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A Comparison of Three Levels of Verbal Redundancy in Multimedia Learning and Its Effects on Memory Retention and Transfer in Legal Professionals

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A COMPARISON OF THREE LEVELS OF VERBAL REDUNDANCY IN
MULTIMEDIA LEARNING AND ITS EFFECTS ON MEMORY RETENTION AND
TRANSFER IN LEGAL PROFESSIONALS

by

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DEDICATION

To Ty and Ashley, two incredibly smart kids who are more awesome than their mom could ever hope to be.

ABSTRACT

This study sought to examine verbal redundancy in multimedia learning and its effects on memory retention and transfer in legal professionals who were randomly assigned to watch one of three multimedia videos. Tests of ANOVA showed no significant differences in performance, mental load, or combined efficiency scores among the three instructional groups, but participants in the complementary text group rated the video with complementary slides as significantly more helpful than the videos with redundant, overloaded text slides and spoken words only. Factorial ANOVA also revealed that the redundant text group with fewer than five years of experience scored significantly lower than other groups. The cognitive load of the learners was discussed and recommendations included assessing the prior knowledge of learners, reducing extraneous and redundant text, and including relevant graphics with words.

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CHAPTER ONE

NATURE AND SIGNIFICANCE OF THE PROBLEM

The Growth of Multimedia Instruction

Multimedia presentations, or presentations that use both words and pictures, abound in today's instructional environments (Clark & Mayer, 2001; Mayer, 2009, 2005). Live and recorded multimedia presentations have become standard in many realms of K-12 and higher education, government, and industry as a means to effectively and efficiently convey information and promote retention and learning (Issa, Schuller, Santacaterina, Shapiro, Wang, Mayer, & DaRosa, 2011; Strauss, Corrigan, & Hofacker, 2011; Yue, Bjork, & Bjork, 2013). For example, Paoletti, Bortolotti, and Zanon (2012) found that university teachers used multimedia slides to help students better understand what is being said and to provide a concise structure for the lecture. Also, Bergen, Grimes, and Potter (2005) reported that television producers have adopted multimedia messaging (e.g., reporters, graphics, and scrolling text) for entertainment, news, sports, and business programming as an effective way to attract and inform television watchers. Additionally the United States Patent and Trademark Office (2013) indicated that their use of multimedia learning has grown tremendously over the past decade due to the overall effectiveness and efficiency of multimedia in dealing with security, budget, and travel constraints.

Despite this abundance of multimedia and the various reasons for its growth, an important key question remains for researchers and ultimately for all types of teachers –

under what conditions are multimedia presentations effective at promoting learning? Multimedia strategies provide instructors with the ability to share a great deal of information simultaneously, but are these redundant ways of presenting information helpful? Or do they provide a level of cognitive overload that hampers the learner's ability to retain and transfer information? More specifically does verbal redundancy, or when spoken words and written text are presented at the same time, enhance or impede learning? The research in this area is broad and mixed, and more is still needed (Adesope & Nesbit, 2011; Mayer, 2005, Mayer & Johnson, 2008; Sweller, 2005b). This study seeks to contribute to research and help answer and clarify the questions about learning by looking at multimedia redundancy, specifically verbal redundancy and its effects on memory retention and transfer in legal professionals.

Multimedia Instruction in Legal Education

Multimedia instruction in legal education and legal practice has also seen recent growth. Legal education researchers have examined the instructional delivery methods for law schools and law school professors, finding an increase in the use of multimedia technology in law school classrooms including online classrooms (Nievelstein, van Gog, Dijck, & Boshuizen, 2011; Sullivan, Colby, Wegner, Bon, & Shulman, 2007).

Professional legal education for practicing attorneys has also incorporated multimedia instruction into practice (Faulconbridge & Muzio, 2009; Matasar, 2010). For example, the United States Department of Justice's National Advocacy Center, the national training center for federal legal personnel, has incorporated principles of multimedia into its faculty development training; however, its effects on learning have not been empirically examined (M. B. Pfister, personal communication, August 23, 2013).

Additionally, there is recent research on the benefits of including multimedia instruction when attorneys and judges are dealing with jurors (Hewson & Goodman-Delahunty, 2008; Otto, Applegate, & Davis, 2007; Reisburg, 2007).

This growth in multimedia instruction may not have come without a cost. As Stuckey (2007) noted, although many multimedia methods are available, “virtually no legal educators have educational training or experience when they are hired, and few law schools provide more than cursory assistance to help new faculty develop their teaching skills (p.106).” Similar to what Stuckey has suggested with legal schools, Devlin and Downie (2012) recommend that “as the legal profession begins to design and deliver these [programs] it should take into consideration the insights of the educational literature on lifelong learning (p. 9).” Unfortunately, these insights gleaned from educational literature may or may not be generalizable to legal professionals, such as attorneys; the research for this particular group is scant. Many researchers call for additional research for specific types of learners (Adesope & Nesbit, 2011; Mayer, Heiser, & Lonn, 2001; Mayer & Johnson, 2008; Yue, Bjork, & Bjork, 2013).

Verbal Redundancy in Multimedia Instruction

A typical multimedia presentation may include in any combination lecture or spoken text as well as accompanying overhead slides (e.g., PowerPoint slides), videos, and handouts that contain written text, images, charts, and or graphs (Clark & Mayer, 2011; Schnotz, 2005). Often instructors think that by providing multiple representations of the same material (e.g., spoken words, written words, pictures) the learner is kept interested and can choose his or her preference for learning, resulting in better learning (Gyselinch, Jamet, & Dubois, 2008; Moreno & Mayer, 2000). Students also seem to

prefer redundant information, often by the inclusion of lecture, slides, and handouts, stating that instructors who provide this type of multimedia are more interesting and easier to follow (Fenesi, Heisz, Savage, Shore, & Kim, 2013; Paoletti, Bortolotti, & Zanon, 2012). Again, the question arises whether multimedia presentations are effective learning methods, and if so, what types of multimedia presentations are most effective (i.e., best promote learning)?

Verbal redundancy in multimedia occurs when learners are simultaneously presented with text and speech, most commonly through concurrent lecture (live or recorded) and accompanying overhead slides (Adesope & Nesbit, 2011; Cooper, 2009; Savoy, Proctor, & Salvendy, 2009). Three primary forms of verbally redundant multimedia presentations have been commonly observed and researched: (1) a verbal lecture with text-laden, on-screen slides that are read verbatim; (2) a verbal lecture with text-laden, on-screen slides that are summarized or paraphrased; and (3) a verbal lecture with shorter, on-screen slides containing key points, takeaways, and/or short summaries of information (Adesope & Nesbit, 2011; Ardac & Unal, 2008; Mayer & Johnson, 2008; Moreno & Mayer, 2000). Teachers and students tend to agree that redundant information that is a concise, organized summary of key points (referred to as complementary verbal redundancy) is preferred. This has also been confirmed by multiple research studies (Adesope & Nesbit, 2011, Mayer & Johnson, 2008; Paoletti, Bortolotti, & Zanon, 2012). However, others have found that although students prefer redundant information, they actually learn less as indicated by retention and transfer tests (Amare, 2006; Savoy, Proctor, & Salvendy, 2009; Yue, Bjork, & Bjork, 2013). The explanations for these and

other findings tend to focus on the working memory, cognitive load, and multimedia learning theories and models.

Verbal Redundancy and Four Theoretical Models of Cognition

Learning from multiple modes of information delivery, such as is the case with verbal redundancy, is based on the ability to process disparate sources of information and this ability is constrained or limited (Gyselinch, Jamet, & Dubois, 2008; Mayer, 2005; Sweller, 2010). Verbal redundancy and how it relates to learning and learning constraints is based on four theoretical models: (1) Baddeley's (2000) working memory model, or the idea that working memory is controlled by four components that work together to temporarily store and process information; (2) Sweller's (2005a; 2010) cognitive load theory, the theory that working memory is limited in the amount of information that can be processed at one time; (3) Mayer's (2005) cognitive theory of multimedia learning, the theory that information is processed in limited-in-capacity visual and verbal channels; and (4) Schnotz' (2005) integrative model of text and picture comprehension, or the idea that learners build mental models and representations by combining or integrating visual and verbal channels.

All four models posit that regardless of the type of information and how it is conveyed through multimedia instruction, the learner must still process and integrate separate pieces of information into a coherent, understandable whole (Mayer 2009; Schnotz, 2005; Sweller, 2010). This processing requires cognitive resources and is limited in the amount that can be processed in working memory components (verbal and visual) at any one time. Therefore, presenting redundant sources of information becomes problematic when the learner must choose between attending to and processing two or

more sources of information. With verbal redundancy, which primarily involves written and spoken text, the learner must choose and coordinate between reading and listening and this takes away from the cognitive resources available for learning. This effect has been demonstrated in research with mixed results (Adesope & Nesbit, 2011; Jamet & Le Bohec, 2007; Leahy, Chandler, & Sweller, 2003; Mayer, Heiser, & Lonn, 2001).

Overview of Research Methodologies

Measuring multimedia learning and creating multimedia instruction involves assessing the cognitive load of learners (Clark, Nguyen, & Sweller, 2006; DeLeeuw & Mayer, 2008; Paas, Tuovinen, Tabbers, & Van Gerven, 2003). Brunken, Plass, and Leutner (2003, p. 55) define cognitive load as “a theoretical construct, describing the internal processes of information processing that cannot be observed directly.” They posit that there is no ideal single measure, but rather four specific measures of cognitive load according to objectivity (subjective or objective) and causal relationship (indirect or direct). Table 1.1 includes specific measures of each.

Table 1.1

Measures of Cognitive Load

		Causal Relationship
Objectivity	Indirect	Direct
Subjective	Self-reported mental effort	Self-reported stress
		Self-reported helpfulness of materials
Objective	Physiological measures	Measures of brain activity (fMRI, EEG)
	Behavioral measures	
	Learning outcome measures	Dual task performance

Objective Measures

According to Mayer (2005), two major goals for multimedia learning are remembering and understanding. Remembering is commonly measured through retention testing, and understanding is commonly measured through transfer testing (Mayer & Johnson, 2008). Retention and transfer testing are learning outcome measures, or indirect, objective measures of cognitive load. These types of measures have been used in numerous, published studies as valid and reliable measures of cognitive load (Leahy, Chandler, & Sweller, 2003; Mayer & Johnson, 2008; Moreno & Mayer, 2000). However, Brunken, Plass, & Leutner (2003) suggest that differences in learning outcome measures could also be associated with the measurements themselves or the traits and prior knowledge of the learners. Prior knowledge in particular has been shown to affect intrinsic cognitive load (Adesope & Nesbit, 2011; Clark, 2008; Gyselinck, Jamet, & Dubois, 2008; Leahy, Chandler, & Sweller, 2003; Sweller, 2005).

Although more difficult to measure, researchers can also use neuroimaging measures of brain activity (fMRIs or EEGs) or dual task performance to reach beyond measures of learning to a more direct, objective measure of cognitive load. Dual task performance involves simultaneously performing two tasks that involve the same visual or verbal components of working memory (Brunken, Plass, & Leutner, 2003). This approach has been commonly used to assess working memory and, more recently, in cognitive load research (Kalyuga, Chandler, & Sweller, 2004; Schuler, Scheiter, & Genuchten, 2011). However, dual task performance is not the ideal measure to assess learning outcomes, because the learning outcomes are purposely manipulated by the dual tasks (Brunken, Plass, & Leutner, 2003).

Subjective Measures

Common, subjective measures of cognitive load include self-evaluations of how much mental effort was involved in the activity (an indirect, subjective measure), how much stress was involved in the activity (a direct, subjective measure), and the perceived helpfulness of the materials in contributing to understanding and learning (a direct, subjective measure) (Brunken, Plass, & Leutner, 2003; Paas, Tuovinen, Tabbers, & Van Gerven, 2003). Although these measures are easy to create and implement, it has not been made clear how subjective measures relate to actual cognitive load and whether learners are valid evaluators of themselves (Brunken, Plass, & Leutner, 2003; Fenesi, Heisz, Savage, Shore, & Kim; Savoy, Proctor, & Salvendy, 2009). Paas, Tuovinen, Tabbers, and Van Gerven (2003) and Paas and Van Merriënboer (1994), however, posit that valid and reliable measures of cognitive load have been obtained through a unidimensional, subjective scale assessing perceived amount of mental effort.

Combining Objective and Subjective Measures

Because of their questioned validity, subjective measures have been used in multiple studies as an additional measure of cognitive load, in complement and comparison to objective measures, in order to determine mental efficiency (Cooper, 2009; Diao & Sweller, 2007; Paoletti, Bortolotti, & Zanon, 2012; Yue, Bjork, & Bjork, 2013). According to Paas, Tuovinen, Tabbers, and Van Gerven (2003, p. 63), “the combination of performance and cognitive load measures has been identified to constitute a reliable estimate of the mental efficiency of instructional methods.” In this article, the authors cite Paas and van Merriënboer’s (1993) foundational approach of combining

subjective mental effort and performance to determine a relative condition efficiency measure, a measure that has been used successfully in multiple empirical studies.

Research Designs

To measure cognitive load, researchers commonly conduct experimental comparisons based on random assignment and control, where one group receives the instructional method and the other does not (Adesope, & Nesbit, 2011; Mayer, 2005). Results are typically analyzed for statistical significance through comparisons of mean retention and transfer scores of the experimental group and the comparison group ($p < .05$, or the probability that the difference between the two groups is due to chance is less than 5%). Researchers measure learning outcome measures (mean retention and transfer scores) by asking questions such as “Describe how lightning strikes” (for retention) and “What can you do to prevent lightning strikes?” (for transfer). Results can be measured immediately after the learning event or after a certain amount of time (e.g., 1 month after the event). Efficiency in cognitive load is often measured through the following measure of efficiency (E): $E = (P - ML)/\sqrt{2}$, where P is the measure of performance and ML is the measure of mental load (Clark, Nguyen, & Sweller, 2006; Paas, Tuovinen, Tabbers, & Van Gerven, 2003; Paas and van Merriënboer’s, 1993).

The Present Study

More research is needed to help validate theories of working memory, cognitive load, and cognitive theories of multimedia learning (Adesope & Nesbit, 2011; Schuler, Scheiter, & van Genuchten, 2011). The goal of this study is to contribute to and expand current empirical research in these areas and address the four problems aforementioned: (1) that there is little research on legal professionals and learning; (2) that there is a need

for comparing multimedia instructional design models and their effects on cognitive load and learning; (3) that there is a need for more valid research designs with a well-defined control group; and (4) that there is little research specifically focused on verbal redundancy and learning.

Observations of Verbal Redundancy in Legal Education

The interest in this work was sparked by working as an instructional specialist at a national legal training center for attorneys and legal professionals (e.g., paralegals, legal assistants, administrative support staff). After years of observing presentations/lectures primarily by attorneys, particularly lectures regarding rules, laws, and statutes, it was observed that instructional methods consisted predominantly of lecture accompanied by text-dense slides, which were both displayed on an overhead projector and included in the materials. During these presentations, the instructor would discuss the rule or statute while the rule or statute was displayed, would discuss case cites that supported the rule or statutes while a description of the case was displayed, and would discuss recommendations for practice while the recommendations for practice were displayed.

This practice seemed to contrast with many of the recommendations and findings in regard to theories about human cognition and learning, particularly in the area of cognitive load and cognitive theories of learning (Mayer, 2005; Mayer & Johnson, 2008; Mayer & Moreno, 2003). Evaluation comments also indicated that many students did not particularly like this method of lecture and text and would write statements such as “The slides are too dense,” “This is information overload,” or “Why do we need the instructor if all his material is included on the slide?” These observations were a catalyst for questions of whether this instructional method was overload, and particularly overload

through verbal redundancy. Also, even if by description this instructional method (lecture and verbose on-screen text) may be considered verbal redundancy, was it impeding learning for the attorney, someone who is both educated and skilled in reading comprehension, verbal persuasion, and writing prowess (Stuckey, 2007; Sullivan, Colby, Wegner, Bon, & Shulman, 2007)?

Research Questions

Four questions regarding cognitive load and learning drove this research: (1) What level of verbal redundancy (spoken words only, overloaded verbal redundancy, or complementary verbal redundancy) leads to more effective retention and transfer of learning in adult legal professionals?; (2) What level of verbal redundancy leads to more efficient learning (a combination of performance and mental load) in adult legal professionals?; (3) What level of verbal redundancy do adult legal professionals find most helpful for understanding and learning?; and (4) Does prior legal knowledge and experience affect cognitive load?

Implications of the Current Study

The implications of this work are mutually beneficial to human cognition and instructional design. Through research on cognitive load and multimedia learning, researchers are finding out more about the human cognitive processes involved in learning (Adesope & Nesbit, 2011; Mayer & Johnson, 2008). Researchers are then taking what is learned about human cognition and development and developing recommendations/prescriptions for instruction and managing load that, in turn, support, leverage, and make efficient use of those same cognitive processes. This work has implications for instruction, particularly for instructional design, instructor delivery

practices, and materials development. As Sweller (2005a) suggests, “Good instructional design is driven by our knowledge of human cognitive structures and the manner in which those structures are [organized] into a cognitive architecture (p. 19).”

Additionally, by understanding more closely the outcomes of learning such as retention and transfer, as well as the variables contributing to both, researchers can test traditional theories and hypotheses about the notion of cognition that may perhaps change the way we think about learning and cognitive development. For example, Moreno and Mayer (2000) found through several studies that concurrent music and written text did not affect dual-task performance, leading them to question whether and how much the phonological loop (the verbal component of working memory) is involved in the processing of written text. According to Adesope and Nesbit (2011), “researchers, teachers, and instructional designers lack a comprehensive account of the different conditions under which spoken-written materials facilitate or inhibit learning and have little empirical guidance toward a theory of how learning processes are affected by verbal redundancy (p. 251).”

Examining how legal professionals process verbal redundancy can help create valid recommendations for how instructors develop and deliver instruction to these same legal professionals, while also validating and/or questioning current theories of cognition. For example, the cognitive theory of multimedia learning currently recommends the following two prescriptions (there are a total of twelve) for learning, based upon research findings: (1) people learn better when extraneous information is omitted (according to the coherence principle); and (2) people learn better when redundant information, or redundant ways of presenting information, is excluded (according to the redundancy

principle). If this prescription holds for legal professionals, then delivering instruction could consist of non-redundant, intrinsic-only information, an instructional design method that is not as common as the redundant lectures described earlier. However, if this prescription does not hold for legal professionals, perhaps there are different or additional considerations for cognition that need to be considered.

Lastly, this work can be particularly helpful to learning and training in the workplace, where resources are always at a premium and organizations are requiring training to show a return on learning investment. In addition, people are being asked to do more complex tasks, and information overload abounds. Improved learning processes can help people do their jobs more effectively and efficiently, and organizations can look to scientific findings to apply to their situations and justify training in the workplace.

Limitations of the Current Study

As with all research, there is a limit on what can be collected, compared, and analyzed. This study seeks to compare only verbal redundancy and will not specifically examine or address visual redundancy (e.g., graphics) or visual processes that may be and are likely involved. Also, this study compares only three selected instructional design models – lecture with no on-screen text, lecture with complementary text, and lecture with redundant overloaded text. There are certainly many more instructional methods that can test verbal redundancy. This study also only uses three of the four types of measures of cognitive load – an indirect, objective measure of retention and transfer; an indirect, subjective measure of perceived mental effort; and a direct, subjective measure of perceived helpfulness of materials. Direct, objective measures of cognitive load, such as measures of brain activity and dual task performances, will not be conducted. Lastly,

this study looks at only legal professionals; therefore the results may not be generalized to a different population.

Document Organization and Definitions

This document is organized into five chapters. Chapter one has described the nature and significance of the problem. Chapter two reviews the literature on verbal redundancy and the four theories of cognition mentioned earlier, as well as provides a justification for the current study. Chapter three outlines the methods used in the study. Chapters four and five present the findings and discuss the results and implications for multimedia instruction based on four theories of cognition. For purposes of this study, the following definitions apply:

- (1) Multimedia Instruction – Instruction that includes, in any combination, lecture or spoken text, as well as accompanying overhead slides (e.g., PowerPoint slides), videos, and handouts that contain written text, images, charts, and or graphs (Clark & Mayer, 2011; Schnotz, 2005).
- (2) Redundancy (in multimedia instruction) – The concurrent presentation of identical information either through the auditory channel (verbal redundancy, see below) or the pictorial channel (visual redundancy) (Mayer & Johnson, 2008; Sweller, 2005b)
- (3) Complementary Redundancy (in multimedia instruction) – The concurrent presentation of summary or similar, but not identical, information through either the auditory or pictorial channels (Fenesi, Heisz, Savage, Shore, & Kim, 2013; Mayer & Johnson, 2008)

- (4) Verbal Redundancy (in multimedia instruction) – The condition when learners are simultaneously presented with text and speech, most commonly through concurrent lecture (live or recorded) and accompanying overhead slides (Adesope & Nesbit, 2011; Cooper, 2009; Savoy, Proctor, & Salvendy, 2009).
- (5) Legal Professionals –Employees (attorneys, paralegals, legal assistants, and administrative support staff) who work in offices, divisions, and/or agencies supported by the legal training center in this study.

CHAPTER TWO

REVIEW OF RELEVANT LITERATURE

Verbal Redundancy and Four Theoretical Models of Cognition

As mentioned in chapter one, verbal redundancy and how it relates to learning and learning constraints is based on four theoretical models: (1) Baddeley's working memory model, (2) cognitive load theory, (3) the cognitive theory of multimedia learning, and (4) the integrative model of text and picture comprehension (Baddeley, 2000; Gyselinck, Jamet, & Dubois, 2008; Mayer, 2005; Schnotz, 2005). This chapter describes each of those theories and how they relate to verbal redundancy, then looks at recent literature and the learning outcomes associated with verbal redundancy to justify and explain the framework for the current study.

Baddeley's Working Memory Model

The working memory framework conceptualized by Baddeley (2000) consists of four components that work together to temporarily store and process information, contributing to learning and long-term memory recall. The four components of working memory are: (1) the phonological loop, for processing spoken words and sounds; (2) the visuospatial sketchpad, for processing printed words and pictures; (3) the episodic buffer, for temporarily storing information from the phonological loop and the visuospatial sketchpad, and; (4) the central executive, which controls and directs all the other components. Information is processed independently in two areas, the phonological loop

and the visuospatial sketchpad, then combined by the central executive (with temporary help from the episodic buffer) to send the new information to long-term memory.

With respect to multimedia learning and verbal redundancy, the working memory model and its components are limited in capacity; therefore an overload of information can compromise any or all of the four components. For example, when adult learners read, they mentally rehearse the written text they see, transferring information from the visuospatial sketchpad to the phonological loop. If learners are presented with additional auditory information, such as narration (e.g., a lecture or narrated video), the phonological loop may become overloaded, thereby reducing the amount of information received and processed (Baddeley, 2000; Gyselinck, Jamet, & Dubois, 2008; Schuler, Scheiter, & van Genuchten, 2011).

Cognitive Load Theory

Sweller's Cognitive Load Theory (2005a, 2010) builds on Baddeley's Working Memory Model and the idea that working memory is limited in the amount of information that can be processed at one time. As a result, the learner can become cognitively overloaded based on the following three types of load: (1) intrinsic load, or the mental effort imposed by the content or subject matter itself and the learner's prior knowledge and interactivity among elements of the content; (2) extraneous (non-essential) load, or the mental effort imposed by the instruction that does not support the content or the learning outcomes; and (3) germane (essential) load, or the mental effort imposed by the structure of the instruction that supports essential learning and learning outcomes. The goal for cognitive load theory is efficiency in learning (Clark, Nguyen, &

Sweller, 2006; Sweller, 2005b), which can be brought about by reducing the extraneous load, managing the intrinsic load, and increasing the germane load.

According to Sweller (2005a), verbal redundancy “deals with multiple sources of information in which one source is sufficient to allow understanding and learning while the other sources merely reiterate the information of the first source in a different form” (p. 27). Instructors can reduce extraneous load by eliminating the redundancy. For verbal redundancy, this would involve paring down to only one mode of instruction, for example, lecture or narration without accompanying written text, such as on-screen slides. Sweller (2005a) does state, however, that cognitive load is additive, so there may be instances where redundancy does not hamper learning. For example, intrinsic cognitive load is influenced by the prior knowledge of the learner. For those with high prior knowledge, intrinsic load may be reduced, offsetting the overall effects of the redundancy/extraneous load.

Cognitive Theory of Multimedia Learning

The Cognitive Theory of Multimedia Learning supports both Baddeley’s working memory model and Sweller’s theory of cognitive load and expands upon that with the following three assumptions about human cognition: (1) information is dually processed in separate verbal and visual channels; (2) each channel is limited in the amount of information that can be processed at one time; and (3) the mind must actively and selectively, process, encode, store, and retrieve information. The goal of the Cognitive Theory of Multimedia Learning is to determine through research how humans cognitively process information and how instructors can leverage those different ways to produce the most effective learning (Mayer, 2005; 2009).

Regarding the processing of spoken and written text (Mayer, 2005), spoken words are initially received by the ears and then processed in the verbal component of working memory. Printed words are initially received by the eyes, but then are also processed in the verbal component of working memory. Therefore, with redundant text, there may be overload in the verbal component of working memory due to the two inputs of information. The visual channel could also be overloaded if text and graphics are shown at the same time. Two of Mayer's recommendations for multimedia instruction address verbal redundancy. The first is the redundancy principle, which states that "People learn more deeply from graphics and narration than from graphics, narration, and on-screen text...except when the on-screen text is short, highlights the key action described in the narration, and is placed next to the portion of the graphic it describes" (Mayer & Johnson, 2008). The second is the coherence principle, which indicates that "people learn more deeply from a multimedia message when extraneous material is excluded rather than included" (Mayer, 2005, p. 183). Despite these prescriptions, other factors such as prior knowledge, pacing of the presentation, and the level of redundancy, may reduce the tendency for overload to occur.

Integrative Model of Text and Picture Comprehension (Schnotz, 2005)

Schnotz's (2005) integrated model of picture and text comprehension builds upon the previous three concepts and theories and makes the following four assumptions: (1) comprehending text and pictures takes place in a limited-in-capacity working memory, a sensory/input register, and in a long-term memory; (2) written and spoken text is processed in the verbal channel of working memory, and visual pictures and sounds are processed in the pictorial channel of working memory; (3) both the verbal and pictorial

channels of working memory are limited; and (4) to comprehend or learn, individuals must build mental models and representations by combining all available working memory with long-term memory. The model specifically addresses reading comprehension, listening comprehension, visual picture comprehension, and sound comprehension, as well as the combination of these different processes to bring about meaningful learning.

Verbally redundant information, according to Schnotz (2005), would include any combination of written and spoken text. Both would be processed in the verbal component of working memory and could contribute to increased cognitive load due to the learner attempting to synchronize what is being said with what is being heard. Since we do not read and listen at the same rate, this introduces an extra cognitive load on the learner's working memory, and in effect, learning.

As mentioned, verbal redundancy primarily involves written and spoken text, and the learner must choose and coordinate between reading text and listening to spoken narration. According to the four theories and models of cognition, this coordinated effort should limit the cognitive resources available for learning; however, this effect has been demonstrated in research with mixed results (Adesope & Nesbit, 2011; Ardac & Unal, 2008; Jamet & Le Bohec, 2007; Leahy, Chandler, & Sweller, 2003; Mayer, Heiser, & Lonn, 2001). The next section will discuss these findings.

Current Research on Verbal Redundancy and Cognitive Load

The following recent studies are relevant to and provide a foundation for the present study. Their findings, interpretations, and limitations provide evidence and

justification for this study and how this study seeks to contribute to and move beyond the current body of research.

Partially Redundant On-Screen Text

Previous experiments on verbal redundancy focused mainly on narration and on-screen or written text. Findings were mixed with some outcomes supporting non-redundant information (Jamet & Le Bohec, 2007; Kalyuga, Chandler, & Sweller, 2004; Mayer, 2005; Sweller 2005b) and others supporting verbally redundant information (Mayer, Heiser, & Lonn, 2001; Moreno & Mayer, 2002). Two experiments by Mayer and Johnson (2008) expanded the definition of redundant information to include short, key phrases instead of identical text (complementary text) and led to Mayer's revision of the redundancy principle and the cognitive theory of multimedia learning. In these two experiments, college students watched short, multimedia presentations on how lightning and brakes work, and each presentation contained narration, diagrams, and either partially redundant or non-redundant on-screen text. Results indicated that the group who watched the presentation with partially redundant text (i.e., short, key phrases placed next to the on-screen diagram) performed better than the non-redundant group on retention of information ($d = 0.45$ for experiment one, $d = 0.70$ for experiment two). There was no significant effect for transfer outcomes. Prior knowledge was not assessed, as those with prior knowledge of the subject matter were eliminated from the study.

Mayer and Johnson concluded that short, redundant text that highlights key learning points (complementary text) supports learning because it encourages essential and generative processing (i.e., selecting and processing relevant words and images) without overloading the learner with extraneous material. Limitations of this study as

related to the current study were that students were all college students who were tested in laboratory-type conditions, the instructional presentation was very short (less than ten minutes), and the retention and transfer tests assessed only factual and conceptual knowledge (Anderson & Krathwohl, 2001). In addition, it is not clear from the study the extent to which the verbal redundancy contributed to the overall improved outcomes or whether and to what extent the graphics that were included in the instructional message also contributed to improved outcomes.

Issa et al. (2011) looked specifically at medical students and the effects of multimedia instruction by comparing pre-test and post-test retention and transfer scores from two lectures – a “traditional” lecture containing verbally redundant and overloaded information, and an “improved” lecture with reduced on-screen text (partially redundant) and increased use of graphics based on the cognitive theory of multimedia learning. Researchers found through repeated-measures ANOVA analysis that the improved lecture group significantly improved retention and transfer scores compared to the traditional lecture group ($F = 10.2, p = 0.016$ and $F = 7.13, p = 0.0081$, respectively).

Similarities of this study to the current study are that: (1) the participants for this study (medical students) were slightly closer in age to young, legal professionals than undergraduate college students; (2) the instructional lectures were longer in duration than other similar studies (fifty minutes versus less than ten minutes); and (3) the lectures were conducted in a real classroom environment as opposed to a laboratory environment. However, as with the experiments by Mayer and Johnson, only factual and conceptual knowledge was assessed. Also, because the multimedia improvements included visual

and verbal modifications, it is not known to what extent the reduction of verbal redundancy contributed to the improved retention and transfer outcomes.

Varying Levels of Verbal Redundancy

To expand verbal redundancy beyond identical narration and text, other researchers have looked at three or more varying levels of verbal redundancy. Paoletti, Bortolotti, and Zanon (2012) examined the use of three types of slide presentations in university lectures, looking specifically at varying levels of verbal redundancy. University students ($N = 163$) watched one of three redundant presentations: (1) an oral lecture with fully redundant text slides, (2) an oral lecture with partially redundant text slides containing key words, and (3) an oral lecture with paraphrased slides. Results of an assessment of recall and transfer (factual, conceptual, and procedural knowledge) showed that text slides containing key words best promoted learning, followed by the fully redundant presentation. The paraphrased presentation resulted in the smallest amount of recall and transfer. Results for the paraphrased group were significantly lower than the other two groups for both recall ($p < 0.00001$) and transfer ($p < 0.00001$). This corresponds with Mayer and Johnson (2008) that a certain type of verbal redundancy is best for learning – lecture combined with written key text and summaries. Interestingly, although there were differences in learning outcomes, there were no significant differences between learners' perceptions of the comprehensibility of the conditions; all three were judged to be comprehensible. The researchers reasoned that verbal redundancy, although beneficial when partially redundant, reaches a threshold level where additional redundancy (i.e., fully redundant slides) interferes with the learner's

cognitive load, or his or her ability to integrate written and spoken text, as well as extraneous material.

Although a good comparison of verbal redundancy, the researchers did not look at non-redundancy, or verbal lecture only. Participants were also Italian university students who were required to participate for a course assignment. Students in each group listened to a live in-class lecture, and it is unclear if the presentations were exactly the same or if the instructor controlled or constrained questions. Perhaps the addition of questions, pacing, or learners' prior knowledge (which was not addressed) affected outcomes.

Yue, Bjork, and Bjork (2013) also looked specifically at the amount of verbal redundancy in multimedia learning, or “the extent to which varying degrees of correspondence between on-screen text and narration in a multimedia lesson affect recall and transfer” (p. 266). In two experiments, researchers showed undergraduate psychology college students a multimedia presentation about the life cycle of a star with varying levels of narration and on-screen text. In both experiments, groups who were shown presentations with a small amount of discrepancy between narration and on-screen text performed better on measures of learning and retention than groups who watched either identical on-screen text and narration or presentation with abundant and discrepant on-screen text (pre-tests were given to assess prior knowledge). The researchers posited that a minimal amount of verbal redundancy (e.g., including key words and short sentences on on-screen text) was a “desirable difficulty,” as it provided a signal to the learner for what was important but did not overload the cognitive resources needed to remember and understand the information. As found in other studies (Amare, 2006;

Cooper, 2009; Savoy, Proctor, & Salvendy, 2009), even though they learned better with abridged on-screen text, students preferred identical narration and on-screen text.

Limitations of this study, as identified by the researchers, included non-significant findings for transfer of information in both experiments ($p = .06$, $p = .08$), the elimination of learners with high prior knowledge, and the short length of the instructional segments (less than ten minutes in duration). Also, results were not compared with an audio-only group, and only factual and conceptual knowledge was assessed.

A third study of varying levels of verbal redundancy by Savoy, Proctor, and Salvendy (2009) examined the use of PowerPoint slides and retention of information. Sixty-one university students listened to either a traditional lecture with no accompanying text or a lecture accompanied with on-screen text through the use of PowerPoint slides. Students in the traditional lecture with no PowerPoint group scored fifteen percent higher on a text of retention and transfer than students in the lecture with PowerPoint group; however, the differences in scores were not significant. As mentioned with earlier studies, even though students in the non-PowerPoint lecture scored higher, they preferred having the lecture with the PowerPoint slides. A significant limitation of this study was that the traditional lecture was referred to as “chalk and talk,” so the professor may have included written text on the chalkboard. Additionally, there was no indication of the amount of text included on the PowerPoint slides and whether principles of multimedia instruction were followed when creating PowerPoint slides. There was also no pre-test assessment conducted to determine prior knowledge, and participants were only assessed on what they could conceptually recall about the topic (human factors in engineering).

Lastly, Fenesi, Heisz, Savage, Shore, and Kim (2013) compared outcomes for audio only presentations, verbally identical or redundant presentations, and complementary presentations, or presentations that included narration and short, key words, phrases, and sentences. They found that the complementary or non-redundant group performed significantly better on a test of understanding than the audio only group ($t(64) = 2.44, p < .05, d = 0.61$) and the redundant group ($t(64) = 2.96, p < .01, d = 0.81$). Both the redundant group and the complementary group perceived that they understood more of the instruction than they actually did, supporting the idea that although students may prefer redundant information, it does not translate into an increased understanding of the information. Results were in alignment with Mayer and Johnson's (2008) revised redundancy principle of the cognitive theory of multimedia learning, or that adding short, key word redundancy to presentations does not hamper learning. Three limitations for this study were that: (1) the participants were undergraduate psychology students (who may or may not be similar in characteristic to legal professionals); (2) there was no pre-test assessment conducted to determine prior knowledge; and (3) only factual and conceptual knowledge (no procedural knowledge) was assessed.

A Meta-Analysis of Verbal Redundancy in Multimedia Learning

Perhaps the largest collection of research on verbal redundancy in multimedia learning environments is Adesope and Nesbit's (2011) meta-analysis of fifty-seven independent experimental studies focusing on spoken-written presentations, spoken-only presentations (presentations with no written or on-screen text), and written-only presentations. These two researchers found a significant advantage for learners when presentations were spoken and written than when presentations were spoken only (there

was no significant advantage for spoken-written presentations over written-only presentations). However, the effect size for spoken-written presentations was not large ($E = 0.29$, $p < .05$), and the mixed results were found to be related to variables such as learners' prior knowledge, the pacing of the instruction, and the inclusion/exclusion of graphics. Spoken and written presentations were most effective for learners with little prior knowledge, presentations that were system-paced, and presentations that did not contain graphics. Presentations that contained key terms and summaries accounted for most of the advantage of spoken-written presentations, and Adesope and Nesbit concluded that these types of presentations provide signaling for the learner. Signaling is prescribed in the cognitive theory of multimedia learning as a way to direct the learner to important concepts and takeaways.

Limitations of these studies as related to the current study are that most of the research participants were undergraduate college students (the remainders were elementary and middle school students), and the domain areas examined were general subject areas, such as computer literacy, meteorology, and reading. None of the studies focused on adult professionals in the workplace, and none of the domain areas focused on legal information. Also, the researchers' conclusion that signaling helped learners did not address extraneous information as suggested by cognitive load theory or the overload of the verbal channel as described by the cognitive theory of multimedia learning and the integrated model of text and picture comprehension. Examining adults and legal professionals may help determine if variables such as prior knowledge, pacing, and inclusion of graphics affect adult learners' retention and transfer from multimedia learning in the same ways as younger learners.

Additionally, legal professionals (particularly attorneys) are trained to “think like lawyers,” or read and analyze complex facts and information for precise understanding (Stuckey, 2007), and as a result may be better equipped to integrate and comprehend verbally redundant pieces of information and ignore extraneous information. This construct is called perceptual grouping, and several researchers have found that higher-knowledge learners were able to do this with minimal cognitive effort (Ardac & Unal, 2008; Kalyuga, Chandler, & Sweller, 2004, 2000; Van Gog & Scheiter, 2010). However, others have found that verbal redundancy coupled with difficult material (a high intrinsic load) can still have detrimental effects despite learners’ capabilities for processing information (Bergen, Grimes, & Potter, 2005; Gyselinck, Jamet, & Dubois, 2008; Sweller, 2010).

Summary and Limitations of Current Research

Based on recent research findings, verbal redundancy in the form of key words and short sentences (complementary verbal redundancy) seems to best promote retention and transfer in learners. This effect holds true when compared to: (1) exact or identical verbal redundancy; (2) abundant paraphrasing or overly detailed verbal redundancy; and (3) non-redundancy or narration-only presentations (Adesope & Nesbit, 2011; Fenesi, Heisz, Savage, Shore, & Kim, 2013; Issa, et al., 2011; Mayer & Johnson, 2008; Paoletti, Bortolotti, & Zanon, 2012; Savoy, Proctor, & Salvendy, 2009; Yue, Bjork, & Bjork, 2013). When relating these results to the cognitive theories mentioned, complementary verbal redundancy contributes to learning and prevents cognitive overload in the following ways: (1) it allows the learner to connect and process two forms of verbal input without overloading the phonological loop, or the verbal component of working memory;

(2) it helps the learner form the needed schema for learning without cognitively overloading the learner with extraneous information (cognitive load theory); (3) it signals the learner without overloading the verbal channel (cognitive theory of multimedia learning); and (4) it allows the learner to build mental models and representations without overloading the verbal channel (integrated theory of multimedia learning). Verbatim verbal redundancy and verbal overload do not allow the learner to efficiently and effectively process information because the learner over-extends his or her cognitive resources to connect and make sense of disparate information.

Limitations in the studies mentioned included the homogeneity of the participants who were namely undergraduate students, the lack of participants with prior knowledge, the short lesson lengths (most were less than ten minutes), the assessment of only factual and/or conceptual knowledge (no procedural knowledge), and the inclusion of graphics in the research, making it difficult to isolate the effects of verbal redundancy.

Justification for the Current Study

This study seeks to address the limitations mentioned in the previous section in the following ways: (1) by focusing on legal professionals, who may have an advanced level of education and skillset in understanding and processing complex information; (2) by assessing prior knowledge and experience when looking at verbal redundancy and retention and transfer outcomes; (3) by using an actual and longer-in-duration training module that focuses on conceptual and procedural knowledge; and (4) by eliminating all graphics (e.g., images, charts, graphs) from the presentation to isolate the effects of verbal redundancy on learning outcomes.

CHAPTER THREE

METHODS

Research Questions, Hypotheses, and Variables

As mentioned earlier, three questions regarding cognitive load and learning drove this research: (1) What level of verbal redundancy (spoken words only, overloaded verbal redundancy, or complementary verbal redundancy) leads to more effective retention and transfer of learning in adult legal professionals?; (2) What level of verbal redundancy leads to more efficient learning (a combination of performance and mental load) in adult legal professionals?; (3) What level of verbal redundancy do adult legal professionals find most helpful for understanding and learning?; and (4) Does prior legal knowledge and experience affect cognitive load?

The hypotheses to the first three research questions were that spoken words with complementary text will (1) lead to more effective retention and transfer of learning, (2) lead to more efficient learning, and (3) be perceived as most helpful for understanding and learning. The spoken words only condition is predicted to be the next most effective, efficient, and helpful level of verbal redundancy, followed by the spoken words with redundant, overloaded text condition, which is predicted to result in the least amount of retention and transfer of learning, the least efficient learning, and the least helpful method for understanding and learning. According to the theoretical foundations and research findings in Chapter 2, verbal redundancy in the form of key words and short

sentences (complementary verbal redundancy) best promotes retention and transfer in learners when compared to overloaded verbal redundancy and spoken words only (Adesope & Nesbit, 2011; Fenesi, Heisz, Savage, Shore, & Kim, 2013; Issa, et al., 2011; Mayer & Johnson, 2008; Paoletti, Bortolotti, & Zanon, 2012; Savoy, Proctor, & Salvendy, 2009; Yue, Bjork, & Bjork, 2013). Complementary verbal redundancy allows the learner to connect and process two forms of verbal input without overload and form the needed schema and mental models for learning (Baddeley, 2000; Sweller, 2005a; Mayer, 2005; Schnotz, 2005).

The hypothesis to the fourth question is that prior legal knowledge and experience will not affect the cognitive load of the learners in this research. In Chapter 2, many studies posited that prior domain knowledge d been shown to affect intrinsic cognitive load (Adesope & Nesbit, 2011; Clark, 2008; Gyselinck, Jamet, & Dubois, 2008; Leahy, Chandler, & Sweller, 2003; Sweller, 2005). However, no studies measured or remarked upon the effect of prior general knowledge and experience on cognitive load. Therefore, it is predicted that those with general prior legal knowledge and experience will equally be affected by verbal redundancy and its effects on learning and transfer.

This research involved three dependent variables: (1) performance, measured by learning outcomes scores on a test of knowledge and application of the topic “Fundamental Principles of Bankruptcy” (an indirect, objective measure); (2) perceived mental effort (an indirect, subjective measure) measured by subjective scale; and (3) helpfulness of the materials (a direct, subjective measure) also measured by subjective scale. The two independent variables were (1) group assignment to one of the three

instructional methods as described in the first research question above, and (2) years of experience in the legal profession.

Participants and Procedures

Participants included a total of 394 legal professionals who enrolled in legal courses at the training center between October 2014 and March 2015. Power analysis using G*Power (Faul, Erdfelder, Buchner, & Lang, 2009) resulted in a minimum sample size of 147. 273 of the 394 professionals participated in the final study, and 121 participated in a pilot study designed to assess the viability of the final study procedures and validate and test the reliability of the assessment used in the final study. Pilot study participants, procedures, and results are presented in a subsequent section titled “Test Construction and Validation.”

To ensure a mix of criminal, civil, and appellate attorneys and legal support staff with varying levels of practice and experience, legal professionals attending twenty-four different training courses (a total of 1601 people) were invited to participate. To solicit their participation, an individually addressed email was sent describing the study and requesting assistance. Participation was voluntary, and individuals were informed that they would not receive any payment or credit for their participation. Those invited were also informed that the topic of the research would be fundamental principles of bankruptcy and that only those with very little knowledge of bankruptcy were desired/needed for the study. A sample of the initial email request is included in Appendix A.

Participants were randomly assigned to one of three instructional conditions: (1) a spoken word only condition, watching a video presentation with no on-screen text; (2) an

overloaded verbal redundancy condition, watching a video presentation with verbose on-screen slides containing multiple, paraphrased sentences and complex terminology; and (3) a complementary verbal redundancy condition, watching a video presentation with on-screen slides containing key points and short summaries. Twelve individuals requested to attend a specific day due to scheduling conflicts and were placed in the instructional condition slated for their requested day. None of the participants knew in advance which instructional condition they were assigned but were rather given a date, time, and location to attend. All sessions started at 7:30 am, and instructional conditions/day assignments were rotated over the course of the research to avoid same-day testing bias. Late attendees were not allowed to participate and were not reassigned to another condition or day.

Participants watched in groups a 16-minute recorded, multi-media instructional session on the fundamental principles of bankruptcy. A recorded video was used to control for content, multimedia design manipulations (conditions), and pacing of the presentation. Immediately after the video, participants completed an electronic comprehension (retention and transfer) test to evaluate factual, conceptual, and procedural knowledge of the information, as well as a questionnaire to determine their perceived satisfaction with the assigned video and information and their perceived helpfulness of the materials (on-screen slides). An additional question assessed whether the video or content had been previously viewed; none of the 291 study participants indicated that they had previously seen the video and/or content.

The entire process took approximately thirty minutes. The researcher introduced the video, the process, and the procedures. Participants were instructed to remain silent

and take no notes during the video, after the video, and prior to the post-test and questionnaire. Participants were also told that they could opt out of any part of the procedures at any time; none did. Verbal instructions given to all participants and all groups are included in Appendix B.

Instructional Methods

The three videos used in this research study were modified versions of an actual video created by the training center during 2013. The original video was a sixteen minute lecture by an expert attorney on fundamental principles of bankruptcy. The original video included frames of the expert talking, interspersed with slides containing text and graphics to help visualize and explain the major areas of bankruptcy. In order to isolate the effects of verbal redundancy, these slides and graphics were removed before creating the modified videos. The remaining “talking head” lecture became the video used for the spoken word only condition.

For the other two experimental conditions the modified video was further modified by adding on-screen text in the form of presentation slides. These slides were interspersed throughout the video as related to the framing and topics of the conversation. The video used for the complementary verbal redundancy condition was created by adding section header slides, key-point, and short-summary takeaway slides that complemented the conversation in the video. The video used for the overloaded verbal redundancy condition was created by adding multiple, redundant sentences, complex terminology and definitions, and additional information. Both conditions were similar to conditions created in other studies (Fenesi, Heisz, Savage, Shore, & Kim, 2013; Issa, et al., 2011; Mayer & Johnson, 2008; Paoletti, Bortolotti, & Zanon, 2012; Yue, Bjork, and

Bjork, 2013). All three modified videos were reviewed for accuracy and flow and approved by the subject matter expert in the original video. Sample video frames and slides incorporated into the videos used for the overloaded verbal redundancy condition and the complementary verbal redundancy condition are included in Appendix C.

Instrumentation

The instrumentation for this study consisted of: (1) a questionnaire to collect demographic information (e.g., criminal/civil practice, experience as an attorney/legal professional); (2) a test to assess retention and transfer of the information presented in the video; and (3) a questionnaire to assess perceived mental effort and helpfulness of materials. Assessments for each experimental condition were created using SNAP Surveys evaluation software. A sample electronic assessment (for the complementary verbal redundancy condition) is included in Appendix D.

Test Construction and Validation

The test to measure understanding and application was developed in conjunction with the subject matter expert in the video and was based on Bloom's revised taxonomy of educational objectives (Anderson & Krathwohl, 2001) and multiple-choice test development methods (Gronlund & Waugh, 2009; Haladyna, 2004; Rivera, 2007; Shrock & Coscarelli, 2007). Test construction procedures included the following steps: (1) determining the instructional intent, (2) specifying the domain, (3) item development, (4) item review, and (5) test development.

The first step in developing the bankruptcy examination involved articulating a clear learning outcome, which in this case, was the acquisition of knowledge and application of fundamental bankruptcy procedures. A plan, or table of specifications, as

shown in Table 3.1, was then created to specify the appropriate sample of tasks to represent the domain (evidence of content validity). The domain was based on materials for the teaching portion of the video. Retention and transfer questions included assessments of the fundamental principles of bankruptcy, as well as the ability to transfer new information to hypothetical bankruptcy scenarios. Lastly, the test questions were written by closely following the set of specifications and item writing guidelines contained in earlier-referenced multiple-choice test development methods.

Table 3.1

Table of Specifications

Content	Knowledge	Transfer	Total	Percentage
History of Bankruptcy	1	1	2	7
Goals of Bankruptcy	1	0	1	3
The Bankruptcy Code	2	0	2	7
Bankruptcy Players	4	5	9	30
Types of Bankruptcy	4	3	7	23
The Bankruptcy Process	4	5	9	30
Total	16	14	30	100
Percentages	53	47	100	

The initial set of questions was sent to two subject matter experts to ensure that questions (1) were adequate and appropriate for the domain; (2) functioned as intended, avoiding irrelevance, unsuitable difficulty, ambiguity, clues, or bias; and (3) were arranged properly with clear directions. A sample set of initial questions and subject matter experts' comments and changes are included in Appendix E. All final changes were approved by the principal subject matter expert who created the original bankruptcy principles video. The final number of test questions for the pilot study was 31.

Two questions were used to assess perceived mental effort and helpfulness of materials. The question used to assess perceived mental effort was the question developed and used by Paas and van Merriënboer (1993) – “In answering the preceding questions/problems, I invested...” Responses were recorded on a nine-point category scale from (1) very, very low mental effort to (9) very, very high mental effort. Cronbach’s alpha, or the reliability coefficient, was $\alpha = 0.90$ for this question. The question used to assess helpfulness of materials was patterned after the Paas and van Merriënboer (1993) format, and was written as “Were the PowerPoint slides shown in the video (or ‘Were the absence of PowerPoint slides in the video’) helpful or hindering in understanding the lecture material?” Answers were recorded using a similar nine-point category scale with responses ranging from (1) very, very hindering to (9) very, very helpful. Only two questions were used to assess perceived mental effort and helpfulness of materials (one question for each measure) because according to Paas, Tuovinen, Tabbers, and van Gerven (2003, p. 66), “reliable measures can also be obtained with unidimensional scales.”

Pilot Study Methods and Results

As mentioned, 121 legal professional participated in a pilot study designed to assess the viability of the final study procedures and validate and test the reliability of the assessment used in the final study. The importance of pilot studies has been demonstrated by many researchers, and the procedures followed in this pilot were adopted based on their common recommendations and findings (Baker, 1994; Lancaster, Dodd, & Williamson, 2004; Simon, 2011; van Teijlingen & Hundley, 2011). Pilot study methods included: (1) in-depth, “talk-through” interviews, (2) larger-scale piloting of

questions and processes, and (3) formal item review and analysis. Modifications were made during all stages of the pilot study, and none of the pilot study participants or the results of their assessments were included in the final study procedures or results.

“Talk-Through” Interviews

As recommended by van Teijlingen and Hundley (2011), initial assessment questions, instructions, and procedures were reviewed by conducting individual “talk-through” interviews with six legal professionals from the target audience (who were also similar to the participants in the final study). Observations and changes made as a result of the interviews included the following:

- The majority of the participants did not read the instructions but immediately began answering questions, so the instructions were placed on a separate page before the questions.
- One participant suggested adding to the verbal and written instructions, “If you do not know the answer to a question, you may leave the question blank or make your best selection based on what you know.”
- One participant suggested separating two questions because he changed the answer to the question based on the information in the succeeding question.

Pilot Administration

Pilot procedures were the same as the final study procedures. Participants were recruited from those attending classes at the training center and randomly assigned to one of the three instructional groups. In addition to the previously described instruction, pilot study participants were informed that they were part of the pilot group designed to validate the test being used in the final study and were asked to complete an additional

question at the end of the assessment to provide feedback and/or suggestions for improvement of the video, the test, and/or the process. Participants watched the electronic video and completed the assessment questions, which are included in Appendix F.

Forty-nine of the 104 pilot study participants commented on ways to make improvements; these comments are included in Appendix G. Four comments specifically addressed concern about three questions:

- (Item 1) “Some states have different bankruptcy codes” (true/false). Participants considered this question’s wording confusing and tricky.
- (Item 19) “Banca rotta means” (multiple choice). Participants considered this question too easy.
- (Item 30) “The US Trustee can perform all of the following tasks, EXCEPT” (multiple choice). Participants considered this question’s wording confusing.

There were no comments regarding the administration of the pilot.

Item Analysis

Classical test theory procedures (difficulty, discrimination, distractor analysis, reliability) as suggested by researchers (Gronlund & Waugh, 2009; Haladyna, 2004; Rivera, 2007; Shrock & Coscarelli, 2007) were used to analyze all items, and Microsoft Excel and SPSS to calculate statistics.

Descriptive Statistics

All 121 pilot study participants completed the examination. One participant indicated that he/she had previously seen the video and/or the content; therefore, his/her scores were not included in the analyses. The mean score for the 31 test questions was

24.09; median and mode were 25 and 26, respectively, with a standard deviation of 4.01.

Scores ranged from 13 to 31.

Difficulty and Discrimination Indices

Table 3.2 provides the difficulty and discrimination indices for six items identified with low difficulty (.90 or greater) and low discrimination (.30 or lower) (Haladyna, 2004). All six questions were very easy for the audience, with low discrimination among high and low scorers.

Table 3.2

Difficulty and Discrimination Indices

Item	Difficulty p-values	Discrimination
3	.94	.12
4	.96	.19
5	.98	.07
16	.96	.20
18	.98	.30
19	.95	.11

Two questions (items 30 and 31) had negative discriminations (-0.20 and -0.16, respectively). Item 30 was also identified in two participants' subjective comments as being worded in a confusing way.

Distracter Analysis

Looking at distracter frequencies, items 7 through 14 contained unsuccessful distracters, as no one or very few participants selected the options "Chapter 6" and "Chapter 8," which are not actual types of bankruptcies. Items 3, 4, 5, 16, 18, and 19, easy questions according to each difficulty index, contained distracters that were selected

by none or very few students. Items 20, 22, 23, and 25 each contained one distractor selected by very few students.

Reliability Indices

The reliability of the test was assessed using the split-half method. The Spearman-Brown equal length computed to .71, and Cronbach's alpha coefficient was .74. Factors are considered reliable when the Cronbach's alpha values are 0.7 or higher (Kline, 1999).

Test Modifications

Looking at participant comments, difficulty, discrimination, and distractor indices, as well as using Haladyna's (2004) guidelines for evaluating test items, the following changes were made and incorporated into the final study:

- Item 19 was determined to be too easy and was eliminated.
- Items 7 through 14 and items 22 and 25 contained "Chapter 6" and "Chapter 8" as distractors. These distractors were eliminated (items 7 through 14) or changed to "Chapter 12" (items 22 and 25) to reflect only actual types of bankruptcies.
- Item 30 contained "confusing wording" and a negative discrimination so the question was modified to remove the word "EXCEPT."
- Items 3, 4, 20, and 23 contained poor distractors (i.e., few/no one selected these distractors), which were changed to more relevant distractors
- Items 1, 5, 6, and 18, although easy questions, were deemed by the subject matter expert as critical questions that should remain unchanged.

Final Study Data Analysis

Since modifications were made to the pilot test, the reliability of the final test was assessed using the split-half method. The Spearman-Brown equal length computed to .74, and Cronbach's alpha coefficient was .75. Again, factors are considered reliable when the Cronbach's alpha values are 0.7 or higher (Kline, 1999).

To assess the cognitive load of learners, results from the final study only were analyzed for statistical significance through comparisons of (1) mean performance scores (indirect, objective measures), (2) self-reported mental load scores (indirect, subjective measures), (3) combined performance and mental load (efficiency) scores, and (4) helpfulness of materials scores (direct, subjective measures) of the experimental groups. Significance was set at $p < .05$, or the probability that the difference between the two groups is due to chance is less than 5%. One-way analyses of variance (ANOVA) were conducted to assess group differences in outcomes/scores, perceptions of mental load, efficiency scores, and perceptions of the helpfulness of materials, with Tukey post-hoc analyses to assess specific, significant differences between groups. Additional factorial ANOVAs were computed to address possible interactions between participant experience level and instructional group. As mentioned earlier, power analysis using G*Power (Faul, Erdfelder, Buchner, & Lang, 2009) resulted in a minimum sample size of 147, or 16 in each of the nine interaction groups.

As mentioned earlier, efficiency in cognitive load is often measured through Paas & van Merriënboer's (1993) measure of efficiency, $E = (P - ML) / \sqrt{2}$, where P is the measure of performance and ML is the measure of mental load (Clark, Nguyen, & Sweller, 2006; Kalyuga, Chandler, & Sweller, 1999; Paas, Tuovinen, Tabbers, & Van

Gerven, 2003). According to Paas, Tuovinen, Tabbers, and Van Gerven (2003, p. 63), “the combination of performance and cognitive load measures has been identified to constitute a reliable estimate of the mental efficiency of instructional methods.”

It is important to note that although the self-reported mental load and helpfulness of materials questions are ordinal data, because they include nine categories, they were analyzed as continuous data. According to multiple researchers (Carifio & Perla, 2007; Glass, Peckhan, & Sanders, 1974; Johnson & Creech, 1983; Lubke & Muthen, 2004; Zumbo & Zimmerman, 1993) it is usual practice to consider these scores as continuous data.

CHAPTER FOUR

ANALYSIS

As previously mentioned, measuring multimedia learning and creating multimedia instruction involves assessing the cognitive load of learners (Brunken, Plass, & Leutner, 2003; Clark, Nguyen, & Sweller, 2006; DeLeeuw & Mayer, 2008; Paas, Tuovinen, Tabbers, & Van Gerven, 2003). This section analyzes cognitive load for each of the four research questions – test performance, mental load, helpfulness of materials, and effects of prior experience – and describes the findings of the final study.

Test Performance

The overall average test score for all three instructional groups (273 participants, 91 in each group) was 21.42 out of 30 (71.4% questions answered correctly), with a standard deviation of 4.47. Scores ranged from a low of 6 questions answered correctly to a high of 30 questions answered correctly. To address the first research question – what instructional method or level of verbal redundancy (spoken words only, spoken words with overloaded text, or spoken words with complementary text) leads to better retention and transfer in adult legal professionals – mean test scores, standard deviations, and analysis of variance (ANOVA) were computed. Individual group all, retention-only, and transfer-only question results are included in Table 4.1.

Table 4.1

Mean Differences in Test Scores Among Groups

Variable	Spoken Only			Redundant			Complementary			<i>F</i>	<i>p</i>
	<i>N</i>	Mean	SD	<i>N</i>	Mean	SD	<i>N</i>	Mean	SD		
Performance	91	21.98	4.38	91	21.21	4.79	91	21.08	4.21	1.081	.341

For all questions, the spoken words only group scored highest ($M = 21.98$), followed by the redundant text group ($M = 21.21$) and the complementary text group ($M = 21.08$). However, based on a one-way ANOVA, the differences among the three groups were not statistically significant ($F = 1.081, p > .05$).

To address research question four, possible differences in test scores as a function of the two independent variables, group assignment and years of experience, were also explored. As mentioned earlier, prior knowledge has been shown to affect intrinsic cognitive load (Adesope & Nesbit, 2011; Clark, 2008; Gyselinck, Jamet, & Dubois, 2008; Leahy, Chandler, & Sweller, 2003; Sweller, 2005), and those with legal experience may have a reduced amount of cognitive load. To examine these possible differences, a 3 x 3 between subjects factorial ANOVA was computed, and a significant interaction effect was found ($F = 2.273, p < .05$).

Because the interaction between experience level and instructional group was significant, the experience simple main effects – the differences among the three experience levels for each of the three instructional groups – were examined. To control for Type I error rate across the three simple effects, the alpha level for each was set at .0167 ($\alpha/3 = .05/3$). A significant difference among experience levels was found in the redundant text group. Table 4.2 shows that participants with fewer than five years of

experience scored significantly lower ($M = 16.81$) than participants with five to fewer than ten years of experience ($M = 21.59$) and participants with greater than ten years of experience ($M = 22.32$).

Table 4.2

Descriptive Statistics For Group and Experience

Group	Experience	N	Mean	SD
Spoken Only	<5 years	12	21.75	3.86
	5-<10 years	17	21.82	4.39
	>=10 years	62	22.06	4.52
	Total	91	21.98	4.37
Redundant	<5 years	16	16.81*	6.29
	5-<10 years	17	21.59	3.92
	>=10 years	57	22.32	3.88
	Total	91	21.21	4.79
Complementary	<5 years	10	21.00	2.87
	5-<10 years	21	21.33	3.64
	>=10 years	59	20.98	4.66
	Total	91	21.08	4.21
Total	<5 years	38	19.47	5.28
	5-<10 years	55	21.56	3.90
	>=10 years	178	21.79	4.39
	Total	273	21.42	4.47

*Mean difference is significant at $p < 0.0167$

Mental Load and Efficiency

The overall average perceived mental load score for all three instructional groups was 5.56 out of 9, with a standard deviation of 1.175. Scores ranged from a low of 1 to a high of 9. To address the second research question – what instructional method or level

of verbal redundancy (spoken words only, spoken words with redundant, overloaded text, and spoken words with non-redundant, complementary or summary text) leads to more efficient learning in adult legal professionals – mean test scores, standard deviations, and analysis of variance (ANOVA) were computed. Individual group results are included in Table 4.3.

Table 4.3

Mean Differences in Mental Load Scores Among Groups

Variable	Spoken Only			Redundant			Complementary			<i>F</i>	<i>P</i>
	<i>N</i>	Mean	SD	<i>N</i>	Mean	SD	<i>N</i>	Mean	SD		
M. Load	91	5.68	1.19	91	5.55	1.25	91	5.44	1.07	.966	.382

For the mental load question, the spoken words group invested the most mental effort ($M = 5.68$), followed by the redundant text group ($M = 5.55$) and the complementary text group ($M = 5.44$). However, based on a one-way ANOVA, the differences among the three groups were not statistically significant ($F = 0.966$, $p > .05$).

To discover possible differences in test scores as a function of the two independent variables, group assignment and years of experience, a 3 x 3 between subjects factorial ANOVA was also computed. No significant interaction effect was found ($F = 1.283$, $p > .05$).

Combined Test Performance and Mental Load (Efficiency Scores)

To compute overall efficiency scores, performance and mental load scores were converted to z-scores and entered into the formula $E = (P - ML) / \sqrt{2}$. To fully address the second research question – what instructional method or level of verbal redundancy (spoken words only, spoken words with redundant, overloaded text, and spoken words

with non-redundant, complementary or summary text) leads to more efficient learning in adult legal professionals – mean test scores, standard deviations, and analysis of variance (ANOVA) were computed. Individual group results are included in Table 4.4.

Table 4.4

Mean Differences in Efficiency Scores Among Groups

Variable	Spoken Only			Redundant			Complementary			<i>F</i>	<i>P</i>
	<i>N</i>	Mean	SD	<i>N</i>	Mean	SD	<i>N</i>	Mean	SD		
Efficiency	91	.013	.939	91	-.029	1.019	91	.016	.774	.070	.933

For overall efficiency (combined performance and mental load scores), the complementary text group scored the highest ($M = .016$), followed by the spoken words only group ($M = .013$) and the redundant text group ($M = -.029$). However, based on a one-way ANOVA, the differences among the three groups were not statistically significant ($F = 0.070$, $p > .05$).

To discover possible differences in test scores as a function of the two independent variables, group assignment and years of experience (research question four), a 3 x 3 between subjects factorial ANOVA was also computed. No significant interaction effect was found ($F = 1.390$, $p > .05$).

Helpfulness of Materials

The overall average helpfulness of materials score for all three instructional groups was 5.67 out of 9, with a standard deviation of 2.090. Scores ranged from a low of 1 to a high of 9. To address the third research question – what instructional method or level of verbal redundancy (spoken words only, redundant overloaded text, and

complementary text) do legal professionals find most helpful – mean test scores, standard deviations, and analysis of variance (ANOVA) were computed (Table 4.5).

Table 4.5

Mean Differences in Helpfulness of Materials Scores Among Groups

Variable	Spoken Only			Redundant			Complementary			<i>F</i>	<i>p</i>
	<i>N</i>	Mean	SD	<i>N</i>	Mean	SD	<i>N</i>	Mean	SD		
Materials	91	3.78	1.71	91	6.29	1.75	91	6.93	1.27	99.68	.000*

*Mean difference is significant at $p < 0.05$

For overall helpfulness of materials scores, the complementary text group scored the highest/found the PowerPoint slides most helpful for understanding and learning ($M = 6.93$), followed by the redundant text group ($M = 6.29$) and the spoken words only text group ($M = 3.78$). Based on a one-way ANOVA, the differences among the three groups were statistically significant ($F = 99.681$, $p < .05$). Tukey post-hoc analyses showed that there were significant differences among all three groups, shown in Table 4.6.

Table 4.6

Post Hoc Comparisons of Helpfulness of Materials Scores

Group	Group	Mean	<i>P</i>
Spoken Only	Redundant	-2.505*	.000
	Complementary	-3.154*	.000
Redundant	Spoken Only	2.505*	.000
	Complementary	-.648*	.018
Complementary	Spoken Only	3.154*	.000
	Redundant	.648*	.018

*Mean difference is significant at $p < 0.05$

To discover possible differences in test scores as a function of the two independent variables (research question four), group assignment and years of experience, a 3 x 3 between subjects factorial ANOVA was also computed. No significant interaction effect was found ($F = .312, p > .05$).

Summary

Table 4.7 summarizes the results of the data analysis for each of the research questions: (1) What instructional method results in the most effective learning, (2) What instructional method results in the most efficient learning?, What types of materials learners find most helpful when learning?, and (4) Does prior experience affect cognitive load? The two statistically significant findings were (1) lower test scores for the redundant text group with five or fewer years of experience, and (2) higher helpfulness of materials scores for the complementary text group. These results and their implications will be discussed in the next chapter.

Table 4.7

Summary of Findings

Dependent Variable	Basic Findings	Differences Among Instructional Groups	Differences Among Instructional Groups by Experience Level
RQ 1: Test Performance	74% of questions answered correctly.	No significant differences.	Significantly lower scores for redundant text group with <5 years of experience 56% of questions answered correctly
RQ 2: Perceived Mental Load	Answered between “neither high or low mental effort” and “rather high mental effort”	No significant differences.	No significant interaction.
RQ 2: Combined Performance/ Mental Load	N/a	No significant differences.	No significant interaction.
RQ3: Perceived Helpfulness of Materials	Answered between “neither helpful or hindering” and “rather/somewhat helpful”	Significantly higher scores for complementary text group, followed by redundant text group and spoken words only text group.	No significant interaction.

CHAPTER FIVE

CONCLUSIONS

As described in Chapter Two, learning from multiple modes of information delivery requires the ability to process disparate sources of information. Sometimes this ability is constrained or limited by working memory, cognitive load, and the integration of visual and/or verbal components leading to decreased performance, increased mental load, and the combination thereof (Baddeley, 2000; Gyselinck, Jamet, & Dubois, 2008; Mayer, 2005; Schnotz, 2005; Sweller, 2010). This chapter addresses the research findings for this study and how they relate to or differ from previously addressed and other research findings and offers implications for, limitations of, and expansions of this and other research.

Research Questions One and Two

The hypotheses to the first two research questions were that the instructional video with complementary text would lead to better retention and transfer (research question one) and more efficient learning (research question two), followed by the instructional video with spoken words only. The instructional video with redundant overloaded text was predicted to result in the least amount of retention and transfer of learning and least efficient learning. The rationale for this was that the verbal redundancy of the spoken text and written text would cognitively overload the verbal channel, making it more difficult for the participants to process the redundant

information. This rationale has been supported by multiple researchers (Fenesi, Heisz, Savage, Shore, & Kim, 2013; Issa et al, 2011; Kalyuga, Chandler, & Sweller, 2004; Mayer, 2005; Mayer & Johnson, 2008; Paoletti, Bortolotti, & Zanon, 2012; Savoy, Proctor, & Salvendy, 2009; Yue, Bjork, & Bjork, 2013).

However, the results of this study showed that there were no significant differences in retention and transfer performance (research question one), subjective mental load (research question two), or combined performance and mental load (efficiency scores) (research question two) among the three instructional groups. These results are similar to findings by Mayer, Heiser, & Lonn (2001) and Moreno & Mayer (2002). Possible explanations for the absence of significant differences could include the following:

1. The extraneous load was not high enough to overload working memory, or the redundant slides were not too dense allowing the learners to process the verbal redundancy without difficulty. Ardac and Unal (2008) and Yue, Bjork, and Bjork (2013) shared these same conclusions.
2. The germane load was low because of the clear structure and presentation of the video and instructor, offsetting any overload of intrinsic or extraneous load. Mayer and Moreno (2003) and Savoy, Proctor, and Salvendy (2009) made these recommendations for reducing cognitive load during instruction.
3. The intrinsic load wasn't high enough to overload working memory, because "fundamental principles of bankruptcy" was not a difficult topic for legal professionals to understand and process. Mayer & Johnson (2008) and Sweller

(2005) posited that as intrinsic load increases, extraneous and germane processing become more important in reducing overall cognitive load.

Research Question Three

The hypothesis to the third research question was that legal professionals would find most helpful spoken words with complementary text over spoken words only. Spoken words with redundant overloaded text was predicted to be least preferred by legal professionals. In this study, legal professionals did perceive the video containing complementary text to be significantly more helpful than the video with the overloaded slides (redundant text) and the video with spoken words only, and these findings are similar to others cited earlier (Adesope & Nesbit, 2011, Mayer & Johnson, 2008; Paoletti, Bortolotti, & Zanon, 2012; Yue, Bjork, & Bjork, 2013). However, these legal professional also found the redundant text slides to be significantly more helpful than no slides at all (dissimilar to Kalyuga, Chandler, & Sweller, 1999 but exactly as found by Yue, Bjork, & Bjork, 2013).

Multiple researchers (Brunye, Taylor, Rapp, & Spiro, 2006; Van Gog & Schieter, 2010; Yue, Bjork, & Bjork, 2013) have found that on-screen text accompanied by spoken words functions as a “desirable difficulty” for learners. Because there are two sources of verbal information, learners feel they must pay attention to both sources to reconcile the different types of words and slightly disparate content. Other researches (Amare, 2006; Daniel & Woody, 2010; Fenesi, Heisz, Savage, Shore, & Kim, 2013; Paoletti, Bortolotti, & Zanon, 2012; Savoy, Procter, & Salvendy, 2009) have also found that regardless of what is best for their performance, many learners have fixed opinions that PowerPoint presentations, regardless of the amount or type of content, are most helpful.

Perhaps in this study, legal professionals just wanted something to “go by” when listening to the video and preferred the slides because they caught and kept their attention and/or provided a germane structure for the lecture. As noted by one participant, “Other visual tools to explain the concepts in the video would have probably been helpful. I noticed at times during the video that my attention drifted and I had to return to paying attention.” Also, many participants made negative comments about the absence of or recommendations for the inclusion of PowerPoint slides. For example, one participant stated, “For me, lecture only is not a good means of remembering content. I am also a visual learner, and the use of some PowerPoint slides can help in remembering content.” Another remarked, “For me, a PPT would have been very helpful as it would have given me more than one form of instruction during the learning process. I would have heard and seen the information, not just heard the information.”

Research Question Four

Another possible explanation for the lack of significant effects among instructional groups was the prior knowledge of the learner. According to researchers (Adesope & Nesbit, 2011; Brunken, Plass, & Leutner, 2003; Clark, 2008; Gyselinck, Jamet, & Dubois, 2008; Leahy, Chandler, & Sweller, 2003; Sweller, 2005), multimedia effects are most pronounced for low-knowledge learners, and intrinsic load is most influenced by the prior knowledge of the learner. For learners with high prior knowledge, intrinsic load may be reduced, offsetting the overall effects of the redundancy/extraneous load. In this study, the majority of participants (233 of 273) had ten or more years of experience in the legal profession. Although all groups were likely to have been equally inexperienced with fundamental principles of bankruptcy, perhaps

the legal professionals with ten or more years of experience in their profession had developed enough prior general knowledge of rules, principles, and/or structures to better recognize and make sense of bankruptcy language and concepts. Although not bankruptcy experts, they could be considered *adaptive experts* in the field of law.

As described by others (Bransford, 2000; Bransford et al., 2006; Clark, 2008, Gyselinck, Cornoldi, Buboïs, De Beni, and Ehrlich, 2002; Roodenrys, Agostinho, Roodenrys, & Chandler, 2012; Van Gog & Scheiter, 2010), adaptive experts have progressed enough in their field to transfer their field expertise to new and novel areas, thus developing both a crystallized and fluid intelligence to function as “intelligent novices” in a new area. This intelligence, or adaptive expertise, requires both content knowledge and metacognitive skills to solve problems. It is likely therefore that the metacognitive skills of legal professionals are similar for all types of legal knowledge, and legal professionals with greater than five years of experience have developed the ability to “think like a lawyer,” or have become educated and skilled in reading, comprehension, and application (Stuckey, 2007; Sullivan, Colby, Wegner, Bon, & Shulman, 2007). As experts and “intelligent novices,” the experienced legal professionals in this study may have been better able to determine what was important and ignore what was not important when learning fundamental principles of bankruptcy.

This corresponds with the significant research findings in this study that the redundant text group with 5 or fewer years of experience in their profession scored significantly lower than other groups. Although there were only sixteen individuals in this group, power analysis using G*Power (Faul, Erdfelder, Buchner, & Lang, 2009) resulted in a minimum sample size of 16 for each group. For these 16, it is likely that

including the redundant text cognitively overloaded these learners and inhibited learning, similar to what was found by Kalyuga, Chandler, and Sweller (2000). More specifically, the redundant text increased the extraneous and germane loads for this group because the novice learners were unable to draw upon any adaptive expertise to determine important information and/or structure.

Implications for Teaching and Training

As mentioned in chapter one and referenced by multiple researchers (Gyselinck, Jamet, & Dubois, 2008; Kalyuga, Chandler, & Sweller, 2000), instructional designers are challenged to create and provide instruction in the most effective and efficient ways possible. The cognitive theory of multimedia learning (Mayer, 2005; 2009) currently recommends the following two of twelve prescriptions for learning: (1) people learn better when extraneous information is omitted (the coherence principle); and (2) people learn better when redundant information, or redundant ways of presenting information, is excluded (the redundancy principle). However, Mayer and Johnson (2008, p. 385) have also stated that, “Rather than blindly following design rules, instructional designers should always consider how applying a rule will affect the learner’s cognitive processing during learning, particularly the degree to which applying the principle is likely to lead to reducing extraneous processing, managing intrinsic processing, and fostering generative processing.”

This study focused specifically on how legal professionals processed verbal redundancy and the effects of that verbal redundancy on their cognitive load and learning. Based on the findings in this study and how they relate to working memory and cognitive load (or overload), Mayer’s two recommendations also hold for legal professionals.

Along those lines, the following are implications and recommendations for teaching and training legal professionals.

Assess Learners' Prior Knowledge

Instructional methods for high prior knowledge learners are different than those for low prior knowledge learners (Adesope & Nesbit, 2011; Brunken, Plass, & Leutner, 2003; Clark, 2008; Gyselinck, Jamet, & Dubois, 2008; Leahy, Chandler, & Sweller, 2003; Sweller, 2005). Because of this, instructors should assess learners' prior knowledge before selecting instructional methods, perhaps with a pre-course assessment or a course requisite of a certain level of expertise with the content before being selected for or attending the training. If possible, low prior knowledge and high prior knowledge learners should be given separate trainings.

Reduce Extraneous and Redundant Information

When instructing new legal professionals (those with five or fewer year experience), be very careful not to overload them with redundant, verbose words, namely in the form of spoken and written text (typically shown on presentation slides such as PowerPoint). As mentioned, those newer to the legal field may not yet have developed a fundamental schema for learning legal topics and may not be able to distinguish critical information from extraneous information. The complementary condition, or key words and summary text supporting spoken words, directs the learner to the most important information and allows the learner to distinguish and remember important details without becoming overloaded (Adesope & Nesbit, 2012; Paoletti, Bortolotti, & Zanon, 2012; Strauss, Corrigan, & Hofacker, 2011).

Also, although in this study there were no differences in test scores, most learners regardless of experience in their profession preferred and perceived the complementary slides as most helpful. Therefore, instructors should develop complementary slides as an aid for teaching, again especially when instructing novice legal professionals. These types of slides, again with key words and summary text, will not likely overload the newer learners and is perceived by most as most helpful. That teachers and students tend to agree that redundant information that is a concise, organized summary of key points is preferred and considered most helpful for learning has been confirmed by multiple researchers and research studies (Fenesi, Heisz, Savage, Shore, & Kim, 2013; Paoletti, Bortolotti, & Zanon, 2012). Fenesi, Heisz, Savage, Shore, and Kim (2013) also found no comprehensive benefit to the learner of adding redundant text (Fenesi, Heisz, Savage, Shore, & Kim, 2013).

Research Limitations

Although rigorous in the design, implication, and analysis, this study has the following limitations to be considered and addressed:

- The participants in this study were legal professionals who attended training at a national training center during the time of this study. Therefore, the results of this study can only be generalized to that audience.
- The participants were directed not to take notes, which is different than normal learning conditions where learners can choose whether or not to take notes. Because of this, the results of this study cannot be generalized to normal classroom conditions in which learners can choose to take notes.

- Only fifty-eight participants had five or fewer years of experience in their profession, and the redundant text group with significant lower performance scores only had sixteen people. More novices should be added to this study to attain at least 16 participants in each group (Faul, Erdfelder, Buchner, & Lang, 2009).
- The subjective mental load and helpfulness of materials questions were asked after participants completed the performance assessment. These questions should have been asked immediately after watching the video and before taking the performance assessment, since perceptions about the difficulty of the assessment could have negated or diluted any effects from the videos.
- The topic “Fundamental Principles of Bankruptcy” was not likely difficult or intrinsically hard information since it was introductory. This study could be replicated with a more intrinsically difficult legal topic.

Areas for Further Research

Although this study contributes to current research on verbal redundancy, cognitive load, and adult learning, more research could be considered. As mentioned in the previous section, since most of the participants were experienced legal professionals with more than ten years of experience, the effect of verbal redundancy on novice professionals needs to be explored more. This study could be replicated with a more balanced group of novices and experienced people to better measure the effects of verbal redundancy on learners with differing experience, or the effects of prior knowledge on performance and efficiency. Eye tracking studies of experts and novices to see what is observed/ignored during training could also be explored. Previous eye tracking studies

have shown that expertise influences the allocation of attention (Brunye, Taylor, Rapp, & Spiro, 2006; van Gogg & Scheiter, 2010). In addition, this study could also include note-taking as an additional independent variable to determine an effect on performance or efficiency.

This study did not include graphics, and it has been shown that graphics and text reduces cognitive load, increases working memory, and improves learning (Kalyuga, Chandler, & Sweller, 1999; Mayer, 2005; 2009). There is opportunity for overload if too much text and graphics (Mayer & Johnson, 2008; Yue, Bjork, & Bjork, 2013). Additional research on the use of graphics with and without verbal redundancy could be further explored.

It is also interesting to note that the average score for all participants was 21 out of 30 questions answered correctly (a percentage score of 70%). These scores indicate that not all of the content was remembered or applied simply by watching a sixteen minute video. Additional research could address performance and efficiency scores of specific retention and transfer questions as determined by factor analysis. Additional research could also look at other instructional methods (i.e., audio only, written text only) to determine better and additional ways for learners to learn and apply. Lastly, research on additional legal areas, particularly those that may be intrinsically harder, and research for additional individuals beyond legal professionals should be explored.

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APPENDIX A: INITIAL EMAIL TO PARTICIPANTS

From: Angela Dooley

To: [email address]

Cc:

Subject: OLE Dissertation Research - Invitation to Participate

Hello [name],

I am am conducting a PhD/dissertation research study on multimedia learning at the [REDACTED]. You have been selected from those attending training the week of April 6-10 to participate in this study should you so choose.

Part of this research requires assessing understanding of the fundamental principles of bankruptcy, so **we are looking for individuals with no/very little knowledge of bankruptcy to participate in this study.** Participation includes viewing a 15 minute video and completing a 25-30 question assessment. The total time commitment will be approximately 30 minutes, and you will need to attend one (1) session from 7:30 am until approximately 8:00 am. You will be randomly assigned to attend the Wednesday, Thursday, or Friday morning session. It will not interfere with your classes, which begin at 8:30 am each day.

The results (i.e., your answers to the test questions) will be completely anonymous and confidential. Your name will not be collected or recorded, so your scores on the assessment will not be connected in any way with your name or identifying information. Only aggregate (not individual) responses will be used in the dissertation.

If you have not already participated and would like to participate in this research study, please respond to this email. Your participation is completely voluntary, and you may choose to end your participation at any time during the study. There is no payment or credit for your participation in this study.

Any questions regarding the study, your expectations, or the procedures, please feel free to email or call. Thank you!

Angela

Angela M. Dooley

APPENDIX B: VERBAL INSTRUCTIONS TO GROUPS

Thank you so much for participating in this research study. I am Angela Dooley, and I am an Instructional Specialist here at the [REDACTED]. I am also a student at the University of South Carolina, and I'm working on my PhD in Educational Psychology and Research. This is my dissertation, and again, I thank you for supporting me and this work.

For the next 30 minutes you will be watching a 16 minute video on the fundamental principles of bankruptcy and taking an assessment of what you remembered and what you learned.

So you don't accidentally bias the results of the study, I'd like to ask you to observe the following rules:

- Don't look at the exam questions until after you've watched the video
- Don't take any notes
- Don't talk or discuss the content with your neighbor
- I can't answer any questions about the content
- Don't google or look up the answers when taking the exam

When the video is complete, I'll give you the direction for completing the exam. As I mentioned in the email, this is completely voluntary, so if you'd like to opt out of the study at any time, please feel free to do so. Any questions about the process? Let's begin...

(When video is complete)

Thank you for watching the video, and now I'd like for you to answer the assessment questions. Here are the steps:

- Take a look at the exam in front of you and make sure you see "Group 1/2/3" at the top of the exam
- Answer the questions
- If you don't know the answer, leave it blank rather than guess
- Feel free to scroll back and forth through the exam by clicking the "Back" and "Next" buttons, and take as long as you want/need to answer the questions
- When you are finished, click the "Submit" button and the exam will close and you are free to leave

Just remember not to discuss the content with anyone else, as he/she may be attending a later session. I will share answers and results after the study via email. Thanks!

APPENDIX C: SAMPLE FRAMES FROM MULTIMEDIA VIDEOS

Sample video frame (used in all three videos):



Sample slide used in the overloaded verbal redundancy video:

Goals


- There are two major goals of a bankruptcy:
 - 1. Fair administration of the assets so creditors are treated justly (but not necessarily paid), rather than “first come first serve.”
 - 2. The debtor then gets a “discharge” or forgiveness of the debts and a “fresh start” depending on the situation (e.g., medical debts, divorce, accidents, business failures).
- The concept is simple, but the operation can be complex.

Sample slide used in the complementary verbal redundancy video:

Bankruptcy Goals

1. Orderly distribute the debtor's assets (if any) to creditors
2. Give the debtor a fresh start

APPENDIX D: SAMPLE SNAP ASSESSMENT

 <div>Bankruptcy in 2500 Words or Less Assessment (Group 3)</div>	
General Questions/Demographics	
1. What is your primary, general role in your office/district?	
<input type="radio"/> a. Criminal attorney	
<input type="radio"/> b. Civil attorney	
<input type="radio"/> c. Criminal legal support staff	
<input type="radio"/> d. Civil legal support staff	
<input type="radio"/> e. Administrative support staff	
<input type="radio"/> Other (please specify in the box below)	
<input type="text"/>	
2. How long have you served in this general role?	
<input type="radio"/> a. Less than 1 year	
<input type="radio"/> b. 1 year to less than 5 years	
<input type="radio"/> c. 5 years to less than 10 years	
<input type="radio"/> d. 10 or more years	
3. How long have you been an attorney/legal professional/administrative professional?	
<input type="radio"/> a. Less than 1 year	
<input type="radio"/> b. 1 year to less than 5 years	
<input type="radio"/> c. 5 years to less than 10 years	
<input type="radio"/> d. 10 or more years	
4. Have you previously seen this video or this content?	
<input type="radio"/> a. Yes	
<input type="radio"/> b. No	

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ome states have different bankruptcy codes.

- ☐ a. True
- ☐ b. False

he Internal Revenue Service (IRS) can be a creditor in all types of bankruptcy.

- ☐ a. True
- ☐ b. False

he goals for all types of bankruptcy are the same.

- ☐ a. True
- ☐ b. False

eward Five Credit Card Company has an unsecured claim in a Chapter 13 case. Under Chapter 13 bankruptcy protection, Reward Five Credit Card Company will secure payment by filing a proof of claim with the court.

- ☐ a. True
- ☐ b. False

he bankruptcy code is a federal law.

- ☐ a. True
- ☐ b. False

hich of the following statements is FALSE?

- ☐ a. Bankruptcy law was revised in 2005 by BAPCPA.
- ☐ b. Bankruptcy law is divided into distinct chapters
- ☐ c. Bankruptcy law now includes a means test for the debtor.
- ☐ d. Current federal bankruptcy law is called the Bankruptcy Act.

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Matching

11. Match the type of bankruptcy to the correct player.

	Chapter 7	Chapter 11	Chapter 12	Chapter 13
The standing trustee who administers cases for individuals with regular incomes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The trustee who oversees farmer related cases	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The trustee who serves on a panel to take in and sell assets for equity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The debtor who also administers the case	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. Match the type of bankruptcy to the correct description.

	Chapter 7	Chapter 11	Chapter 12	Chapter 13
Business restructures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Family fisherman provisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Individual reorganizations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Individual asset liquidations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. Put the following bankruptcy processes/steps in chronological order from 1 to 4.

	Step 1	Step 2	Step 3	Step 4
A 341 meeting is scheduled.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The debtor gets a discharge.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
An automatic stay is created	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The bankruptcy petition is filed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Multiple Choice

14. A complex set of calculations to determine whether or not a debtor can afford to pay their creditors is called a(n) _____.
☐ a. asset assessment
☐ b. claims test
☐ c. creditor assessment
☐ d. means test
15. ACME Company needs to get a reading on the debtor's situation. ACME should consult the _____.
☐ a. automatic stay
☐ b. bankruptcy schedule
☐ c. proof of claim
☐ d. discharge order
16. Trustee Carmen Smith just received a monthly payment from Shirley Cantu, a debtor who recently filed for bankruptcy. Upon receipt of Shirley's payment, Carmen pays Shirley's federal school loans. In this scenario, Carmen is a _____ trustee.
☐ a. Chapter 7
☐ b. Chapter 11
☐ c. Chapter 12
☐ d. Chapter 13
17. Joe Patel's organic produce farm was recently hit by a tornado that ruined his crops, severely affecting his seasonal revenue. Joe files for bankruptcy protection. Under the appropriate bankruptcy protection, Joe will continue to oversee:
☐ a. farming operations
☐ b. financial operations
☐ c. both farming and financial operations
☐ d. neither farming nor financial operations
18. Horizon Home Lenders has filed a proof of claim with the court on behalf of a defaulted home loan provided to one of their debtors. Horizon's claim is most likely to be considered a _____.
☐ a. priority claim
☐ b. secured claim
☐ c. secondary claim
☐ d. unsecured claim

19. Sanjay Rivers is experiencing financial difficulty due to medical bills and is considering filing for bankruptcy protection. Sanjay's means test shows he doesn't have any money to pay his past debt. For which type of bankruptcy protection should Sanjay file?

- ☐ a. Chapter 7
- ☐ b. Chapter 11
- ☐ c. Chapter 12
- ☐ d. Chapter 13

Multiple Choice (continued)

20. Manny's Garage is filing for Chapter 11 bankruptcy protection. As a result, Manny's Garage will need to do all of the following, EXCEPT

- ☐ a. act as a debtor in possession.
- ☐ b. administer its own bankruptcy case.
- ☐ c. appoint an outside trustee for the garage.
- ☐ d. serve as a fiduciary for its creditors.

21. Keyuana Groves has just filed a petition for Chapter 13 bankruptcy protection. When does Keyuana's automatic stay come into existence?

- ☐ a. After the 341 meeting
- ☐ b. At the time she files the bankruptcy petition
- ☐ c. When she is given a discharge
- ☐ d. When she files the automatic stay request
- ☐ e. There is no automatic stay in a Chapter 13 filing.

22. Brady Thompson is a family fisherman who has filed for bankruptcy protection. Brady will have a trustee oversee his financial operations while he continues to run his tuna boat. Based on the above information, Brady has most likely filed for which type of bankruptcy?

- ☐ a. Chapter 7
- ☐ b. Chapter 11
- ☐ c. Chapter 12
- ☐ d. Chapter 13

23. The Chapter 7 trustee has determined that Hilda Shivers has no assets available to pay her creditors. It is likely that Hilda will

- ☐ a. receive a discharge.
- ☐ b. submit a plan to pay her creditors when assets become available.
- ☐ c. file for Chapter 13 bankruptcy protection.
- ☐ d. All of the above
- ☐ e. None of the above.

24. The US Trustee can perform which of the following tasks?

- ☐ a. Appoint other trustees to oversee the bankruptcy process.
- ☐ b. Assist agencies in filing proofs of claim.
- ☐ c. Conduct 341 meetings.
- ☐ d. Oversee the bankruptcy process.
- ☐ e. The US Trustee can perform all of the above tasks.

25. Sari Ubert has recently filed for Chapter 13 bankruptcy protection. Which debt will she most likely have to pay first?

- ☐ a. Her credit card bills
- ☐ b. Her medical bills
- ☐ c. Her motorcycle loan
- ☐ d. Her unpaid taxes

26. In answering the preceding questions/problems, I invested

- ☐ a. very, very low mental effort.
- ☐ b. very low mental effort.
- ☐ c. low mental effort.
- ☐ d. rather low mental effort.
- ☐ e. neither low nor high mental effort.
- ☐ f. rather high mental effort.
- ☐ g. high mental effort.
- ☐ h. very high mental effort.
- ☐ i. very, very high mental effort.

27. Were the PowerPoint slides shown in the video helpful or hindering in understanding the lecture material?

- ☐ a. Very, very hindering
- ☐ b. Very hindering
- ☐ c. Hindering
- ☐ d. Rather/somewhat hindering
- ☐ e. Neither helpful or hindering
- ☐ f. Rather/somewhat helpful
- ☐ g. Helpful
- ☐ h. Very helpful
- ☐ i. Very, very helpful

APPENDIX E: SAMPLE SUBJECT MATTER EXPERT'S COMMENTS

<p>How many of these are different B-1. same codes? (Only one b. code)</p> <p>is the Bankruptcy code a Federal law. IF</p> <p>could so influence use's that you can't profit for it.</p>			
Question	Question Type	Topic Area	
1. Bankruptcy law is a combination of federal and state law.	Retention	History	
a) True b) False			
2. The goals for all types of bankruptcy are to fairly distribute any assets to creditors and give the debtor a new start.	Retention	Goals	
a) True b) False			
3. Which of the following statements is FALSE? (Retention Question)	Retention	Code	
a) Bankruptcy law was revised in 2005 by the Bankruptcy Reform Act. b) Bankruptcy law is divided into distinct chapters. c) Bankruptcy law now includes a means test for the debtor. d) Current federal bankruptcy law is called the Bankruptcy Code. Not			
4. A complex set of calculations to determine whether or not a debtor can afford to pay their creditors is called a(n) _____.	Retention	Code	
a) asset assessment b) liquidation charge c) means test d) proof of claim			
<p>For questions, 5-12, please select from the following answers:</p> <p>a) Chapter 6 b) Chapter 7 c) Chapter 8 d) Chapter 11 e) Chapter 12 f) Chapter 13</p>			

<p>Match the bankruptcy player to his/her role.</p> <p>5. The trustee who oversees and administers cases for the bankrupt <i>Individuals</i> <u>Chapter 11</u> (1)</p> <p>6. The trustee who oversees financial operations only <u>12</u> (c)</p> <p>7. The trustee who serves on a panel to take in and sell assets for equity <u>7</u> (b)</p> <p>8. The bankruptcy <i>Debtors</i> entity who also administers the case <u>11</u> (d)</p>	Retention	Players
<p>Match the type of bankruptcy with its description.</p> <p>9. Business restructures <u>11</u> (d)</p> <p>10. Family farmer provisions <u>12</u> (c)</p> <p>11. Individual reorganizations <u>11</u> (f)</p> <p>12. Individual asset liquidations <u>7</u> (b)</p>	Retention	Types
<p>Put the following bankruptcy processes/steps in chronological order from 1 to 5.</p> <p>13. A 341 meeting is scheduled <u>2</u> (4)</p> <p>14. The debtor gets a discharge <u>4</u> (5)</p> <p>15. An automatic stay is created <u>3</u> (2)</p> <p>16. The bankruptcy petition and schedules are filed <u>1</u> (1)</p> <p>17. Creditors file proofs of claim <u>5</u> (3)</p>	Retention	Process
<p>18. ACME Company needs to get a reading on the debtor's situation. ACME should consult the _____.</p> <p>a) automatic stay</p> <p>b) bankruptcy schedules</p> <p>c) proof of claim</p> <p>d) discharge order</p> <p><i>Joe Patel</i></p>	Transfer	Process
<p>19. Joe Patel's organic produce farm was recently hit by a tornado that ruined his crops, severely affecting his seasonal revenue. Joe files for Chapter 12 bankruptcy protection. Under Chapter 12 bankruptcy protection, Joe will continue to oversee:</p> <p>a) farming operations</p>	Transfer	Players

<p>b) financial operations</p> <p>c) both farming and financial operations</p> <p>d) neither farming nor financial operations</p>		
<p>20. Horizon Home Lenders has filed a proof of claim with the court on behalf of a defaulted home loan provided to one of their debtors. Horizon's claim is most likely to be considered a _____.</p> <p>a) priority claim</p> <p>b) secured claim</p> <p>c) secondary claim</p> <p>d) unsecured claim</p>	Transfer	Process
<p>21. Trustee Carmen Smith just received a monthly payment from Shirley Cantu, a debtor who recently filed for bankruptcy. Upon receipt of Shirley's payment, Carmen pays Shirley's federal school loans. In this scenario, Carmen Smith is a _____.</p> <p>a) Chapter 7 Trustee</p> <p>b) Chapter 8 Trustee</p> <p>c) Chapter 11 Trustee</p> <p>d) Chapter 13 Trustee</p>	Transfer	Players
<p>22. Sanjay Rivers is experiencing financial difficulty due to medical bills and is considering filing for bankruptcy protection. Sanjay does NOT want to reorganize his assets but would rather liquidate his assets to pay his bills. For which type of bankruptcy protection should Sanjay file?</p> <p>a) Chapter 7</p> <p>b) Chapter 8</p> <p>c) Chapter 11</p> <p>d) Chapter 13</p>	Transfer	Players
<p>23. Reward Five Credit Card Company has an unsecured claim in a no-asset case. Under Chapter 13 bankruptcy protection, Reward Five Credit Card Company can secure payment by filing a proof of claim with the court, and will be paid 100%.</p>	Transfer	Types


2413
False



<p>a) True b) False</p>		
<p>24. Manny's Garage is filing for Chapter 11 bankruptcy protection. As a result, Manny's Garage will need to do all of the following, EXCEPT</p> <p>a) act as a debtor in possession. b) administer its own bankruptcy case. c) have a trustee appointed on behalf of the garage. d) form a new business entity when the bankruptcy is filed. e) Manny's Garage will need to do all of the above.</p>	Transfer	Types
<p>25. Keywuna Groves has just filed a petition for Chapter 13 bankruptcy protection. When does Keywuna's automatic stay come into existence?</p> <p>a) After the 341 meeting b) At the time she files the bankruptcy petition c) When she is given a discharge d) When she files the automatic stay request e) There is no automatic stay in a Chapter 13 filing.</p>	Transfer	Process
<p>26. Brady Thompson is a family fisherman who has filed for bankruptcy protection. Brady will have a trustee oversee his financial operations while he continues to run his front ^{boat} hatchery. Based on the above information, Brady has most likely filed for which type of bankruptcy protection?</p> <p>a) Chapter 10 b) Chapter 11 c) Chapter 12 d) Chapter 13</p> <p><i>turn Boat into fishery</i></p>	Transfer	Types
<p>27. Sari Ubert has recently filed for Chapter 13 bankruptcy protection. Which claim will she most likely have to pay first?</p> <p>a) Her credit card bills b) Her motorcycle loan</p>	Transfer	Process

c) Her medical bills d) Her unpaid taxes		
28. The Chapter 7 Trustee has determined that Hilda Shivers has no assets available to pay her creditors. <i>After 341 meeting, it is likely that Hilda will</i>	Transfer	Process
a) receive a discharge <i>not at the 341 meeting</i> b) submit a plan to pay her creditors in the future. c) submit a proof of claim to prove her bankrupt status d) All of the above e) None of the above <i>see claim filed by 341 trustee</i>		
29. The Internal Revenue Service (IRS) can be a creditor in all types of bankruptcies. a) True b) False	Transfer	Players
30. The US Trustee can perform all of the following tasks, EXCEPT a) Appoint other trustees to oversee the bankruptcy process. b) Assist agencies in filing proofs of claim. c) Conduct 341 meetings. d) Oversee the bankruptcy court. e) The US Trustee can perform all of the above tasks.	Transfer	Players

APPENDIX F: SAMPLE SNAP PILOT ASSESSMENT



Bankruptcy in 2500 Words or Less

Assessment

(Group 1)

General Questions/Demographics

1. What is your primary, general role in your office/district?
 - ☐ a. Criminal attorney
 - ☐ b. Civil attorney
 - ☐ c. Criminal legal support staff
 - ☐ d. Civil legal support staff
 - ☐ e. Administrative support staff
2. How long have you served in this general role?
 - ☐ a. Less than 1 year
 - ☐ b. 1 year to less than 5 years
 - ☐ c. 5 years to less than 10 years
 - ☐ d. 10 or more years
3. How long have you been an attorney/legal professional/administrative professional?
 - ☐ a. Less than 1 year
 - ☐ b. 1 year to less than 5 years
 - ☐ c. 5 years to less than 10 years
 - ☐ d. 10 or more years
4. Have you previously seen this video or this content?
 - ☐ a. Yes
 - ☐ b. No

alse

ome states have different bankruptcy codes.

- ☐ a. True
- ☐ b. False

he Internal Revenue Service (IRS) can be a creditor in all types of bankruptcy.

- ☐ a. True
- ☐ b. False

he goals for all types of bankruptcy are the same - to fairly distribute any assets to creditors and give the debtor a fresh start.

- ☐ a. True
- ☐ b. False

eward Five Credit Card Company has an unsecured claim in a Chapter 13 case. Under Chapter 13 bankruptcy protection, Reward Five Credit Card Company will secure 100% payment by filing proof of claim with the court.

- ☐ a. True
- ☐ b. False

he bankruptcy code is a federal law.

- ☐ a. True
- ☐ b. False

hich of the following statements is FALSE?

- ☐ a. Bankruptcy law was revised in 2005 by BAPCPA.
- ☐ b. Bankruptcy law is divided into distinct chapters
- ☐ c. Bankruptcy law now includes a means test for the debtor.
- ☐ d. Current federal bankruptcy law is called the Bankruptcy Act.

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11. Match the type of bankruptcy to the correct player.

	Chapter 6	Chapter 7	Chapter 8	Chapter 11	Chapter 12	Chapter 13
The standing trustee who administers cases for individuals with regular incomes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The trustee who oversees farmer related cases	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The trustee who serves on a panel to take in and sell assets for equity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The debtor who also administers the case	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. Match the type of bankruptcy to the correct description.

	Chapter 6	Chapter 7	Chapter 8	Chapter 11	Chapter 12	Chapter 13
Business restructures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Family fisherman provisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Individual reorganizations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Individual asset liquidations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. Put the following bankruptcy processes/steps in chronological order from 1 to 4.

	Step 1	Step 2	Step 3	Step 4
A 341 meeting is scheduled.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The debtor gets a discharge.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
An automatic stay is created	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The bankruptcy petition is filed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Multiple Choice

14. "Banca rotta" means _____.

- ☐ a. broken bank
- ☐ b. broken bench
- ☐ c. rotten bank
- ☐ d. rotten bench

15. A complex set of calculations to determine whether or not a debtor can afford to pay their creditors is called a(n) _____.

- ☐ a. asset assessment
- ☐ b. liquidations charge
- ☐ c. means test
- ☐ d. proof of claim

16. ACME Company needs to get a reading on the debtor's situation. ACME should consult the _____.
- ☐ a. automatic stay
 - ☐ b. bankruptcy schedules
 - ☐ c. proof of claim
 - ☐ d. discharge order
17. Trustee Carmen Smith just received a monthly payment from Shirley Cantu, a debtor who recently filed for bankruptcy. Upon receipt of Shirley's payment, Carmen pays Shirley's federal school loans. In this scenario, Carmen is a _____ trustee.
- ☐ a. Chapter 7
 - ☐ b. Chapter 8
 - ☐ c. Chapter 11
 - ☐ d. Chapter 13
18. Joe Patel's organic produce farm was recently hit by a tornado that ruined his crops, severely affecting his seasonal revenue. Joe files for Chapter 12 bankruptcy protection. Under Chapter 12 bankruptcy protection, Joe will continue to oversee:
- ☐ a. farming operations
 - ☐ b. financial operations
 - ☐ c. both farming and financial operations
 - ☐ d. neither farming nor financial operations
19. Horizon Home Lenders has filed a proof of claim with the court on behalf of a defaulted home loan provided to one of their debtors. Horizon's claim is most likely to be considered a _____.
- ☐ a. priority claim
 - ☐ b. secured claim
 - ☐ c. secondary claim
 - ☐ d. unsecured claim
20. Sanjay Rivers is experiencing financial difficulty due to medical bills and is considering filing for bankruptcy protection. Sanjay's means test shows he doesn't have any money to pay his past debt. For which type of bankruptcy protection should Sanjay file?
- ☐ a. Chapter 7
 - ☐ b. Chapter 8
 - ☐ c. Chapter 11
 - ☐ d. Chapter 13

Multiple Choice (continued)

☐ d. serve as a fiduciary for its creditors.

Keyuana Groves has just filed a petition for Chapter 13 bankruptcy protection. When does Keyuana's automatic stay come into existence?

- ☐ a. After the 341 meeting
- ☐ b. At the time she files the bankruptcy petition
- ☐ c. When she is given a discharge
- ☐ d. When she files the automatic stay request
- ☐ e. There is no automatic stay in a Chapter 13 filing.

Brady Thompson is a family fisherman who has filed for bankruptcy protection. Brady will have a trustee oversee his financial operations while he continues to run his tuna boat. Based on the above information, Brady has most likely filed for which type of bankruptcy?

- ☐ a. Chapter 10
- ☐ b. Chapter 11
- ☐ c. Chapter 12
- ☐ d. Chapter 13

The Chapter 7 trustee has determined that Hilda Shivers has no assets available to pay her creditors. It is likely that Hilda will

- ☐ a. receive a discharge.
- ☐ b. submit a plan to pay her creditors when assets become available.
- ☐ c. file for Chapter 13 bankruptcy protection.
- ☐ d. All of the above
- ☐ e. None of the above.

The US Trustee can perform all of the following tasks, EXCEPT

- ☐ a. appoint other trustees to oversee the bankruptcy process.
- ☐ b. assist agencies in filing proofs of claim.
- ☐ c. conduct 341 meetings.
- ☐ d. oversee the bankruptcy process.
- ☐ e. The US Trustee can perform all of the above tasks.

26. Sari Ubert has recently filed for Chapter 13 bankruptcy protection. Which debt will she most likely have to pay first?

- ☐ a. Her credit card bills
- ☐ b. Her motorcycle loan
- ☐ c. Her medical bills
- ☐ d. Her unpaid taxes

27. In answering the preceding questions/problems, I invested

- ☐ a. very, very low mental effort.
- ☐ b. very low mental effort.
- ☐ c. low mental effort.
- ☐ d. rather low mental effort.
- ☐ e. neither low nor high mental effort.
- ☐ f. rather high mental effort.
- ☐ g. high mental effort.
- ☐ h. very high mental effort.
- ☐ i. very, very high mental effort.

28. Was the absence of PowerPoint slides helpful or hindering in understanding the lecture material?

- ☐ a. Very, very hindering
- ☐ b. Very hindering
- ☐ c. Hindering
- ☐ d. Rather/somewhat hindering
- ☐ e. Neither helpful or hindering
- ☐ f. Rather/somewhat helpful
- ☐ g. Helpful
- ☐ h. Very helpful
- ☐ i. Very, very helpful

29. **Questions, comments, concerns about any of the bankruptcy questions (please include the question number):**

(Were any of the questions too easy/hard? Was any of the language confusing? Were the answers clear/confusing?)

APPENDIX G: PILOT PARTICIPANTS' COMMENTS

Most answers were easy. However, a few I did not remember hearing the information in the video. The language was not confusing at all.
thanks. This was interesting. hope it is helpful for you.
They were appropriate questions. Good review.
For a subject with specific and regular parts, like the bankruptcy code, I feel that some of these specific questions would have been much simpler to answer had I been able to take notes on the distinguishing features of the various bankruptcy chapters. Other than that, I felt that the lecture did a good job of repeatedly emphasizing important information, which helped me retain knowledge of these areas.
The questions were easy but I think I would have been able to retain more with a Power Point because I am a visual learner. None of the language was confusing and the answers were clear.
taking notes would have been beneficial. it was alot of information provided in short period of time. I am now interested in learning more about bankruptcy.
Not at all. Wish I could have taken notes. Interesting to know and to find out. Glad I participated.
The information was presented in a very clear, understandable manner. I like the sequence in which the information was presented.
28--I learn best from a personal story or lecture, so this format was perfect. I think more people would benefit from ppt slides, to present visual representations of the concepts being presented, for their memory. By their nature, test questions don't always do the best job of really measuring the quality of the material presentation, or the learner's grasp of it. That said, these questions were pretty good. I hated #5 though. If I recall, bankruptcy CODE, meaning the overall body of bankruptcy law, is all federal (presumably a power reserved to the fed govt and not the states). State "codes" on bankruptcy exist and vary, but cover certain areas of bankruptcy administration, and are secondary to the federal code. Which leaves the student asking, "is this a trick question, and they want to know that I know the CODE is all federal, so the answer is false. Or, they are using code as a generic term synonymous with "law" etc., and the answer is true. I went with the latter. Some questions were very hard, but they need to be, on such a complex subject. Overall, great job of creating a very effective introduction for "common fold" by condensing an extremely complex subject into a 15 min video. Entire law school courses cover the same material, and entire lifelong legal practices are devoted to it. Speaker's folksy, humble manner was extremely effective in conveying such complex material, without it seeming too intimidating. One comment: there was a word at about 11:30, I forget right now, that I was able to intuit since I had a decent grasp of the subject matter, but most people would probably have missed it, and it was pretty key to understanding the concept being presented.

Did not think some of the questions were directly addressed in the video.
The questions were straightforward and well-phrased, although one about a fisherman running his fishing operation while the trustee runs the finances kind of gave away the answer to an earlier question about a farmer. Video was instructive on all questions.
Writing a question where you ask the testor to find the one that does not apply was a bit difficult to understand, due to the way it was written with "except" at the end.
suggested answers to question 25 were confusing
it was hard to remember all the different types of bankruptcy (7,8,11,12,13, etc.,) without power point to show the main points.
The video was interesting.
thanks...i learned a lot.
It is a little difficult to distinguish between the different chapters and remember them.
PP slides would've helped
Questions were generally clear. On a couple of the questions I either did not recall the video lesson addressing it or I could have paid better attention to the video lesson.
The denial of the ability to take notes was very hindering: seeing, hearing AND writing down the information tends to help me file it away in my small brain.
Wasn't certain whether the US Trustee can assist federal agencies in filing proofs of claims.
What PowerPoint slides? We watched a video and then took the test. The video explained the process very well.
The AUSA should conduct some training for the Financial Litigation Units to have a broader understanding of bankruptcy laws as it impacts collections.
Video was informative. Questions were fair.
It was difficult to listen to the lecturer and read the slides at the same time, particularly since the slides were not on the screen long.
The part that made it difficult is that it constantly referred back to Chp 7, 11, 13, etc. in not distinct order. I would have had an easier time if each was explained separately and had it re-enforce what was already stated. I find bankruptcy law extremely boring. Between that and it being 8AM (6AM MST) I found it somewhat difficult to pay close attention to the presentation and retain the information.
I learn best with written materials. I find it distracting to have both oral and written materials at the same time. Likewise, I am a note taker, and would have had the main points- eg 7, 11 and 13 noted as to which is which. Questions 27 and 28 were interesting, as I spent some time thinking about what mental effort meant, and how to best characterize it. I found the video to be very interesting, and helpful.
This video was very helpful in learning of the different types of bankruptcy. It also allows you to never try and get into this situation if possible and if so, don't make same mistakes getting back into it again. Questions, language was very easy and concise.
Not really. The only thing that I am not sure I remembered was how administrations under Ch. 12 work (i.e. how the farmer acts as trustee). Thanks.
There was too much concentration on recalling the exact numbers of the chapters rather than the content. Otherwise it was well done.
Clearly unfamiliar with bankruptcy, however the questions appeared to be on point and

reflected the presentation. I did not find the language confusing. I did find 25 confusing because I could not recall. I also could not for the life of me remember some of the other questions but now can't recall which ones gave me pause.
With the short, compact nature of the presentation, and the four different chapters discussed, it was a little tough keeping them straight (except for farmers and fishermen).
Very interesting subject matter.
Questions were generally well structured.
The questions well drafted and the language easy to understand.
I'm sure if I listened to the video again I would be able to answer all of the questions correctly and clear up any confusion I may have had about a few of the answers. The AUSA was a very good speaker and it was an excellent video.
The questions were easy. The video was very helpful.
I thought the slides were useful, especially in terms of defining the vocabulary used. More diagrams or other visual representations of the relationships between the different actors in a given type of bankruptcy filing might have been useful as well.
There was a lot of information given in a short period of time. More time given to each area of bankruptcy would be helpful. I thought the video was interesting, but again, too much information given in a short amount of time to fully absorb it all.
I think in a couple of the questions the language was a little confusing, but I don't think the questions were too hard.
The questions were excellent and well-phrased, but it is obvious to me that my understanding of the differences between Chapter 11 and Chapter 13 bankruptcies is unclear. The test has done me the favor of showing me what I would need to brush up on.
A fair test given the subject and the presentation. Not too hard.
None
I paid very close attention to the presentation, and I found the questions fairly difficult, particularly the order of events and the various nuanced differences between the different kinds of bankruptcy. Broken bench -- that one was easy.
It may have been totally my problem, but I had problems with # 13 in that although I knew the answer, I was unable to correctly set them in the order they should have been. Sometimes, the answer shifted on me. Thank you.
The way the slides were presented was a little confusing.
all good.
I don't recall hearing about Automatic Stays...not sure if I zoned out? Questions were clear and concise. Test was well organized.
Good questions! First question doesn't allow for attorneys who are managers - i.e. neither exclusively criminal or civil. Other than that, all are good! Good luck! It was fun!