243	6.17	7.15	3	11
	Total	150	6.96	1.969	.161	6.64	7.28	3	11

One ANOVA tested the effect of narrative structure on participants' ability to recall the story, and a second ANOVA tested the effect of narrative structure on participants' ability to comprehend the story. For recall, the ANOVA yielded a statistically significant difference $F(2, 147) = 34.15, p = .000, \eta^2 = 0.32$. For comprehension, the ANOVA was also statistically significant $F(2, 147) = 6.81, p = .001, \eta^2 = 0.085$. Results of the independent between-groups ANOVAs are shown in Table 17.

Table 17
Results of the Independent Between-Groups ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Recall	Between Groups	3976.013	2	1988.007	34.151	.000
	Within Groups	8557.080	147	58.211		
	Total	12533.093	149			
Comprehension	Between Groups	49.000	2	24.500	6.811	.001
	Within Groups	528.760	147	3.597		
	Total	577.760	149			

To evaluate the nature of the differences between the three means further, the statistically significant ANOVA was followed-up with a series of single-step Tukey HSD multiple comparisons tests. The post-hoc comparisons are reported in Table 18.

Table 18
Tukey HSD Multiple Comparisons

Dependent Variable	(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Recall	1	2	11.200*	1.526	.000	7.59	14.81
		3	10.620*	1.526	.000	7.01	14.23
	2	1	-11.200*	1.526	.000	-14.81	-7.59
		3	-.580	1.526	.923	-4.19	3.03
	3	1	-10.620*	1.526	.000	-14.23	-7.01
		2	.580	1.526	.923	-3.03	4.19
Comprehension	1	2	1.300*	.379	.002	.40	2.20
		3	1.100*	.379	.012	.20	2.00
	2	1	-1.300*	.379	.002	-2.20	-.40
		3	-.200	.379	.858	-1.10	.70
	3	1	-1.100*	.379	.012	-2.00	-.20
		2	.200	.379	.858	-.70	1.10

*. The mean difference is significant at the 0.05 level.

As summarized in Table 19, four of the six comparisons were statistically significant ($p < .05$). For recall, post hoc comparisons between means for groups 1 (Linear) and 2 (Simple Non-linear), and 1 (Linear) and 3 (Complex Non-linear) were found to be statistically significant, with quite large effect sizes $d \geq 0.80$ (based on Cohen's (1992) guidelines. This means there is a large effect on recall between the paired groups when narrative structure is manipulated. Group 1 (Linear) was found to be statistically superior to Groups 2 (Simple Non-linear) and 3 (Complex Non-linear) for promoting recall.

For comprehension, post hoc comparisons between means for groups 1 (Linear) and 2 (Simple Non-linear), and 1 (Linear) and 3 (Complex Non-linear) were found to be statistically significant, with moderate effect sizes $d \geq 0.50$. Group 1 (Linear) was found to be statistically superior to Groups 2 (Simple Non-linear) and 3 (Complex Non-linear) for promoting comprehension.

Table 19
Results Associated with Tukey's HSD Multiple-Comparison

	Comparison		p	d
Recall	Group 1*	Group 2*	.000	1.47
	Group 1*	Group 3*	.000	1.48
	Group 2	Group 3	.923	-0.07
Comprehension	Group 1*	Group 2*	.002	0.66
	Group 1	Group 3*	.012	0.61
	Group 2	Group 3	.858	-0.10

Note: N=50 for all groups; Group 1 = Linear structure; Group 2 = Simple non-linear structure; Group 3 = Complex non-linear structure; d = Cohen's d

A visual depiction of a comparison between a large and moderate effect sizes is illustrated in the following graphs (see fig. 15).

Figure 15. Large and moderate effect sizes

A post hoc power analysis was conducted using the software package, GPower (Faul & Erdfelder, 2009) was performed to determine statistical power, and the observed power was found strong at .99 for recall and .92 for comprehension tests. A visual depiction of the observed power for recall (see Fig. 16).

Figure 16. Plot for observed power for recall.

A visual depiction of the observed power for comprehension is shown below (see Figure 17).

Figure 17. Plot for observed power for comprehension.

Summary

The objective of this study was to gain a better understanding of the effect of narrative structure on recall and comprehension of stories. Through this study, information obtained include 1) Linear narrative structure was found superior for promoting recall, and 2) Linear narrative structure was found superior for promoting comprehension, will aid in the better design and development of narrative structure for use in ESL classroom. Chapter V discusses the findings and its' implication for future research.

CHAPTER V

DISCUSSION

Narrative Structure, Recall and Comprehension

The results of this study showed that there was an effect of narrative structure of animated movies that was sequenced in a linear, a simple non-linear and a complex non-linear manner on ESL learners' recall and comprehension of stories. Information derived from the linear structure was better (in terms of performance) recalled and comprehended than from the simple and complex non-linear structures. This is consistent with the findings of many other studies that examined narrative structure in text (Amer, 1992; Nicholas et al., 2011; Weinstein, 2006), in hypermedia (Kordaki, 2014; Lowrey, 2004), in interactive media (Laurillard et al, 2000; Mesbah, 2006; Nuutinen et al., 2010; Plowman, 2005) and in static visuals (Gary et al., 1997; Lin et al., 2006; Pagan, 2006). Thus, as indicated by the results of this study, the better way to develop this type of instructional activity for ESL learners is linear. The results also found that recall and comprehension were affected when stories were not in their linear (ideal) order or sequence – no matter the degree of complexity or non-linearity of the narrative structure, in this case, simple or complex non-linearity.

Additionally, this finding seems in agreement with the evidence concerning the fundamental structure of story grammar models that stipulated that the sequential order of information that follows the structure of a story grammar is often better remembered and is more comprehensible than those that are not, and that the story structure is an essential ingredient for recall and comprehension – the more a story conforms to a linear (ideal) structure, the better the retrieval of information should be (Mandler & Johnson, 1977; Rumelhart, 1975; Stein & Glenn, 1979; Thorndyke 1977).

Herman (2013) and Ryan (2004) posited that instructors must provide ample learning opportunities for learners by using several modalities for instruction. For the purpose of this study, animated movies were used as the instructional material delivery media to help facilitate the transition of the learners' recall to comprehension of information. The results of the study found that the narrative structure of stories could promote or impede learning outcomes rather than the content and media used to convey information. This concurs with Mayer's (2011b) statement that the media does not cause learning; instead, the methods of instruction, and instructional design do. Similarly, in discussing the narrative structure of interactive media Plowman (2005) stated that "Problems are generally caused by structure rather than the content of interactive media" (p.1).

Implication of the Study

Cortazzi and Jin (2007) suggested that the use of stories and storytelling activities would be beneficial to learning as it may help the learners' "linguistic and metacognitive development" (p. 646). Although all kinds of authentic materials are commonly accepted as useful for ESL learners, watching animated movies in English might be one of the richest ways of presenting authentic and natural input since it can be the combination of elements such as audio, visual, and text (Barak et al., 2011; Ogasawara, 1994; Smith, 2000). In this context, it is perhaps useful that ESL instructors consider the narrative structure when selecting and using animated movies for instruction. Choosing an appropriate narrative structure can help learners follow the sequence of events and flow of the animated movie, which as a result can facilitate the recall and comprehension of narratives (Duchan, 2004).

In the context of ESL, when using animated movies in instruction, instructors must be aware that learners are actively processing information, have dual coding channels and limited

capacity. As such it is perhaps useful that ESL instructors consider including an awareness of narrative structure that can help ESL learners to develop a mental representation of the information (story) that, in turn, can help them distinguish between main ideas and supporting details of stories (Amer, 1992). Therefore, in the context of this study, it is important that ESL instructors and instructional designers consider the narrative structure of animated movies for use in L2 learning environment to ensure that the learner will receive a clear understanding of the information or message of the story (Herman, 2013) that meet the learning objectives (Mayer, 2011b).

Limitations

This study identified the following limitations. Firstly, the findings of this study are limited to the length of the animated movie (12-13 minutes), and duration of the study, and as such are not necessarily applicable to feature length animated movies and brief animated movie commercial promotions. Additionally, since college level learners were used in this research, the results are not necessarily applicable to younger or older learners. Next, the use of ESL learners prevents the results from being generalized to other types of learners, language proficiency levels, information processing levels, types of institution, and methods of test administration. The use of a 2D animated movie prevents the results from being generalized to other types of audiovisual presentations. Although video, feature films may perform the same functions as animated movies, it is outside the area of the study so it will not be considered further in this review. Additionally, the study will not be concerned with any other instructional design that may involve extensive learning or narrative, film theories, strategies, models, grammar structure, or culture and native language of the learners except where these were specifically relevant and

mentioned in transit. Finally, the narrative structure addressed in this study followed an organization or pattern, which reflected an American/European culture.

Recommendations for Further Research

The results of this study demonstrated the effect of narrative structure of animated movies on ESL learners' recall and comprehension of stories. However, this study was still a small-scale investigation. Further research is needed to be undertaken with a larger sample to provide an additional thorough understanding of the effect of narrative structure. Next, it would be interesting to see how the narrative structure could influence recall and comprehension of learners of different ages. Furthermore, this study used a single abridged story, "*Lord of the Flies*." It would be interesting to examine the effect of narrative structure of other stories or stories of the learners' own cultures. In addition, this study only investigated learners in an individual setting. It would be worthwhile to examine the effect of narrative structures in storytelling activities associated with other settings and cultures. Another is to investigate the effect of narrative structure of 3D animated movies or feature films. Finally, since there is no universally correct or best method in language teaching; likewise in language testing, there is no one best test technique for different situations (Brown, 2001). Perhaps, various methods of test administration can yield different outcomes. Gathering information from these perspectives through further studies can help obtain a thorough understanding of narrative structure, which can allow the instructors to design a storytelling activity that can enhance learners' recall and comprehension of stories in language learning environment.

One observation from the results showed, quite surprisingly, that Group 3 (Complex Non-linear) scored higher (in terms of performance) in both recall and comprehension than Group 2 (Simple Non-linear). However, since parametric assumptions were not violated because

the variance between groups was not significant on the majority of the variables, there may be other explanations for the outcomes of both groups. More elaborate analysis could look at the correlations between other variables such as age, gender, origin, and so on that may also affect recall and comprehension. Additionally, perhaps modification of the length of the movies and degree of non-linearity can produce a different result.

Conclusion

Traditionally, English in a second language classroom has been taught using linear instructional methods that were pre-planned, text-based and procedural in nature. Such instructional methods tend to focus more on the development of competency (what learners know or can do in terms of knowledge, skills, and attitude) rather than capability (learners ability to adapt to change, create new knowledge, and continue to improve their language acquisition and performance) (Fraser & Greenhalgh, 2001). The new ESL curriculum includes non-linear instructional methods that involve more spontaneity, provide hands on experience, and encourage reflection – all of which may require higher levels of cognitive processes. The animated movie is one method used as an instructional strategy in the new ESL curriculum.

Although the results of this study showed that a linear animated movie is preferred by the participants; however, perhaps there is a need for ESL instructors and instructional designers to develop instructional strategies or materials that can make a non-linear narrative structure of an animated movie more comprehensible to the ESL learners. We live in a world where many types of media such as film, newspapers, the World Wide Web surround, and influence us; thus, we are easily and constantly exposed to a non-linear way of working and thinking. Relating this fact to the context of this study, instructors must help bridge this gap between preferences for a linear narrative structure to adapting to a non-linear narrative structure. Doing so can help learners

develop their language competency as well as their capability to adapt to change, create new knowledge, and continue to improve their language acquisition and performance (Fraser & Greenhalgh, 2001). In one sense, this can help prepare them to move on to the next proficiency level; in another sense, this can assist them in receiving and adapting to non-linear incoming information. Having both skills can contribute to improving their overall performance.

In conclusion, the results of this study can be important to ESL instructors and instructional and multimedia content designers as they plan for instruction such as selecting instructional materials and methods of effective instruction, and for selecting a narrative structure of an animated movie that works the best in a second language learning environment.

REFERENCES

- Alexander, B. (2011). *The new digital storytelling: Creating narratives with new media*. Santa Barbara, California: Praeger.
- Amer, A. (1992). The effect of story grammar instruction on EFL students' comprehension of narrative text. *Reading in a Foreign Language* 8(2), 711-720.
- Atkinson, R., & Shiffrin, R. (1968). Human memory: A proposal system and its control processes. In K. W. S. a. J. T. Spence (Ed.), *The psychology of learning and motivation* (Vol. 8). London: Academic Press.
- Bal, M. (1997). *Narratology: Introduction to the theory of narrative* (2nd ed.). Buffalo, Toronto: University of Toronto Press.
- Baltova, I. (1999). Multisensory language teaching in a multidimensional curriculum: The use of authentic bimodal video in core French. *Canadian Modern Language Review*, 56(1), 32-48.
- Barak, M., Ashkar, T., & Dori, Y. (2011). Learning science via animated movies: Its effect on students' thinking and motivation. *Computers & Education*, 56(3), 839-846.
doi:10.1016/j.compedu.2010.10.025
- Barthes, R. (1975). An introduction to the structural analysis of narrative. *New Literary History: A Journal of Theory and Interpretation*, 6(2), 237.
- Baumann, J., & Bergeron, B. (1993). Story map instruction using children's literature: Effects on first graders' comprehension of central narrative elements. *Journal of Literacy Research*, 25(4), 407-437. doi:10.1080/10862969309547828

- Beck, R., & Clarke-Stewart, K. (1998). Improving 5-year-olds' narrative recall and comprehension. *Journal of Applied Developmental Psychology, 19*(4), 543-569.
doi:10.1016/S0193-3973(99)80055-0
- Bernhardt, E. & Kamil, M. (1995). Interpreting relationships between L1 and L2 reading: Consolidating the linguistic threshold and the linguistic interdependence hypotheses. *Applied Linguistics, 16*, 15-34.
- Black, J., & Wilensky, R. (1979). An evaluation of story grammars. *Cognitive Science, 3*(3), 213-229. doi:10.1016/S0364-0213(79)80007-5
- Bloom, B., Englehart, M., Furst, E., Hill, W., & Krathwohl, D. (1956). *Taxonomy of Educational Objectives, the classification of educational goals – Handbook I: Cognitive Domain*. New York: McKay.
- Bransford, J., & Johnson, M. (1972). Contextual prerequisites for understanding: Some investigations of comprehension and recall. *Journal of Verbal Learning and Verbal Behavior, 11*, 717-726.
- Brenner, S. (1997). Storytelling and story schema: A bridge to listening comprehension through retelling. (Order No. 9820462, Ohio University). *ProQuest Dissertations and Theses*, 211-211 p. Retrieved from
<http://search.proquest.com/docview/304361579?accountid=2837>
- Brown, H. (2001). *Teaching by Principles*, 2nd ed., New York: Pearson Education.
- Chatman, S. (1978). *Story and discourse: Narrative structure in fiction and film*. Ithaca, N.Y: Cornell University Press.
- Nolan, C. (Director). (2000), *Memento*. [Motion picture]

- Clark, J., & Paivio, A. (1991). Dual coding theory and education. *Educational Psychology Review*, 3(3), 149-210. doi:10.1007/BF01320076
- Cobley, P. (2013). Narrative. Retrieved from <http://www.ebilib.com>
- Cohen, B. (2013). *Explaining psychological statistics* (4th ed.). Hoboken, NJ: John Wiley & Sons.
- Cohen, J. (1992). Statistical Power Analysis *Current Directions in Psychological Science*, Vol. 1, No. 3, pp. 98-101, doi:10.1111/1467-8721.ep10768783
- Cohn, N. (2013). Visual Narrative Structure. *Cognitive Science*, 37(3), 413-452. doi:10.1111/cogs.12016
- Cohn, N., Paczynski, M., Jackendoff, R., Holcomb, P., & Kuperberg, G. (2012). (Pea) nuts and bolts of visual narrative: Structure and meaning in sequential image comprehension. *Cognitive Psychology*, 65(1), 1-38. doi:10.1016/j.cogpsych.2012.01.003
- Connelly, F. M., & Clandinin, D. J. (1990). Stories of experience and narrative inquiry. *Educational Researcher*, 19(5), 2-14. doi:10.2307/1176100
- Coon, D. (1986). *Introduction to psychology: Exploration and application* (Fourth edition.). West Pub. Co.
- Cooper, J. (1986). Improving reading comprehension. Boston: Houghton Mifflin Co
- Cortazzi, M. & Jin (2007). 'Narrative Learning, EAL and Metacognitive Development', *Early Childhood Development and Care*, 177 (6-7), 645-660.
- Currie, M. & Chiramanee, T. (2010). 'The effect of the multiple-choice item format on the measurement of knowledge of language structure,' *Language Testing*, Vol. 27, pp. 471-491.

- Darmi, Ramiza & Albion, P. (2013). *English language in the Malaysian education system: Its existence and implications*. In: 3rd Malaysian Postgraduate Conference (MPC 2013), 4-5 July 2013, Sydney, Australia.
- Denning, S., & ebrary, I. (2011). *The leader's guide to storytelling: Mastering the art and discipline of business narrative* (2 ed.). San Francisco, CA: Jossey-Bass.
- Dick, W., & Carey, L. (1996). *The systematic design of instruction*. 4th ed. New York, NY: Harper Collin
- Dimino, J., Gersten, R., Carnine, D., & Blake, G. (1990). Story grammar: An approach for promoting at-risk secondary students' comprehension of literature. *The Elementary School Journal*, 91(1), 19-32.
- Duchan, J. (2004). *Framework in language and literacy: How theory informs practice*. New York: Guilford Press.
- Dymock, S. (2007). Comprehension strategy instruction: Teaching narrative text structure awareness. *The Reading Teacher*, 61(2), 161-167. doi:10.1598/RT.61.2
- El-Koumy, A. (1999). *Effect of Instruction in Story Grammar on the Narrative Writing of EFL Students*. Washington, D.C.: ERIC Clearinghouse on Languages and Linguistics. ERIC Document No. 435 173.
- Elmes D., Kantowitz, B., & Roediger, H. (2012). *Research methods in psychology*. Belmont: Cengage Learning
- Faggella-Luby, M., Schumaker, J. S., & Deshler, D. D. (2007). Embedded learning strategy instruction: Story-structure pedagogy in heterogeneous secondary literature classes. *Learning Disability Quarterly*, 30(2), 131-147.

- Fang-O, K., Pao-Ta, Y., & Wei-Hung, H. (2013). Develop and evaluate the effects of multimodal presentation system on elementary ESL students. *Turkish online journal of educational technology*, 12(4), 29-40
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A.G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, 41, 1149-1160.
- Findahl, O., & Höijer, B. (1985). Some characteristics of news memory and comprehension. *Journal of Broadcasting & Electronic Media*, 29(4), 379-396.
- Frank, A. & Sandra, S. (1971). *Handbook of short story writing*. Cincinnati, OH: Writer's Digest.
- Frank, E. (2010). "Lord of the Flies": The Educational Value of Golding's Text." *Pell Scholars and Senior Theses*. Paper 58. http://digitalcommons.salve.edu/pell_theses/58
- Fraser, S. & Greenhalgh, T. (2001). Coping with complexity: Educating for capability. *BMJ*, 323: 799-803.
- Freytag, G., (1908). Freytag's technique of the drama; an exposition of dramatic composition and art. United States
- Gagne, R. (1977). *The conditions of learning*. (4th ed.). New York: Holt, Rinehart & Winston, Inc.
- Gary J. A., Robert L. T., & Kevin C. M. (1997). The Effect of Dynamic and Static Visuals on the Recall and Comprehension of Information Using Computer-Based Instruction. *Journal of Visual Literacy*. Vol. 17, Iss. 2.

- Gaskill, W. (1979). The teaching of intermediate reading in the ESL classroom in *Teaching English as a second or foreign language* (Eds. Marianne Celce-Murcia & Lois McIntosh). Rowley, MA: Newbury House.
- Golding, W. (1954). *Lord of the Flies*. New York: The Berkley Publishing Group
- Gordon, J., & Pearson, J. (1983). Cyclic nucleotides. Part II. Physiology and pharmacology. Experimental pharmacology. Edited by J. W. Kebabian and J. A. Nathanson. pp. 888. (Springer-Verlag, 1982.) *Quarterly Journal of Experimental Physiology*, 68(4), 752-753. doi:10.1113/expphysiol.1983.sp002769
- Herman, D. (2013). *Storytelling and the sciences of mind*. Cambridge, Massachusetts: The MIT Press.
- Herron, C., Dubreil, S., Corrie, C., & Cole, S. (2002). A Classroom investigation: Can video improve intermediate-level French language students' ability to learn about a foreign culture? *The Modern Language Journal*, 86(1), 36-53.
- Herron, C., Morris, M., Secules, T., & Curtis, L. (1995). A comparison study of the effects of video-based versus text-based instruction in the FL Classroom. *French Review*, 68(5), 775.
- Hsiang, C., Hung, C. & Juite, W. (2009). Exploring the elements of a story from advertising and its effectiveness. *The 16th ACME International Conference on Pacific Rim Management, Association for Chinese Management Educators*. San Francisco, California.
- Hsiao, W. (2013). Develop and evaluate the effects of multimodal presentation system on elementary ESL students. *Turkish Online Journal of Educational Technology*, 12(4), 29-40.

- Hughes, A. (2003). *Testing for Language Teachers* (2nd Ed), Cambridge: Cambridge University Press.
- Isbell, R., Sobol, J., Lindauer, L., & Lowrance, A. (2004). The effects of storytelling and story reading on the oral language complexity and story comprehension of young children. *Early Childhood Education Journal*, 32(3), 157-163.
doi:10.1023/B:ECEJ.0000048967.94189
- King, J. (2002). Using DVD feature films in the EFL Classroom. *Computer Assisted Language Learning*, 15(5), 509-523.
- Ko, J., Schallert, D., & Walters, K. (2003). Rethinking Scaffolding: Examining Negotiation of Meaning in an ESL Storytelling Task. *TESOL Quarterly*, 37(2), 303–324.
<http://doi.org/10.2307/3588506>
- Kobayashi, S. (1986). Theoretical issues concerning superiority of pictures over words and sentences in memory. *Perceptual and Motor Skills*, 63(2), 783-792.
doi:10.2466/pms.1986.63.2.783
- Kordaki, M. (2014). On the design of educational digital stories: The ed-W model. *Procedia - Social and Behavioral Sciences*, 116, 1631-1635. doi:10.1016/j.sbspro.2014.01.447
- Krathwohl, D. (2002). A revision of bloom's taxonomy: An overview. *Theory into Practice*, 41(4), 212-218. doi:10.1207/s15430421tip4104_2
- Lalas, J. (1983). Story Grammar Application in ESL Reading. *TESL Reporter*, 16(4).
- Laurillard, D., Stratfold, M., Luckin, R., Plowman, L., & Taylor, J. (2000). Affordances for learning in a non-linear narrative medium. *Journal of Interactive Media in Education*, 2000(2), 2. doi:10.5334/2000-2

- Lin, H., Chen, T., & Dwyer, F. (2006). Effects of Static Visuals and Computer-Generated Animations in Facilitating Immediate and Delayed Achievement in the EFL Classroom. *Foreign Language Annals*, 39(2), 203-219. doi:10.1111/j.1944-9720.2006.tb02262.x
- Lowrey, W. (2004). Assessing the Non-linear Web Story. *Newspaper Research Journal*, 25, 83-97.
- Lutz, S., & Huitt, W. (2003). Information processing and memory: Theory and applications. Educational Psychology Interactive. Valdosta, GA: Valdosta State University. Retrieved 11/28/2014, from <http://www.edpsycinteractive.org/papers/infoproc.pdf>
- Mandler, J. (1987). On the psychological reality of story structure. *Discourse Processes*, 10, 1–29.
- Mandler, J., & DeForest, M. (1979). Is there more than one way to recall a story? *Child Development*, 50(3), 886-889. doi:10.1111/j.1467-8624.1979.tb02442.x
- Mandler, J., & Johnson, N. (1977). Remembrance of things parsed: Story structure and recall. *Cognitive Psychology*, 9, 111-151.
- Mayer, R. (1999). Research-based principles for the design of instructional messages: The case of multimedia explanations. *Document Design*, 1, 7-20.
- Mayer, R. (2005a). Cognitive theory of multimedia learning. In R.E. Mayer (Ed.), *The Cambridge Handbook of Multimedia Learning*. New York: Cambridge University Press.
- Mayer, R. (2009). *Multimedia learning* (2nd ed). New York: Cambridge University Press.
- Mayer, R. (2011b). Instruction based on visualizations. In R.E. Mayer & P.A. Alexander (Eds.), *Handbook of Research on Learning and Instruction*. New York: Routledge.
- Mayer, R., & Anderson, R. (1991). Animations need narrations: An experimental test of the dual-coding hypothesis. *Journal of Educational Psychology*, 83, 484-490.

- Mayer, R., & Moreno, R. (1998). A split-attention effect in multimedia learning: Evidence for dual processing systems in working memory. *Journal of Educational Psychology*, 90, 312-320.
- McClean, S. (2007). *Digital storytelling: The narrative power of visual effects in film*. Cambridge, Mass: MIT Press.
- McLeod, S. (2009). Eyewitness Testimony. Retrieved August 29, 2015, from www.simplypsychology.org
- McQuillan, M. (2000). *The narrative reader*. New York; London: Routledge.
- Mesbah, H. (2006). The impact of linear versus nonlinear listening to radio news on recall and comprehension. *Journal of Radio Studies*, 13(2), 187-200.
doi:10.1080/10955040701313222
- Meyer, B. J. F. (1975). *The organization of prose and its effects on memory*. Amsterdam: North-Holland Publishing Company
- Miller, D. & Glover, D. (2002). The interactive whiteboard as a force for pedagogic change: the experience of five elementary schools in an English education authority. *Information Technology in Childhood Education Annual*, 5-19. Retrieved August 29, 2015, from www.athena-s.com/mimio/ITCE200215.pdf
- Mishler, E. (1995) "Models of narrative analysis: A typology", *Journal of Narrative and Life History*, 5(2): 87-123.
- Moore, McCabe & Craig. (2009). *Introduction to the practice of statistics*. W.H. Freeman Publishers. Gordonsville, VA.
- Moreno, R., & Mayer, R. (2007). Interactive Multimodal Learning Environments. *Educational Psychology Review*, 19(3), 309-326.

- Morgan, A. (2012). Language, literacy, literature: Using storytelling in the languages classroom. *Babel*, 46(2/3), 20-29. Retrieved from <http://e-publications.une.edu.au/1959.11/13150>
- Najjar, L. (1998). Principles of educational multimedia user interface design. *Human Factors: The Journal of the Human Factors and Ergonomics Society*, 40(2), 311-311. doi:10.1518/001872098779480505
- National Standards in Foreign Language Education Project. (1996). National standards for foreign language learning: Preparing for the 21st century. Lawrence, KS: Allen Press, Inc.
- Nicholas, B. J., Rossiter, M. J., & Abbott, M. L. (2011). The power of story in the ESL classroom. *Canadian Modern Language Review/La Revue Canadienne Des Langues Vivantes*, 67(2), 247-268.
- Norbury, C., & Bishop, D. (2002). Inferential processing and story recall in children with communication problems: A comparison of specific language impairment, pragmatic language impairment and high-functioning autism. *International Journal of Language & Communication Disorders*, 37(3), 227-251. doi: 10.1080/13682820210136269
- Nunnally, J. (1978). *Psychometric theory* (2d ed.). New York: McGraw-Hill.
- Nuutinen, J., Sutinen, E., Botha, A., & Kommers, P. (2010). From mindtools to social mindtools: Collaborative writing with woven stories. *British Journal of Educational Technology*, 41(5), 753-775.
- Ogasawara, S. (1994). Effectiveness of Using English Captioned Videos on Listening Comprehension Proficiency. *Bulletin of Faculty of Liberal Arts, Nagasaki University, Humanities*, 35(1), 103-114.
- Paivio, A. (1986). *Mental representations: A dual coding approach*. New York: Oxford University Press.

- Paivio, A. (2007). *Mind and its evolution: A dual coding theoretical approach*. Mahwah, NJ: Erlbaum.
- Palmer, B., Harshbarger, S., & Koch, C. (2001). Storytelling as a constructivist model for developing language and literacy. *Journal of Poetry Therapy*, 14(4), 199.
doi:10.1023/A:1017541527998
- Parlett, C. (2012). *Using movies in college psychology classroom curriculums to help students be more empathetic toward individuals with psychological disorders*. Charleston, SC: BiblioBazaar.
- Paul, W. (2005). *Animation: Genre and authorship*. Wallflower Press. London.
- Phelan, J., Kellogg, R., & Scholes, R. (2006). *Nature of Narrative*. Cary: Oxford University Press. ProQuest ebrary. Web. 5 May 2015.
- Plowman, L. (1996). Narrative, linearity and interactivity: making sense of interactive multimedia. *British Journal of Educational Technology* 27 (2) 92-105.
- Rieber, L. (1990). Animation in computer-based instruction. *Educational Technology Research and Development*, 38(1), 77-86. doi:10.1007/BF02298250
- Rosen, Y. (2009). The effects of an animation-based on-line learning environment on transfer of knowledge and on motivation for science and technology learning. *Journal of Educational Computing Research*, 40(4) p451-467.
- Rumelhart, D. (1975). "Notes on a Schema for Stories." D. G. Bobrow & A. Collins (eds). *Representation and Understanding: Studies in Cognitive Science*. New York: Academic P, 211-35.
- Ryan, M. (2004). *Narrative across media: The languages of storytelling*. Lincoln: University of Nebraska Press.

- Sarbin, T. (2005). If these walls could talk: Places as stages for human drama. *Journal of Constructivist Psychology*, 18(3), 203-214. doi:10.1080/10720530590948737
- Schmider, E., Ziegler, M., Danay, E., Beyer, L., & Buhner, M. (2010). Is it really robust? Reinvestigating the robustness of ANOVA against violations of the normal distribution assumption. *Methodology: European Journal of Research Methods for the Behavioral and Social Sciences*, 6, 147–151.
- Schmidt, M. & O'Brien, D. (1986). Story grammars: Some cautions about the translation of research into practice. *Reading Research and Instruction*, 26, 1-8.
- Schmidt, V. (2005). *Story structure architect: a writer's guide to building dramatic situations & compelling characters*. Cincinnati: Writer's Digest Books
- Schunk, D. (1996). *Learning theories (2nd ed.)*. Englewood Cliffs, New Jersey: Merrill, an imprint of Prentice Hall.
- Serin, O. (2011). The Effects of the Computer-Based Instruction on the Achievement and Problem Solving Skills of the Science and Technology Students. *Turkish Online Journal of Educational Technology*, 10(1), 183-201.
- Smith, C. (2000). Electronic storytelling and high-definition television. *Journal of Film and Video*, 52(1), 3-9. Retrieved from <http://www.jstor.org/stable/20688230>
- South, J.B., Gabbitas, B., & Merrill, P.F. (2008). Designing video narratives to contextualize content for ESL learners: A design process case study. *Interactive Learning Environments*, 16(3), 231–243.
- Stein N. L., & Glenn, C. G. (1979). An analysis of story comprehension in elementary school children. In R. Freedle (Ed.), *Discourse processing: Multidisciplinary perspectives*. Norwood, NJ: Ablex.

- Surani, S., Rao, S., Khimani, A., Surani, S., & Subramanian, S. (2014). Effect of animated movie in combating child sleep health problems. *Chest*, 145(3 Suppl), 446A.
- Sweller, J. (2005). Implications of cognitive load theory for multimedia learning. In R.E. Mayer (Ed.), *The Cambridge Handbook of Multimedia Learning*. New York: Cambridge University Press.
- Tammi, P. (2006). Against narrative. *Partial Answers: Journal of Literature and the History of Ideas*, 4(2), 19-40. doi:10.1353/pan.0.0113
- Thorndyke, P. (1977). Cognitive structures in comprehension and memory of narrative discourse. *Cognitive Psychology*, 9, 77-110.
- Titone, D., Prentice, K., & Wingfield, A. (2000). Resource allocation during spoken discourse processing: Effects of age and passage difficulty as revealed by self-paced listening. *Memory & Cognition*, 28, 1029–1040.
- Tsou, W., Wang, W., & Tzeng, Y. (2006). Applying a multimedia storytelling website in foreign language learning. *Computers & Education*, 47(1), 17-28.
doi:10.1016/j.compedu.2004.08.013
- Wang, M. (2012). *Research on the relationship between story and the popularity of animated movies* (Doctoral dissertation). Retrieved from ProQuest Dissertations & Theses. (AAT 8625740).
- Ward, A. R. (2002). *Mouse morality: The rhetoric of Disney animated film*. Austin, TX: University of Texas Press.
- Way, C. (1988). The effects of story grammar and story interestingness on children's recall and preference of narratives in standardized reading comprehension tests. *ProQuest*

- Dissertations and Theses*, 208-208 p. Retrieved from
<http://search.proquest.com/docview/303546959?accountid=2837>
- Weinstein, G. (2006). Learners' lives as curriculum. In G. Beckett and P. Miller (Eds.), *Project-based second and foreign language education* (pp. 159-165). Greenwich, CT: Information Age Publishing.
- Woodall, W., Davis, D., & Sahin, H. (1983). From the boob tube to the black box: Television news comprehension from an information processing perspective. *Journal of Broadcasting*, 27, 1-23.
- Woodford, K. & Bancroft, P. (2005). 'Multiple Choice Questions Not Considered Harmful'. Australian Computing Education Conference 2005 – Research and Practice in Information Technology, Vol. 42. Pp.1-8. 13
- Yang, C. (2009). A case study of the use of short stories in a junior secondary ESL classroom in Hong Kong. *International Journal of Learning*, 16(1), 35-46.
- Zahoor, M., & Janjua, F. (2013). Narrative comprehension and story grammar. *International Journal of Academic Research in Business and Social Sciences*, 3(9), 604-618.
- Zhao, Y. (2005). The future of research in technology and second language education. In Y. Zhao (Ed.), *Research in technology and second language learning: Developments and directions* (pp. 445-457). Greenwich, CT: Information Age Publishing, Inc.

APPENDICES

Appendix A: A Summary of SME Tasks

To ensure reliability and validity, the experts review and approve:

1. Instructional materials – content, language, suitability and objectives
2. Instructional tests – content, language, suitability and objectives
3. Survey - content and objectives
4. Narrative – story, structure, script, storyboard, animated movies
5. Language proficiency level
6. Instructional design and technology
7. Technical functionality

Appendix B: Recall Test

Lord of the Flies – From the Eyes of the Missing Boys**Recall Test**

Computer No: _____

Total score: _____

Instruction:

This test is based on the animated movie you have just watched, the *Lord of the Flies – From the Eyes of the Missing Boys*, adapted from the novel *Lord of the Flies* by William Golding. This test contains ONE question. Write the answer that best answers the question. Use next page if you need more space to write.

Question

What were the major events of the story according to how they appeared in chronological order or time sequence (what happened first, second, next, etc.)?

Appendix C Comprehension Test

Lord of the Flies – from the eyes of the missing boys
Comprehension Test

Computer No: _____

Total score: _____/12

Instruction:

This test is a summary test based on the animated movie you have just watched, *the Lord of the Flies – From the Eyes of the Missing Boys*, adapted from the novel *Lord of the Flies* by William Golding. This test contains 12 questions. Circle the answer choice that best answers the question.

1. One of the rules that Ralph made is that the only way someone may speak at the meeting is if they are holding the conch (seashell). Why was this rule made?
 - a. To establish order so that the boys can take turns to speak
 - b. To keep the beast from harming the boys
 - c. To ensure that the fire does not get out of control
 - d. To protect the boys and make them feel safe

2. Which of the following most closely describes Ralph's character?
 - a. The most intelligent boy on the island
 - b. Morally responsible, with common sense and kindness
 - c. The most violent, and evil
 - d. Short-tempered, with anger issues

3. Which of the following most closely describes Piggy's character?
 - a. Knowledgeable, intelligent, and wise
 - b. Cruel, with an impulsive (spontaneous) actions
 - c. Kind, with a short-tempered behavior
 - d. Aggressive (violent) and bossy (dictator) behavior

4. Ralph and Jack use fire for different reasons. Ralph uses fire because _____.
 - a. He wants the smoke to be a signal for help
 - b. He wants the smoke to burn the island
 - c. He wants to scare the beast away
 - d. He wants to cook food to feed himself

5. What do Piggy's eyeglasses symbolize?
 - a. Intellectualism
 - b. Firestarter
 - c. Truth
 - d. Power

6. What does the conch (seashell) symbolize?
 - a. Law and order
 - b. Nature and sound
 - c. Desire and hope
 - d. Savagery (violence) and order

7. Towards the end of the story the significance (the importance of the use) of the conch (seashell) changed? How?
 - a. It has lost its influence as a tool for keeping order.
 - b. It has gained more and more power and influence as a tool for keeping order.
 - c. It became a tool to create chaos (problems) on the island
 - d. It became a symbol of violence (cruelty) and uncivilized (bad) behavior

8. Which is the best description of Jack?
 - a. He is a natural leader and enjoys to lead people
 - b. He is intelligent but is not aware of his brain power
 - c. He is a visionary (far-sighted) and has many admirable (good) characteristics
 - d. He seems like a rebel (go against) and knows how to manipulate (make use of or influence) the boys

9. Although Jack is unable to get the boys to agree to vote Ralph out as their leader, he still manages to overthrow (take over) Ralph's authority. How?
 - a. By influencing the boys to agree that he (Jack) is a better leader
 - b. By forcing the boys to disobey Ralph's authority
 - c. By telling the boys that he (Jack) has more power than Ralph
 - d. By making the boys feel afraid of Ralph

10. What is the significance (meaning) of the first fire on the mountain?
 - a. It shows the boys how much wood they need to keep a fire going
 - b. It shows the boys how easy it is for the fire to get out of control
 - c. It shows the relationships between the boys
 - d. It shows there is no hope for them to be rescued

11. What symbolizes evil on the island?

- a. The storms
- b. The fire
- c. The beast
- d. The face paint

12. Which of the following is a tactic Jack used to try to harm Ralph?

- a. Jack used spies who told him everything that Ralph planned
- b. Jack used camouflage (mask) that prevented Ralph from seeing him (Jack)
- c. Jack stalked (followed) Ralph during the night when it was hard to see
- d. Jack used fire to try to smoke Ralph out of his hiding place

Appendix D: Demographic Survey

Survey

The purpose of this survey is to collect background information for a research based on the animated movie you have just watched, the *Lord of the Flies – From the Eyes of the Missing Boys*, adapted from the novel *Lord of the Flies* by William Golding. It will require approximately 5-8 minutes to complete this survey.

We appreciate the time and effort that this takes and thank you for your cooperation and your contribution and participation.

Instruction: Please provide a response for each of the following questions. Write in or circle your response.

Section I: Demographic

- 1) How old are you? _____ (specify)
- 2) What is your gender? a) Male b) Female
- 3) What is your first language? _____ (specify)
- 4) What is your race or ethnicity? _____ (specify)
- 5) Which of the following best describes the area you come from?
 a) Urban b) Suburban c) Rural
- 6) Which of the following best describes your family income background?
 a) High-income b) Middle-income c) Low-income
- 7) On a scale of 1-5 where “1” means poor and “5” means fluent, rate your English language proficiency level.

1 2 3 4 5

Section II: Content Information

- 1) Are you familiar with the novel *Lord of the Flies* by William Golding?
 a) Yes b) No c) Some

- 2) Rate this statement, "I like learning English as a second language."
- strongly agree
 - somewhat agree
 - neutral
 - somewhat disagree
 - strongly disagreed
- 3) Rate this statement, "I am interested in learning using animated movies."
- strongly agree
 - somewhat agree
 - neutral
 - somewhat disagree
 - strongly disagreed
- 4) Rate your interest in the story, *Lord of the Flies – From the Eyes of the Missing Boys* (in terms of plot, characters, etc.).” Do you have:
- A great amount of interest?
 - A good amount of interest?
 - Some amount of interest?
 - A little amount of interest?
 - No interest at all?
- 5) Rate your preference for a story that is told in chronological order (in the time *order* it happened).

On a scale 1-5, 1 being the least and 5 the most desirable (preferred)

1 2 3 4 5

- 6) On a scale of 1-5 where "1" means the least and "5" means the most, rate the following:

I understand the events of the story in the animated movie.

1 2 3 4 5

I understand the English language of the animated movie.

1 2 3 4 5

I am familiar with how a story is organized (arranged).

1 2 3 4 5

I remember the events in the story clearly.

1 2 3 4 5

I think that a story is more interesting when it is not arranged in the time order it happened (the order is mixed-up).

1 2 3 4 5

7) What is your comment on the organization (arrangement) of the story in the animated movie?

8) What other comments do you have?

9) How would you rate the quality (in terms of audio visual elements: graphics, color, sound) of the animated movie?

a) Poor b) Fair c) Good d) Excellent

APPENDIX E Assumption of Normality (Recall and Comprehension)

Appendix F Tests of Between-Subjects Effects

Directional Measures

			Value
Nominal by Interval	Eta	Group Dependent	.513
		Recall Dependent	.563

Tests of Between-Subjects Effects - Dependent Variable: Recall

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	3976.013 ^a	2	1988.007	34.151	.000	.317
Intercept	551338.907	1	551338.907	9471.317	.000	.985
Group	3976.013	2	1988.007	34.151	.000	.317
Error	8557.080	147	58.211			
Total	563872.000	150				
Corrected Total	12533.093	149				

a. R Squared = .317 (Adjusted R Squared = .308)

Directional Measures

			Value
Nominal by Interval	Eta	Group Dependent	.250
		Comprehension Dependent	.291

Tests of Between-Subjects Effects - Dependent Variable: Comprehension

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	49.000 ^a	2	24.500	6.811	.001	.085
Intercept	7266.240	1	7266.240	2020.080	.000	.932
Group	49.000	2	24.500	6.811	.001	.085
Error	528.760	147	3.597			
Total	7844.000	150				
Corrected Total	577.760	149				

a. R Squared = .085 (Adjusted R Squared = .072)

Appendix G: Gpower A Priori and Statistical Power

F tests - ANOVA: Fixed effects, omnibus, one-way			
Analysis: A priori: Compute required sample size			
Input:	Effect size f	=	0.5
	α err prob	=	0.05
	Power (1- β err prob)	=	0.95
	Number of groups	=	3
Output	Noncentrality parameter λ	=	16.500000
	Critical F	=	3.142809
	Numerator df	=	2
	Denominator df	=	63
	Total sample size	=	66
	Actual power	=	0.953475
F tests - ANOVA: Fixed effects, omnibus, one-way			
Analysis: Post hoc: Compute achieved power			
Input	Effect size f	=	0.3022462
	α err prob	=	0.05
	Total sample size	=	150
	Number of groups	=	3
Output	Noncentrality parameter λ	=	13.702915
	Critical F	=	3.057621
	Numerator df	=	2
	Denominator df	=	147
	Power (1- β err prob)	=	0.917058