University of Nevada, Reno

The Effect of Using Three Types of Instructional Media on Comprehension and Motivation of Korean College Students in an Online Course

A dissertation submitted in partial fulfillment of the
requirements for the Doctor of Philosophy in
Counseling & Educational Psychology

by

JeongChul Heo

Dr. Leping Liu/Dissertation Advisor

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JEONGCHUL HEO

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DOCTOR OF PHILOSOPHY

Leping Liu, Ph.D., Advisor

Cleborne D. Maddux, Ph. D., Committee Member

Margaret Ferrara, Ph. D., Committee Member

Robert Quinn, Ed. D., Committee Member

Steven Harlow, Ph. D., Committee Member

Zong Tian, Ph. D., Graduate School Representative

Marsha H. Read, Ph. D., Dean, Graduate School

May, 2012

ABSTRACT

Online enrollments have been growing substantially for the last ten years (Allen & Seaman, 2011). In addition, it has been crucial that higher-education institutions offer effective online courses and programs for the last ten years. Online circumstances in distance education have advanced using multimedia based on interactions among students, teachers, and other technology instructional sources. Applying multimedia or technology tools in on/off-line courses can create better educational circumstances to enhance students' learning as a means to interact with critical educational factors (Hartsell & Yuen, 2006; Kozma, 1994; Mayer, 2003).

The primary purpose of this study was to examine the effectiveness of three types of instructional media to deliver online lectures for motivation and content-related comprehension in the online course of Health Counseling Psychology. This study examined whether one instructional media (e.g., video-based instruction) was better than another (e.g., audio-based instruction or text-based instruction) in motivation and content-related comprehension.

The total of 237 online students majoring in the field of counseling and psychology at the Seoul Cyber University in Korea participated in this study in fall 2011. The participants were randomly assigned to one of three treatment groups (e.g., video-based instruction, audio-based instruction, and text-based instruction without using streaming media). Finally, the total of 172 students completed the two-week online lectures for three treatment groups and took two posttests on comprehension and motivation. This study used an experimental design with quantitative data. A between-groups experimental design with the short form of IMMS and comprehension test was

employed. For the first and second research questions, a one-way ANOVA was conducted to determine if there were significant different means in student motivation and comprehension across three different types of instructional media.

According to the findings of this study for students' motivation, instructional video as a means of streaming media was a more effective instructional medium than text to enhance students' motivation in an online course. In addition, streaming media (e.g., video clips and audio files) were efficient instructional technology tools to motivate online students positively in diverse online settings. The streaming media (e.g., video and audio) in diverse instructional designs can be used as a means of instructional delivery tools to help online students to be successfully motivated in online learning.

According to the results in students' comprehension, three different types of instructional media had no different effect on students' comprehension in online learning. In the three different types of instructional design with streaming media or web-based text only, using instructional technology tools did not affect the student comprehension as a means to increase student understanding cognitively in an online educational setting.

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CHAPTER I: INTRODUCTION

This chapter addresses five important concepts relevant to instructional technologies and motivation in online learning. The five concepts reviewed in this chapter are: (a) online learning; (b) instructional technology tools; (c) motivation and learning; (d) technologies and motivation; and (e) technologies and learning. This chapter also contains a statement of the problem, research questions, and the importance of this research, including the definitions of major terms.

Online Learning

Khan (1997) defines web-based online learning education as hypermedia-based instruction that uses the attributes and resources of the World Wide Web (WWW) to create a meaningful learning environment. McVay (2000) suggests that online learning is online education that takes place when a teacher and students are separated by a physical distance, and the Internet and World Wide Web are used as tools to connect the teacher and student.

A critical criterion of online learning is the proportion of content delivered online. For instance, Allen and Seaman (2007) suggest that online courses are those in which at least 80% of course content is delivered online. In blended/hybrid learning, 30% to 79% of the course content is delivered online. In web-facilitated learning, 1% to 29% of the course content is

delivered online. All course content is delivered in writing or orally for traditional learning. The literature in distance education indicates that instructors should consider a variety of factors such as: (a) teacher-student interaction via asynchronous and

synchronous communications; (b) online testing; (c) feedback; and (d) access to course materials (e.g., text documents and PowerPoint lectures) (Navarro & Shoemaker, 2000). Additional factors in online learning and teaching include instructional design, CD-ROM based lectures and technical problems (Skylar, 2006).

The number of educational institutions offering complete online college degree programs has increased exponentially over the last five years (NCES, 2003). In 2001-2002, out of 4,134 two-year and four-year institutions surveyed, 56% offered distance education courses (NCES, 2003). Furthermore, there are critical benefits relevant to motivation and convenience in order to increase online courses in high education. Numerous studies have compared the academic performance of distance learners to that of traditional learners (Baker, Hale, & Gifford, 1997; Diaz, 2000; Schutte, 1996). Results indicate that there is no significant difference in the achievement of student participants in traditional vs. online coursework.

Understanding critical benefits and elements is important to online instructors. Howell, Williams, and Lindsay (2003) suggest that online education is consistent with a constructivist model in which students are responsible for their own learning. Thus, online instruction tends to be more learner-centered than traditional instruction (Howell, Williams, & Lindsay, 2003). McVay (2000) also stated that online learners are expected to be independent learners who play active roles, control the pace of learning, and engage in interactive learning. In other words, in online education, students are responsible for keeping up with assigned reading and completing assignments on time. In addition, learners have to set their own learning pace. These learners also need to be comfortable with using the available technology such as reading online texts, taking notes from

instructional media that are provided by the instructor, using a keyboard and mouse to communicate with peers and the instructor, and using online resources for course assignments. Therefore, online learners need to have the capacity to adapt, reflect, evaluate, and learn from their instructors so that they continually improve their knowledge (Moore & Kearsley, 2005).

Online learning/teaching has increased due to the Internet and availability of broadband access. Online courses are available to learners almost anywhere and anytime. In addition, numerous writers have listed advantages of online education. For example, Whiteworth (1990) finds that students enrolled in online courses believe they have more interaction with the instructor and that they are provided more feedback on their assignments than in traditional courses. Students indicate that online courses are desirable because of scheduling convenience and convenient learning at their own pace (Navarro & Shoemaker, 2000).

Thurmond, Wambach, Conners, and Frey (2002) conducted a study to explore the reasons students choose to take online courses and to measure student satisfaction. Results from the survey indicated that 57 students out of 120 enrolled in seven online nursing courses were satisfied or very satisfied with the online course. Student satisfaction is significantly correlated with the degree to which students receive timely comments from the instructor (r=.51, p<.01); the degree to which the instructor offers a variety of methods to assess student work (r=.68, p<.01); and familiarity with the instructor (r=.58, p<.01).

In addition, instructors need to make use of various instructional delivery methods to deliver instructional content. The Internet and World Wide Web have become

important delivery mechanisms that allow instructors to plan and manage their courses and students to track their learning progress (Tantrarungroj, 2008). Digital media and technological advances will continue to increase opportunities for independent and self-directed learning.

As a result, it is important for instructional designers to pay attention to details concerning students' perspectives, distance learners' characteristics, students' satisfaction, and students' learning styles in order to meet the needs of their online students (Gibson, 1998). Furthermore, Gibson suggests that online instructors and designers should be able to consider critical components by using diverse methods to deliver instructional content in order to enhance students' learning. Besides, distance education in online circumstances has moved into multimedia based on interactions among students, teachers, and other technology instructional sources (Keegan, 1996).

Instructional Technology Tools for Online Learning

Technology will probably continue to revolutionize our society and our daily lives. One of the most noticeable characteristics of computers during the past twenty years has been their decreasing physical size. Currently, we are seeing the advancement of ubiquitous computing with palm-sized computers. In addition, microcomputers, technological devices such as palm-sized PCs, flash memory cards, DVD, digital video, the Internet, and wireless technologies continue to evolve.

Network resources in the classroom will significantly improve students' access to real-world data exchanges. Importantly, learning technologies will make education available to everyone. It also seems likely that future technologies will become more

interactive, facilitate problem solving, improve communication, and promote higher-order thinking with improved motivation and satisfaction in the more convenient online learning (Bitter & Pierson, 2002; Valdez, McNabb, Foertsch, Anderson, Hawkes, & Raack, 1999).

Many colleges and universities in the United States offer a wide variety of online courses (Dalziel, 2004). Most online courses are asynchronous; teaching and learning usually do not take place at the same time. Examples of the technology involved include bulletin boards, email, message boards, and so on. These asynchronous telecommunication tools are especially useful for students who live in different time zones and who want to learn from home or the workplace. In addition, the roles of instructor and learner are changing because of the influence of media and technology. In online education, teachers and textbooks are no longer the sources of all knowledge. The teacher becomes more like a director and educational designer of the knowledge access process.

Skylar (2004) maintains that because the goal of education is to provide authentic instruction and experiences, the incorporation of a variety of technological improvements into distance education provides educators with richer and more experiential means of instruction. In sum, it is important, as new instructional media becomes available, that research continues to explore the most effective and efficient methods of incorporating media into online learning. For these reasons, current studies place emphasis on diverse instructional technology tools that efficiently deliver educational content in online learning and teaching. The following are important instructional technology tools used in online learning to deliver instructional content: (a) streaming video, (b) interactive video,

(c) synchronous conferencing, (d) streaming audio, (e) audio and on-screen text, and (f) multimedia and hypermedia.

Streaming Video

McGreal and Elliot (2009) describe that every personal computer built today can deliver multimedia presentations for education and entertainment including the special software to interpret and play the stream of data. While the first part of the sample is being played, the next is being downloaded. The second sample begins seamlessly, and the first is deleted (McGreal & Elliot, 2009). Shephard (2003) suggests that streaming video is defined as a sequence of moving images that are sent in compressed form over the Internet and displayed by a viewer program as they arrive.

Among a variety of instructional media, video technology is believed to be particularly useful and suitable for problem-based learning because it can convey setting, characters, and action in an interesting way and can portray complex and interconnected problems (Anderson, Armbruster, & Roe, 1989; Cognition and Technology Group at Vanderbilt, 1992; Overbaugh, 1995). For example, video stories help learners understand and remember content (Jonassen, Peck, & Wilson, 1999). In addition, Schwartz and Hartman (2007) maintained that video technology provides a powerful way to enhance learning.

Information obtained visually is more memorable, and the simultaneous processing of both auditory and visual information increases learner comprehension and retention. The advent of affordable, high-quality consumer video technology has greatly increased its use in classroom instruction; particularly in teacher education because

streaming video sustains learners' interest for a longer period of time (Beitzel & Derry, 2009; Derry, 2007; Sherin, 2007; Wetzel, Radtke, & Stern, 1994). In short, the attributes of streaming video can enhance students' attention and thus lead to increases in learning (Boster, Meyer, Roberto, Inge, & Smith, 2006; Hartsell & Yuen, 2006; Wetzel et al., 1994). Furthermore, streaming video has been shown to be an effective tool for both distance education and in face-to-face classroom settings (Mullins-Dove, 2006; Shephard, 2003)

Interactive Video

In order to ascertain the effectiveness of using CD-ROM case studies, Bliss and Mazur (1996) conducted a study using video clip narratives and additional resources (e.g., lesson plans, examples of student work, commentaries by teachers, and full text of articles). Their results indicated that all of the teachers felt that the video and audio media made a case more realistic (Bliss & Mazur, 1996). In addition, interactive video that provides individual control over random access to content may lead to better learning outcomes and higher learner satisfaction (Zhang, Zhou, Briggs, & Nunamaker, 2006). However, simply incorporating video media into e-learning environments may not always be sufficient to improve learning (Zhang et al., 2006). Interactive video captures learners' attention and holds their interest by providing questions and requiring frequent responses including the advantages of self-paced, learner-managed study, and two-way communication.

Synchronous Conferencing

Some audio or video teleconferencing software allows users to see what is on another user's computer screen, allowing them to view the same files or software while discussing them orally (Allessi & Trollip, 2001). Video teleconferencing extends the concepts of audio teleconferencing by adding video. A popular program for teleconferencing is Microsoft NetMeeting. In order to use this program, connected computers must have microphones, speakers, video cameras, and the specialized software (Allessi & Trollip, 2001).

Teng and Taveras (2004) suggest that a major drawback to synchronous conferencing (e.g., interactive synchronous online experience within Horizon Live) is that it takes away from the asynchronous dialogue that is extremely important in a discussion. However, it helps students to develop a deeper understanding of the course material since synchronous dialogues can activate more interaction and feedback relevant to the course content. In addition, synchronous conferencing has contributed to an innovative combination of synchronous education using live streaming video, audio, and chat over the Internet, blended with asynchronous online discussions and group activities (Teng & Taveras, 2004).

Streaming Audio

Audio was the first type of multimedia to be delivered over the Internet in a streaming format; concerts and live radio broadcasts were among the first examples of streamed audio to appear (McGreal & Elliot, 2009). Streaming audio is also currently used as a supplement to classroom-based and online course delivery, usually in the form

of prerecorded lectures, interviews with guests, student projects, samples of student classroom interaction, or sound bytes of content relevant to the course of study (McGreal & Elliot, 2009).

Streaming audio has been more successful than video, which has generally been limited to small picture sizes or low resolution (grainy) video projections. However, as the bandwidth increases, higher quality, full-screen video becomes more practical (McGreal & Elliot, 2009). For example, studies show that learners who receive animation and narration perform better on tests of retention and transfer than learners who receive animation and on-screen text; students learn better when words in multimedia messages are presented as spoken text rather than printed text only (Mayer & Anderson, 1991; Najjar, 1998)

Audio and On-screen Text

Education is a key area within which voice recognition technology can be usefully applied, commonly through producing transcriptions of spoken lectures which can be displayed simultaneously together with lecture slides and audio narration (Debuse, Hede, & Lawley, 2009). Debuse and colleagues also suggest that this is likely to be attractive to adults who may have to fit their learning around a work schedule and who may also be studying English as their second language.

Mayer and Moreno (2003) suggest that students can understand a multimedia presentation better when words are presented as narration rather than as narration and on-screen text in a redundancy effect. The redundancy of information has a negative effect in that the use of identical written and spoken words simultaneously can decrease

memory by overloading the verbal channel. The combination of written and auditory information violates both the modality and redundancy principles (overloaded channel). However, in cases where students have difficulty understanding spoken words or when the pacing of the materials is not fast (Clark & Mayer, 2003), simultaneous audio and visual information may be experienced as non-redundant and overload may be avoided (Debuse et al., 2009)

A recent study appears to contradict modality and redundancy effects, with its finding that there is no significant difference in student performance using lecture slides with audio compared to lecture slides with transcription (Day, Foley, & Catrambone, 2006). These findings also indicate that adding audio or transcription to lecture-slide-only presentations makes no significant improvement in learning. However, a combination of video, audio, and lecture slides proved significantly better than all other approaches (Debuse et al., 2009).

Multimedia and Hypermedia

Iverse and Barron (2006) explain that multimedia uses several media to present information. This combination can include text, graphics, animation, pictures, audio, and video. Multimedia incorporates text, graphics, and audio media (often with real video or animations) and combines them, using a computer. Almost every personal computer built today is capable of delivering multimedia presentations for entertainment, advertising, or education (McGreal & Elliot, 2009). Well-designed multimedia enriches students' learning (Mayer, 2003; Najjar, 1998; Sweller, 1999).

"Hyper" environments, such as hypertext and hypermedia, have added to multimedia's definition by providing electronic and nonlinear approaches to moving through a body of information (Ivers & Barron, 2006). Hypermedia adds video clips, graphics, and/or audio files to hypertext. These multiple modal approaches to education may benefit students with diverse learning and cognitive styles. Both hypertext and hypermedia can be considered subsets of multimedia (Ivers & Barron, 2006).

Motivation and Learning

Streaming media (e.g., videos and audios in online learning) has a powerful link to learning and motivation (Choi & Johnson, 2005; Smith & Ragan, 1999). It is critical to investigate the relationship between motivation and learning in online educational circumstances so that students are able to perform their online learning and workload independently. Teng & Traveras (2004) insist that if students are not self-motivated, they may find it difficult to maintain their workload.

Motivation means having a desire and willingness to do something. According to Quinn (2007), motivation, or self-directed learning is the most difficult and the most important variable in our education. For example, three thousand high school students drop out of school every day, and it has been noted that motivation is at the heart of the issue (Quinn, 2007). In other words, teachers can motivate students to stay on task, increase their knowledge and skills and improve their ability to acquire lots of information. Boster and his colleagues (2006) state that middle school teachers report that students are much more engaged in their lessons and began to improve their academic performance with more attention when using streaming videos.

Technology and Motivation

Motivation

Motivation means having the desire and willingness to do something. Learning is enhanced when learners' perception and attention are engaged (Smith & Ragan, 1999). Teachers who want to motivate students to stay on tasks must guide the initiation, direction, intensity and persistence of learning behavior (Keller, 2008).

Keller's theory (2008) makes use of five critical categories (attention, relevance, confidence, satisfaction, and volition/self-regulation). The five principles of motivation may be stated and briefly explained as follows:

a. Attention: Motivation to learn is promoted when a learner's curiosity is aroused due to a perceived gap in current knowledge.
b. Relevance: Motivation to learn is promoted when the knowledge to be learned is perceived to be meaningfully related to learners' goals.
c. Confidence: Motivation to learn is promoted when learners believe they can succeed in mastering the learning task.
d. Satisfaction: Motivation to learn is promoted when learners anticipate and experience satisfying outcomes to a learning task.
e. Volition and Self-regulation: Motivation to learn is promoted and maintained when learners employ volitional (or self-regulatory) strategies to protect their intentions.

Keller (2008) maintains that teachers and educational designers can integrate diverse technologies more efficiently into e-learning and especially self-directed learning

when combined with a systematic design process in the above five motivational and volitional principles.

Technology and Motivation in Online Learning

A variable in distance education that is closely related to student performance is learners' satisfaction. Biner (1993) maintains that high satisfaction of learners should result in lower dropout rates and a lower withdrawal rate for nonacademic reasons. He also found a positive relationship between students' satisfaction with instruction and their subsequent success in a course. Instructors should take advantage of various instructional technology tools in order to motivate learners.

Many studies show that streaming videos increase students' attention and motivation (Bennett & Glover, 2008; Choi & Johnson 2005; Cofield, 2002; Green et al., 2003; Jha et al., 2002; Reisslein, Seeling, & Reisslein, 2005; Zhang et al., 2006). Furthermore, the promotion of motivation in online learning is related to instructional technology tools and multimedia (Mullins-Dove, 2006; Shephard, 2003). The integration of diverse instructional technology tools into online learning is an important variable that promotes students' motivation (Keller, 2008; Quinn, 2007).

Technology and Learning

Boster and his colleagues (2006) suggest that streaming video may enhance students' attention, and increase their academic achievement. Three-dimensional models can help students gain a better understanding of complex human organs (Jha et al., 2002; Najjar, 1998). Cofield (2002) also reports that students' performance on certain subjects tends to increase after they are exposed to video clips. Students who accessed streaming

video responded that it helped them to have a better understanding of content. He also suggests that streaming media (e.g., streaming video and audio) act as learning reinforcements since students can replay sections they need to repeat. Cofield states also that further study is needed to determine the relationship between effectiveness of streaming media and age.

Another tool to deliver instructional content is interactive video. Interactive video provides random access to content with individual control and may lead to better learning outcomes and increased learner satisfaction (Zhang et al., 2006). In order to ascertain the effectiveness of using CD-ROM case studies, Bliss and Mazur (1996) use video clip narratives and additional resources (e.g., lesson plans, examples of student work, commentaries by teachers, and full text of articles). Results indicate that video and audio media make the case being studied seem more realistic. However, simply incorporating video media into e-learning environments may not always be sufficient to improve learning (Zhang et al., 2006).

How instructors integrate technologies into the lesson is the most important factor in students' learning. In order to integrate technologies effectively, instructors need research on how actual classroom teaching and learning behaviors change as a result of introducing computers to the curriculum.

Students can work best when technologies are not the topic itself but are integrated into the entire curriculum (Panel on Educational Technology, 1997; Quinn, 2007). The Panel on educational technology presents strategies to promote the application of various technologies to K-12. They state that it is important to focus on learning with technology as a tool, not about technology as a subject, and to give special attention to professional

development for teachers on the effective use of technology. The panel also suggests that instructors should be able to ensure equitable, universal technology access to all students, regardless of socioeconomic status, race, ethnicity, gender, or geographical factors. In sum, one of the most important roles of media and technology is to serve as catalysts for promotion of learning and motivation in the whole educational environment.

Statement of the Problem

Quinn (2007) supports technologies as a tool to increase students' motivation. Smith and Ragan (1999) also hold that learning is enhanced when learners' perception and attention are engaged. Motivation regarding instructional technology is important for online learners in independent learning. Teng and T raveras (2004) point out that if students are not self-motivated, they may find it difficult to maintain their workload in distance education. Self-motivation is a very important factor in student completion in online learning (Dalziel, 2004; Pierre & Olsen, 1991; Stephens, 1974). Biner (1993) also maintains that high satisfaction in learners should result in lower dropout rates and a lower withdrawal rate from classes for nonacademic reasons. Biner also finds a positive relationship between students' satisfaction with instruction and their subsequent success in a course.

The primary purpose of this study is to investigate whether there are significant mean differences in the motivation of online students and content-related comprehension by different types of instructional media: (a) video-based instruction; (b) audio-based instruction; (c) text-based instruction. More precisely, this study will examine whether one instructional media (e.g., video-based instruction) is better than another (e.g., audio-

based instruction or text-based instruction) in increasing self-motivation and content-related comprehension tests.

Kozma (1994) argues that using instructional media as a vehicle for delivering instruction can have an influence on learning. It is important to investigate whether diverse media can influence online learning positively under specific educational conditions (e.g., instructional methods or designs). This research will place emphasis on different types of instructional media that might have a significant influence on online students' motivation and comprehension related to instructional content. This study has two research questions. The first research question is to validate the actual effect of diverse media in instructional media (i.e., audio- based instruction and video-based instruction) on instructional motivation. To answer this question, the researcher will examine whether audio and video-based instruction can motivate online students more positively than text-based instruction in online learning. The second research question of this study is to identify the actual effect of different instructional technologies on content-related comprehension. To answer this question, the researcher will examine whether video-based instruction can enhance online-students' comprehension comparing with the other instructional design (e.g., traditional text-based instruction and audio based instruction).

The Importance of This Research

According to the United States Department of Education, the National Center for Education Statistics (NCES) Report on Distance Education at Degree-Granting Postsecondary Institutions 2006-2007, in the 2006-2007 academic year, there were an

estimated 6,565,000 enrollments in all online courses offered by 2-and 4-year institutions (NCES, 2009). Furthermore, Almost 6.1 million students were taking at least one online course during the fall 2010 term. The 10 percent growth rate for online enrollments also far exceeds less than 1 percent growth of the overall higher education student population. In short, online enrollments have been growing substantially for the last ten years (Allen & Seaman, 2011).

Higher education is becoming increasingly competitive due to budget cuts and funding limitations. Colleges and universities are competing for student enrollment (Arbaugh, 2000; Bullen, 1998; Taylor, 2002; Whitney, 2001). The competition in higher education is resulting in rapid growth of online education and a wide variety of online offerings to enhance value of college and university brand. Allen and Seaman (2011) suggest that online enrollments have been growing substantially faster than overall higher education enrollments. It is crucial that higher education institutions offer effective online courses and programs.

Since the 1990s, the most recent developments in distance education involve the use of technologies such as television, computers, and the World Wide Web. The explosive growth of the web and microcomputer technologies has been a dramatic revolution in school education. For years, people have tried to predict the ways in which information technology would change schools. The federal government has provided a great deal of support for all public school classrooms to become connected to the web (Alessi & Trollip, 2001). Allen and Seaman (2007) suggest that a large majority (69%) of academic leaders believe that student demand for online learning is still growing and

virtually 83% institutions with online offerings expect their online enrollment to increase over the coming year.

Many of these academic leaders are very positive about a number of aspects of online education, including a belief that students are at least as satisfied with online classes as they are with face-to-face classes. They also believe that evaluating the quality of online instruction is no more difficult than for face-to-face, and an increasing majority view is that the quality of online education is the same or better that face-to-face instruction (Allen & Seaman, 2007). However, some higher education administrators have negative attitudes toward development of proper instruction and indicate the expected lack of discipline in online learning. For example, in research on five years of growth in online learning with leaders of U.S. higher education, academic leaders cite the lack of discipline on the part of online students as the most critical barrier of online learning. They also mention faculty acceptance of online instruction and higher costs for online development and delivery as the barriers (Allen & Seaman, 2007).

It is necessary to explore a variety of instructional methods with technology and develop effective instruction using diverse media in online learning and teaching. Additionally, instructors also use instructional media to enhance traditional courses, to create

hybrid courses (combination of online and traditional), and to develop stand-alone online courses (Carchidi, 2002). This study will explore effective instructional methods and effective technology tools that can be incorporated into online learning to promote self-motivation. The exploration of different types of instructional media will contribute to

build up effective online instruction by promoting motivation and satisfaction in online education. .

Research Questions

The primary purpose of this study is to examine the effectiveness of three types of instructional media to deliver online lectures in online courses. For the purposes of this study, research questions are as follows:

Research question one: Do the three different types of instructional media (text-based, audio-based and video-based instruction) have a different effect on student motivation with Korean college students?

Research question two: Do the different types of instructional media (traditional text-based instruction, audio-based and video-based instruction) have a different effect on content-related comprehension for Korean college students?

Definition of Major Terms

1. Instructional Motivation: Instructional motivation is the degree to which learners perceive that the instruction with diverse media is interested, related, and satisfied to enhance students' learning (Keller, 1987; Small, 1997).
2. Comprehension in Learning: Learner comprehension is the degree to which students understand the concepts or knowledge they have obtained from instruction and/or instructional technology media.
3. External Motivation: Keller (2008) suggests that external motivation is promoted and maintained when learners are able to use self-regulation to promote their intentions. Interaction and using technologies are critical for the promotion of

students' motivation with students' self-regulation in online learning (Keller, 2008; Rodrigues et al., 2008; Skylar, 2004). The self-regulation is changed into external motivation including critical extrinsic elements of interaction and technology in online learning.

4. Online Learning Environment: In this study, the online learning environment describes online education in which students accessed course content on the World Wide Web (WWW) via Course Management System of Seoul Cyber University (CMSSCU). In the online environment, online students usually view PowerPoint notes and videos, transcribe lecture notes, turn in assignments, complete quizzes, and communicate with an instructor.
5. Instructional Method: In this study, cognitive learning approach, cognitive theory of multimedia learning, and a constructivist approach are used as a critical instructional method in online learning.
6. Instructional Media: Skyler (2004) suggests that instructional media means various methods which deliver instructional content (e.g., computer-based learning, Web-based learning, online learning, CD-ROM, correspondence, broadcasting, interactive television). In particular, this research focuses on streaming audio and video which are inserted into web-based teaching modules based on well-designed web-pages with online text in order to deliver instructional content.
7. Instructional Technology Tools: On online learning, instructional technology tools are defined as important means in which instructional content and knowledge are delivered (e.g., streaming video, streaming audio, streaming audio

and onscreen-text, and synchronous conferencing, etc.). Technologies refer to more than computers, including a range of electronic methods and tools that can be used to support learning (Bitter & Pierson, 2002; Shyu, 2000). The technologies can be used to supplement traditional instruction and as important self instructional materials to school learning.

8. Video-based Instruction: Video-based instruction is an instructional design with streaming video through which instructional content is presented, delivered, and experienced mainly in streaming video format with multimedia learning strategies. Video-based instruction incorporates cognitive learning, cognitive theory of multimedia learning, and a constructivist approach. In a video-based instruction, a real-life situation involving a problem is presented via a video format. An experimental group will be given a video-based instruction with the online text based on Mayer's (2001) cognitive theory of multimedia learning.
9. Audio-based Instruction: Audio-based instruction is an instructional design with streaming audio through which instructional content is presented, delivered, and experienced mainly in streaming audio format with multimedia learning strategies. Audio-based instruction incorporates cognitive learning, cognitive theory of multimedia learning, and a constructivist approach. In an audio-based instruction, main instruction and knowledge are delivered via streaming audio format. Finally, an experimental group will be given audio-based instruction with the online text based on Mayer's (2001) cognitive theory of multimedia learning.

CHAPTER II: REVIEW OF THE LITERATURE

The primary purpose of this study is to examine whether there are significant mean differences in the motivation of online students and content-related comprehension by different types of instructional media relevant to streaming media: (a) video-based instruction; (b) audio-based instruction; (c) text-based instruction. This chapter is composed of five sections: (a) Theoretical framework; (b) Online learning; (c) Instructional technology tools and media in online education; (d) Technology and motivation; and (d) Technology and learning.

Cognitivism and Constructivism

Cognitive psychologists (e.g., Clark, Mayer, and Moreno) suggest that students' learning is processed through the construction of knowledge, whereby learners are encouraged to construct their knowledge with experiences through cooperative interaction in their educational environment. Constructivist teachers are able to encourage students to engage in conversation with a teacher and one another. These teachers also encourage learners to ask questions of each other with diverse inquiries and open-ended questions to help students construct their knowledge with activating learners' development (Ivers & Barron, 2006).

In constructivism, applying diverse technologies and multimedia is crucial in the learning and teaching process. This philosophy encourages learners to construct their knowledge and promotes motivation (Brown, Collins, & Dugid, 1989; Petraglia, 1998). Furthermore, learning together or group-based learning using technology and multimedia supports small group interaction, positive socialization, and the development of original

projects that reflect a groups' collaboration. Students learn by helping other classmates to construct knowledge, making information more meaningful, and motivating learning through cooperative arrangements (Wolfe, 2001).

Researchers have found that it is significant that teachers or instructional designers incorporate effective instructional methods into their classes with effective multimedia design using diverse technologies in order to encourage learners to construct their knowledge (Kozma, 1994; Mayer, 1999 and 2003). Using multimedia with various instructional technologies has been investigated systematically by examining positive effects toward learning achievement, motivation, and satisfaction (Choi, 2006; Clark, 1994; Mayer, 2003). It is critical that instructors or instructional designers can construct effective media including proper instructional methods based on cognitivism and constructivism (e.g., duel cord, load theory, learning processing, and cognitive theory of multimedia learning).

Cognitive Theory of Multimedia Learning

Mayer (2003) suggests that students can learn more deeply from a well-designed multimedia message consisting of words and pictures than from more traditional modes of communication involving words alone. He also holds that if an instructional method promotes the same kinds of cognitive processing across different media, then it might result in the same benefits across media. The design of multimedia instructional messages should be based on an understanding of the nature of human learning. In short, using different technologies does not change the fundamental nature of how the human mind works; however, to the extent that instructional technologies are intelligently designed,

they are able to serve as powerful aids to human cognition for online students (Kozma, 1994; Mayer, 1999 and 2003).

In addition, Mayer (2003) views a multimedia instructional message in multimedia learning as a presentation consisting of words and pictures that is designed to foster meaningful learning. There are two parts to the definition: (a) the presentation contains words and pictures, and (b) the presentation is designed to foster meaningful learning. The pictures can include static graphics (e.g., illustrations, maps, charts, and photos). Learners with personalized messages are more likely to engage in cognitive processes by actively processing the series of transformations in learning information (Mayer, 2003).

A multimedia presentation including words and pictures enters students' sensory memory through the eyes and ears, while a spoken text is processed through the ears. Then working memory is used to hold and manipulate visual images of pictures and sound images of words. In long-term memory, a large amount of information can be stored over long periods of time, but that information will be brought back to working memory whenever a person actively thinks about it. Mayer (2003) states that processing of pictures mainly occurs in the visual/pictorial channel and processing of spoken words occurs in the auditory/verbal channel.

Processing of printed words, on the other hand, takes place initially in the visual channel and then moves to the verbal channel.

Important Theories Based on Cognitive Theory of Multimedia Learning

Mayer's cognitive theory of multimedia learning (2003) is based on Paivio's dual-coding theory (1986), load theory, and Baddeley's model of working memory (1992) that

helps explain the flow of information between the multimedia presentation memory stores (i.e., sensory memory, working memory, and long-term memory). Therefore, it is important to review dual-coding theory, load theory, and the model of working memory which are based on Mayer's (2001) cognitive theory of multimedia learning.

Dual-coding theory. Dual-coding theory presents a cognitive model of multimedia learning intended to represent the human information processing system. Paivio (1986) explains that verbal and visual systems can be activated independently, but there are interconnections between the two systems that allow dual-coding of information. In Paivio's later study, mental representations (1986), students construct their knowledge more effectively when nonverbal and verbal groups of mental representation have connections.

Load theory. According to cognitive load theory (Sweller, 1988), students might not be able to develop an understanding of the course content if instructional materials have too much extraneous information. Since working memory on information is limited, meaningful learning cannot occur while the processing channel is overloaded (Mousavi, Low, & Sweller, 1995). In sum, Mayer (2003) suggests that the cognitive load is balanced when learners process the presented material through their eyes (e.g., animation) and ears (e.g., words presented in narration). In contrast, when pictures and words are both presented visually (e.g., animation and text), visual/pictorial channel can become overloaded. However, the auditory/verbal channel is underused.

Modality principle. Mayer (2001) states that the sensory modality of multimedia is consistent with a cognitive theory of learning, which assumes that humans have separate information processing channels for auditory and visual processing. Mousavi and his

colleagues (1995) suggest the modality principle; that meaningful learning cannot occur when the processing channel is overloaded since people have a limited working memory.

Redundancy. Mayer and Moreno (2003) define the redundancy effect as the finding that students understand a multimedia presentation better when words are presented as narration rather than as narration and on-screen text. The redundancy of information has a negative effect, that is, a memory overload due to overloaded channel in multimedia learning. Mayer and Moreno (2003) argue that overload may be reduced by approaches which use the modality principle, whereby audio narration is presented instead of on screen text to reduce the visual channel load. Avoiding the use of identical written and spoken words to accompany animation can reduce memory overload (e.g., presenting audio and visual elements simultaneously to reduce memory loading). Debuse, Hede, and Lawley (2009) suggest that simultaneous audio and visual information may be experienced as non-redundant and overload may be avoided.

Learning Processing

Smith and Ragan (1999) show that information processing theory is designed to help explain cognitive processing that occurs when information is received, processed, stored, and recalled by a human mind. The information processing theory is used to present the processing steps of transformation of learning information: sensory register, working memory, and long-term memory.

Sensory register. When information is received from the environment through sensory receptors (i.e., sight, smell, hearing, taste, and touch), the sensations are

converted to electrochemical messages and sent to the brain. Immediately after sensing information, the perception occurs within a sensory register.

Working memory. Through sensory resisters, learners selectively receive certain information which is processed in their short-term or working memory. This working memory can only hold a limited amount of information for a period of time. There is a continuous transfer of information between long-term memory and working memory to help encode information, so that the new information is integrated with the old information and stored in the long-term memory in a meaningful way to a receiver.

Encoding and long-term memory. Meaningful information is transferred from working memory and permanently stored in long term memory, which has an unlimited capacity to store knowledge. The information is encoded and placed into long-term memory in an organized manner, which helps learners to receive, retain, and recall meaningful information (Smith & Ragan, 1999). The information processing theory explains how the information is moved from the sensory resister to memory. Rehearsing or other techniques help to keep information in the memory longer (Tantranrungroj, 2008). In addition, Mayer (2001) views multimedia as an effective learning tool to help students enhance their memory and learning.

Critical Effects of Cognitive Theory of Multimedia Learning

Mayer (2003) also suggests critical effects of multimedia presentation as follows: (a) multimedia effect, (b) coherence effect, (c) contiguity effect, and (d) personalization effect.

Multimedia effect. The most basic effect of the presentation method concerns whether multimedia presentations are more effective than single medium presentation. Through the multimedia effect, students learn more deeply from a multimedia explanation presented in words and pictures than in words alone. For example, consider a textbook lesson on how brakes work in which the explanation is presented in printed words (words-only group) or in printed words along with accompanying illustration (words-and-pictures group). In a series of three studies involving brakes (Mayer and Anderson, 1991), the words-and-picture group generated a median of 79% more creative solution on problem-solving transfer tests than the words-only group. When the media consist of printed text and illustrations, there was a strong multimedia effect. Similarly, consider a computer-based lesson on how brakes work that presents a narration describing the steps in how brakes work (words-only group) or narration along with concurrent animation (words-and pictures group). When the media consists of spoken text and animation, there is a strong multimedia effect.

Coherence effect. Another important effect of presentation method concerns what happens when the presentation includes interesting but irrelevant material (which is called seductive details) to a multimedia explanation. The coherence effect refers to the finding that students learn more deeply from a multimedia explanation when extraneous material is excluded rather than included. For example, Mayer (2003) states that a concise presentation group generates a median of 90% more creative solutions than the embellished presentation group, yielding a median effect size of 1.67

Contiguity effect. Another presentation method effect concerns how the corresponding text and illustration on a page or computer screen is shown. A spatial

contiguity effect is that students learn more deeply from multimedia explanation when corresponding words and pictures are presented at a close range rather than from a distance on a page or screen (Mayer, 2003).

Personalization effect. The personalization effect is that students learn more deeply from a multimedia explanation when words are presented in a conversational style rather than in a formal style (Mayer, 2005).

According to the cognitive theory of multimedia learning (Mayer, 2001), it is better to present an explanation in images and words at the same time rather than in images only or words. Sweller (1999) concludes that instructional designers of multimedia instruction should be able to understand that the use of auditory and visual information under conditions in which both sources of information are essential will help increase one's capacity of working memory.

Effects of Incorporating Proper Instructional Method into Teaching and Learning

It is necessary to understand that proper instructional method of Mayer's multimedia learning is effective in online education and multimedia learning by using technology and media. Kozma (1994) calls for research on media and methods that employ them as they interact with the cognitive and social processes by which knowledge is constructed. Similarly, Clark (1994) favors research on what learners learn from various instructional methods used within various media rather than on media as a vehicle of delivering instruction. He concludes that proper instructional methods will be very effective in students' instruction without using diverse media.

Mayer (2003) holds that using different technologies does not change the fundamental nature of how the human mind works. If an instructional method promotes the same kinds of cognitive processing across different media, then it will also result in the same benefits across media (Mayer, 2003). The design of multimedia instructional messages should be based on an understanding of the nature of human learning. Using different technologies does not change the fundamental nature of how the human mind works; however, to the extent that instructional technologies are intelligently designed, they can serve as powerful aids to human cognition.

Gorrell and Capron (1990) conducted research to determine how expert knowledge can be effectively imparted to teachers using both direct instruction video and cognitive modeling video. The findings of this study indicate that students in the cognitive modeling video group have higher levels of recall and application than students in the direct instruction video group. Cognition and Technology Group at Vanderbilt (1992) holds that video-based instruction involving a constructivist approach is successful in promoting students' learning as well as enhancing attitudes toward mathematics and instruction. Integration of diverse technologies and combination of proper instructional method into online instruction can enhance students' learning by promotion of human cognition.

Online Learning

Important (Affective) Elements to Enhance Learning in Online Learning

Rodriguez, Ooms, and Montanez (2008) explain that satisfaction with online-learning experiences may prevail as a determining factor for the success of online courses

in the future. Student satisfaction with online courses appears to be a multidimensional concept, including learner-instructor interaction, learner-learner instruction, learner-content interaction, course organization, support services/administrative issues, facilitator, technical support, and delivery method (Roberts, Irani, Telg, & Lundy, 2005).

Rodriguez and his colleagues (2008) found a link between motivation and satisfaction. According to their finding, motivation and satisfaction related to perceived quality are critical elements relevant for success of online learning since online students might be responsible for their own learning. Furthermore, understanding the needs of students, supporting students in online courses, and promoting successful learning experiences will be critical in the overall success of the online learning arena (Rodriguez et al., 2008).

Learner-centered Instruction to Online Learning

There has been a pedagogical shift in online education with a constructivist model in which students are responsible for their own learning. The instruction in online education is becoming more learner-centered (Howell et al., 2003). For example, McVay (2000) states that online learners are expected to be independent learners who play active roles, control the pace of learning, and engage in interactive learning. Online students should be responsible for keeping up with assigned reading and completing assignments on time. In addition, they have to set their own learning style and pace independently. Moreover, McVay (2000) maintains that online learners need to be comfortable with using available technologies such as reading text online, taking notes from instructional media that are provided by an instructor, using a keyboard and mouse to communicate with peers and an instructor, and using online resources for their course assignments.

Online learners need to have the capacity to adapt, reflect on, evaluate, and learn from their instructors so that they continually improve their knowledge (Moore & Kearsley, 2005).

In order to enhance learner-centered instruction, instructors and/or instructional designers in online learning would be responsible for developing learner-centered media, texts, and teaching modules which may motivate online students to get online instruction independently (Howell et al., 2003; McVay, 2000). Online instructors and/or instructional designers should consider what principles are critical to develop learner centered instruction. There are several core elements in which online students can accomplish their independent learning. Navarro and Shoemaker (2000) add that instructors in distance education should consider a variety of factors such as: (a) teacher-student interaction via asynchronous and synchronous communication, (b) online testing, (c) feedback, and (d) access to course materials (e.g., text documents, PowerPoint Lectures). Skylar (2006) adds that additional factors for consideration include effective instructional design, CD-ROM based lectures, and other technical problems.

In addition, to enhance independent learning while connecting online students and instructors, a Course Management System (CMS) might be critical to online students so that they can be provided with interaction, feedback, assessment, multimedia and hypermedia with video and audio files relevant to enhancing their online learning (Emiroglu, 2007). He concludes that multimedia enhanced web-based course management systems are gaining popularity and playing an important role in the academic enterprise of teaching and learning in many universities. (Emiroglu, 2007).

For example, Baskent University Course Management System (BUCMS) aims to support course content with multimedia elements such as picture, audio and video without knowledge of internet programming (Emiroglu, 2007). Due to this technological improvement, the multimedia enhanced web-based course management system is also aimed to improve the level of instructional quality in higher education. Students can maximize their online learning through learner-centered instruction when important online learning principles (e.g., interaction, feedback, assessments, and multimedia) are incorporated into online learning curriculum with the development of high-motivated instruction and the application of effective technological tools in CMS. Furthermore, online instructors should be challenged to design effective instructional multimedia and hypermedia to deliver instructional content so that online learners are able to improve their independent learning with high motivation (Howell et al., 2003; Skylar, 2006).

Independent Learning and Diverse Activities in Online Learning

Many researchers focus on group-based learning and group activities in online education (Barron, 2000; Choi, 2006; Haron, Cress, Hammer, & Friedrich, 2007; Khan, 1997). Video-conference settings, too, are becoming increasingly interesting for the organization of net-based learning environments because of the increase of new work capacities and price reduction in hardware equipment (Hron, Cress, Hammer, & Friedrich, 2007). Researchers also analyze positive effects from the incorporation of group-based activities into online learning circumstances (Barron, 2000; Choi, 2006; Haron, Cress, Hammer, & Friedrich, 2007; Khan, 1997).

There are many benefits of activities that enhance students' learning (e.g., quantitative solutions and expanding experiences with classmates). Barron (2000) maintains high-achieving students benefit from collaborative work with peers who are in similar achievement levels. In addition, group members can jointly monitor solution processes and prevent errors or inefficient explorations of incorrect solution paths (Schoenfeld, 1989). For instance, because of the increasing advancement of communication technologies, videoconference settings with application sharing might be increasingly used for collaborative learning in university and vocational education (Hron et al, 2007). Online instructors should be able to incorporate collaborative activities into online learning while using advancing communication technologies in effective instructional design so that online students enhance online learning independently.

Instructional Technology Tools and Media in Online Education

Over time, many technologies for learning have been developed. Newer technologies, such as interactive video, computer based instruction, and hypermedia, have been getting more convenient and important for delivery of educational contents and resources efficiently. Besides, new technologies include the use of computers, compact discs, digital videodiscs (DVDs), satellite communications, internet, and so on. Instructors are no longer limited to the confines of a classroom. Through a school media center and computer networks such as the Internet and campus intranets, the world becomes each student's classroom on the Web (Heinich, Molenda, Russell, & Smaldino, 2002).

In particular, with instructional design in online education, online students can be motivated by the use of diverse media (e.g., streaming video, streaming audio, hypermedia, and video conferencing). In addition, there is the evidence that situations involving the use of instructional technologies that are authentic, relevant, and stimulating to learners are more likely to influence attitudes and performance (Shyu, 2000). With video-based format anchored instruction, students could watch stories and experience the situation more vividly, and interact with the embedded data more easily (Shyu, 2000). Also, using digital audio in Computer Based Training (CBT) can be easily recorded, digitized, and inserted into an existing program, providing much greater program longevity (Barron & Kysilka, 1993)

Diverse media including multimedia and hypermedia use is very effective in online learning and is based on a cue summation theory (Koroghlanian & Sullivan, 2000). This principle of learning theory predicts that learning increases as the number of available cues or stimuli is increased (Barron & Kysilka, 1993; Hsia, 1968). Shyu (2000) suggests that technology will make a difference in educational reform by emphasizing student-centered rather than teacher-centered learning. He also postulates that instructional technologies and diverse instructional technology media are the hope for bridging the gap between the classroom and the real world conditions within which students are expected to work outside of a classroom.

Instructional Technology Tools and Media

Online instructors should be able to understand positive effects according to diverse instructional media and to incorporate diverse media including multimedia and

hypermedia into online instructional design so that their students can enhance their own independent learning with positive motivation. Shyu (2000) suggests that learning mathematics can be more enjoyable and enhanced by a systematized, instructional design which incorporates learning theory and multimedia video technology into instruction.

Streaming video. With the emergence of the Internet and World Wide Web (WWW), a new form of video distribution called streaming video became possible and is being increasingly used in a web-based instruction (Garrison, 2001; Reed, 2003). Streaming video is defined as a sequence of moving images that are sent in compressed form over the Internet and displayed by a viewer program as they arrive (Shephard, 2003). Sound and video files are transferred and delivered into small packets over a web server to individual users on demand via individual computers with Internet access. Users are able to click on video hyperlinks that take them to stored media files and download them, but it is much faster for users because streaming video does not need to be downloaded as a discrete file (Garrison 2001; Shephad, 2003). In addition, the streaming video is stored as a temporary file on the user's computer and deleted when a media player is closed. This control allows users flexibility to watch, work with, re-sequence, link-to, or otherwise make use of the online video (Shephard, 2003).

Streaming video is a valuable tool for improving class content and teaching methods for online education delivery, and it has been integrated with online instruction at many institutions (Garrison, 2001; Mortensen, Schlieve, & Young, 2000). The primary advantage of streaming video is that it helps students to self-pace their learning by allowing them to choose where and when to watch clips (Hartsell & Yuen, 2006). In sum, benefits of using streaming video in an educational setting is that the potential audience

could be anywhere in the world; there can be an unlimited number of audiences; and live lecturing can occur. In particular, streaming video can allow educators to create visually driven materials that are more appealing to learners (Shephard, 2003).

Streaming audio. Streaming audio can be defined as a stream format of sound or voice that are sent in compressed form over the Internet and displayed by media play program as they arrive. Sound files are transferred and delivered into small packets over a web server to individual users on demand via individual computers with Internet access. The streaming audio can be stored as a temporary file on the user's computer and deleted when the media player is closed (Garrison, 2001). Online students are able to click on audio hyperlinks that take them to the stored media files and download them in order to listen flexibly and repeatedly.

McGreal and Elliot (2009) suggest that streaming audio has been more successful than video, which has generally been limited to small picture sizes or low resolution for video. Students learn better when words in multimedia messages are presented as spoken text rather than printed text only (Mayer & Anderson, 1991; Najjar, 1998). Multimedia presentation results in superior learning when pictorial information (i.e., visual modality) is accompanied by narration (i.e., auditory modality) rather than by on-screen text (i.e., dual verbal presentations in the visual and auditory modalities) (Low & Sweller, 2005; Moreno & Mayer, 1999).

Multimedia. Multimedia in education could be defined in a number of ways. Mishra and Sharma (2004) suggest that this definition gives two ways related to two approaches; one approach is termed as the 'multiple-media' utilization, and the other in which a combination of different channels acquires unification as a medium. The

approach of combination in effective multimedia means that multiple elements of media (e.g., audio, video, graphics, text, animation) could be integrated to enrich students' learning and provide more benefits to learners (Mishra & Sharma, 2004).

Due to this technological improvement, multimedia enhanced web-based course management system is also aimed to improve the level of instructional quality in higher education (Emiroglu, 2007). Using multimedia contents effectively enables lectures within courses more to be comprehensible and intelligible because it is very easy to integrate multimedia content in the course curriculum by using the Baskent University Course Management System (BUCMS) (Emiroglu, 2007). Using effective multimedia with web based interactive CMS has been gaining popularity and is critical to teaching and learning in the field of higher education and online learning.

Hypermedia. Hypermedia adds video clips, graphics, and/or audio files to hypertext. Ivers and Barron (2006) suggest that these multiple modal approaches to education effectively offer students with diverse learning and cognitive styles. They also show that "Hyper" environments, such as hypertext and hypermedia, are the most important delivery method of educational materials to online learning environments based on CMS. Another term, 'interactive multimedia', is a catch-all phrase to describe the hypermedia with a new wave of computer software that primarily deals with a provision of information (Mishra & Sharma, 2004). These researchers suggest that the 'interactive' component refers to the process of empowering users to control the environment usually through a computer running educational software. Such diverse patterns of multimedia, hypermedia, and interactive multimedia can be used in this online

learning based on CMS according to diverse educational purposes with which to promote achievement and motivation in online educational courses (Emiroglu, 2007).

Video conference. Video conference extends the concepts of audio telecommunication and teleconference by adding video and applying specialized software (e.g., Skype 5.0 Beta and Microsoft NetMeeting). Connected computers need microphones, speakers, video cameras and specialized software such as Microsoft NetMeeting which is a popular program for teleconferencing (Alessi & Trollip, 2001). Teng and Taveras (2004) also maintain that this video conferencing system has become an innovative combination of synchronous education using live streaming video, audio, and chat over the Internet, blended with asynchronous online discussion and group activities so that instructors enhance students' learning.

Videoconference settings are becoming more interesting for the organization of net-based learning environments because of increasing new work capacities and price reduction in hardware equipment (Hron, Cress, Hammer, & Friedrich, 2007). Hron et al. (2007) also maintain that video conference settings with application sharing will be increasingly used for collaborative learning in university settings because of the advancement of communication technologies. Video conferences, however, have certain limitations in comparison with face-to-face communication: Eye contact is not possible; deictic gestures are restricted; and contextual conditions are merely apparent to communication partners to a limited degree (Bruce, 1996; Finn, 1997). Online instructors can incorporate video conference technology into a web-based learning environment to activate collaborative learning with shared applications or shared workspaces considering these critical limitations.

Instructional Technology Media including Instructional Method to Online Learning

There is no doubt that it is very important to use diverse instructional media in online education and traditional classes. Many research studies show that students learn more from well-designed multimedia presentations than from traditional verbal-only messages, including improved performance on tests of problem-solving transfer (Mayer, 2003; Najjar, 1998; Sweller, 1999). There are advantages in this learning process such as promoting more high level reasoning and logical skills by using diverse technologies and multimedia (Choi, 2006; Mayer, 2003). The cooperative group work in synchronous/asynchronous telecommunication encourages learners to enhance their higher order thinking skills and problem solving skills (Schwier, 2002).

Intrinsic motivation can carry other significant advantages such as personal satisfaction, challenge, relevance, and promotion of a positive perspective on lifelong learning (Kinzie, 1990). Bitter & Pierson (2002) explain that technologies refer to more than computers, including a range of electronic methods and tools that can be used to support learning. Instructional technologies including proper instructional method can be used to supplement traditional instruction and these self instructional materials can promote student understanding with motivation and satisfaction (Bennett & Glover, 2008; Choi & Johnson 2005).

Learners in off/on-line classes are also more motivated from well-designed multimedia presentations in which diverse instructional technologies and multimedia can be incorporated into learning and teaching by applying effective instructional methods. For instance, Gorrell and Capron (1990) conducted research to determine how expert knowledge can be effectively imparted to learners using direct instruction video and

cognitive modeling video. The findings of this study indicate that students in the cognitive modeling video group had higher levels of recall and application than students in the direct instruction video group (Gorrel & Capron, 1990).

In these studies related to video-based anchored instruction (Cognition and Technology Group at Vanderbilt, 1992; Shyu, 2000; Van Haneghan, Barron, Young, Willians, Vye, & Bransford, 1992), students report that the video-based anchored instruction makes the class more enjoyable and helps them better appreciate the usefulness of what they learned from the instruction. Students also perceive that the video-based anchored instruction motivates them to more actively engage in a class. Furthermore, in the Jasper project, conducted by the Cognition and Technology Group at Vanderbilt University (CTGV, 1992), this research finds that video-based instruction involving a constructivist approach is successful in promoting students' learning as well as enhancing attitudes toward mathematics and instruction. Video-based instruction also provides learners with an environment that is conducive to group works and generative learning activities (Cognition and Technology Group at Vanderbilt, 1992). The researchers conclude that video-based instruction should be elaborately designed and appropriately used in order for it to be effective to learners. In addition, effective application of instructional technology tools or media can be activated more effectively when these instructional technologies are incorporated into instruction and curriculum considering proper instructional method.

Technology and Motivation

In education, learning technologies and the World Wide Web (WWW) enable integration, manipulation, and delivery of various media. Network resources in a classroom will significantly impact students' access to real-world data exchanges. One of the most exciting and promising areas of technological advancements will be in our schools (Bitter & Pierson, 2002). As costs of information technologies (e.g., microcomputers, Internet services, and web servers) decrease and the economic demand for computer-literate adults increase, school systems will be able to build up information infrastructures and strengthen learning using technologies in classrooms and diverse college settings (Heinich, Molenda, Russell, & Smaldino, 2002). It is clear that future technologies will become more interactive, promoting exploration, problem solving, communication, and higher-order thinking with motivation and interest (Valdez et al., 1999).

Another important issue will be relevant to promotion of motivation in terms of using technology in learning and teaching. Three thousand high school students drop out of school every day and it has been noted that motivation is at the heart of the issue since teachers and researchers can identify that 'motivation' is the most difficult and the most important factor in our education (Quinn, 2007). Technology has been shown to allow learners control, increase motivation, provide connections to the real world, and lead to increased achievement when these technologies are tied to content standards and the needs of the learners (Valdez et al., 1999). Media based instruction and learning including diverse technologies can be effectively applied to students' understanding and learning so that instructors can motivate their students to learn independently.

Audio-based Instruction and Motivation

Little research exists to support the notion that adding audio to Computer-based Instruction (CBI) can improve learning (Koroghlanian & Sullivan, 2000). However, studies relevant to motivation and satisfaction have demonstrated that adding audio technology to CBI can be significant in improving positive motivation. Koroghlanian and Sullivan (2000) maintain that audio has usually been added to CBI with the intention of gaining attention and increasing motivation including sound effects, musical interlude, and congratulatory phrases.

In the study of comfort levels in listening to audio on the computer, Rodriguez et al. (2008) represents that 72% respond feeling comfortable about listening to audio on a computer, and 64% answer that they are comfortable regarding viewing video on the computer. In addition, the level of comfort is significantly related to motivation and satisfaction for students with online learning experience. Students can feel more comfortable listening to audio on the computer than viewing video on the computer. It is possible to conclude that the audio technology can result in higher motivation and satisfaction than video technology according to different learning styles of online learners.

Video-based Instruction and Motivation

Video technology can be a valuable source for creating multiple settings, events, and scenarios in order to facilitate generalization (Browning & White, 1986; Mechling, Gast, & Langone, 2002; Morgan & Salzberg, 1992). Moreover, video might be superior for learning complex skills because it could expose learners to problems, equipment, and events that might not be easily demonstrated (Anderson et al., 1989; Overbaught, 1995).

Smith and Ragan (1999) maintain that these advantages of streaming media (i.e., exposition and easy explanation of problems, equipment, and diverse learning materials and encoding new knowledge into long-term memory in a meaningful way) have the potential to enhance learners' retention and motivation.

In particular, video technology could convey the information or knowledge in a more interesting way and allows the portrayal of complicated contexts (Cognition and Technology Group, 1992). Tantrarungroj (2008) suggests that embedded streaming video can be a suitable learning rehearsal tool because it could convey information in a more interesting way than using plain text alone. Choi and Johnson (2005) explain that context-based videos in online courses have the potential to enhance learners' retention and motivation in the study which examines whether video-based instruction can affect learning (e.g., comprehension and retention) and motivation (e.g., attention, relevance, confidence, and satisfaction) by comparing learners' perceptions of both video-based instruction and text-based instruction in an online context-based learning situation. In another example, middle school teachers also report that when streaming videos are used in mathematics classes, students seem to be paying more attention during class time and are much more engaged with their lessons (Boster et al., 2006). Consequently, streaming video helps students to have better attention and to increase their motivation (Bennett & Glover, 2008; Choi & Johnson 2005; Cofield, 2002; Green et al., 2003; Jha et al., 2002; Reisslein et al., 2005; Zhang et al., 2006).

How to Use Diverse Technologies to Enhance Students' Learning and Motivation

One of the most important roles of media and technology is to serve as a catalyst for a change in the whole educational (instructional) environment. Technology facilitates cooperative learning (or learning together) to achieve a common academic goal or task (Hron et al., 2007). The technology for learning or cooperative learning involves an active participatory role by all students who present an active interaction in group projects. Game and simulation are the most interesting learning tools. Games provide attractive frameworks for learning activities. That is to say, they are a very attractive framework for learning activities since they are fun for learners (Alessi & Trollipi, 2001).

Online learners could benefit from the strength of media and the integration of control tools. These tools help learners plan, execute, and manage their learning experience at the place and time of their choice (Schwier, Brown, Misanchuk, & Proctor, 1992). For instance, video cassettes and video discs require learners to respond to their participative exercises, and interactive video captures learners' attention and holds their interest by providing questions and requiring frequent responses. Now it is possible that video and multimedia combine the advantages of self-paced, learner-managed study, with built-in attributes for two-way communication.

How instructors integrate the technology into the lesson is more critical in our online educational circumstance since using integrating technology into instruction facilitates students' motivation and independent learning. When we examine fundamental strengths of information technology, specifically, software and its ability to store, respond, differentiate, and aggregate in multiple ways, it is clear that motivation and technology will be a natural pairing (Quinn, 2007). Quinn (2007) also holds that

advances in reading technology (or reading software) to supplement or strategically intervene are undeniable if careful planning and preparation of instructional technologies are in place. Instructors should be required to apply effective technologies and multimedia which are very far closed to positive motivation in learning and teaching.

The Panel on Educational Technology (1997) presents a series of strategies on the application of various technologies to K-12: It is important to focus on learning with technology as a tool, not about technology as a subject, and to give special attention to professional development for teachers on the effective use of technology. In addition, instructors should be able to ensure equitable, universal technology access to all students, regardless of socioeconomic status, race, ethnicity, gender, or geographical factors. In order to integrate technologies effectively into students' learning, teachers need to think of educational evidences (The Panel on Educational Technology, 1997). For example, instructors need to think of whether computers can make students smarter, how actual classroom teaching and learning behaviors alter as a result of introducing computers to the curriculum, and whether this technological revolution is really good for our children. Students can work best when technology is not the topic itself, but is integrated into the entire curriculum.

Technology and Learning

It appears that student achievement in the online environment is comparable to student achievement in traditional courses (Diaz, 2000). Furthermore, studies based upon instructional technologies show a different finding, usually in favor of learning or recall benefits for text over video (DeFleur et al., 1992; Robinson & Davis, 1990), or possibly

no difference between text and video in learning or recall (Koehler, Yadav, & Phillips, 2005; Neuman, Just, & Crigler, 1992). For example, Clark (1983) holds that media are "mere vehicles that deliver instruction but do not influence student achievement."

On the other hand, studies suggest that online instructional techniques (e.g., streaming audio, streaming video, video conference, and collaborative online discussions) and appropriate instructional design of online courses impact student achievement and satisfaction (Smith, Smith, & Boone, 2000). It will be meaningful that a variety of instructional technologies in the online environment can be examined, which can impact students' academic achievement and enhancement in their learning.

Audio-based Instruction and Learning

Barron and Atkins (1994) hold that in research where computers are employed instead of videotapes, printed texts, 35 mm slides, or audiocassettes, no achievement difference between audio-text and text alone is found. Gramb and Struve (2009) compare textual and speech-based instruction for older adults to use mobile phones. In this study, they state that in an experiment, no differences occur between textual and speech-based instruction since multimedia use in training alone does not guarantee higher learning outcomes. Koroghlanian and Sullivan (2000) state that no significant difference in achievement is found among three treatment groups (Text Only, Full Text-Full Audio, or Lean Text-Full Audio). Furthermore, further results indicate that CBT with or without audio is equally effective (Barron & Kysilka,1993) because effectively designed, text-based CBT appears to be sufficient for teaching basic knowledge similar to that contained in the CD-ROM tutorial.

On the other hand, some researchers find that learners who received animation and narration perform better on tests of retention and transfer than do learners who received animation and on-screen text; that is, students learn better when words in multimedia messages are presented as spoken text rather than printed text only (Mayer & Anderson, 1991; Najjar, 1998). In sum, in terms of academic performance as an instructional technology tool, learners who received animation and narration perform better on tests of retention and transfer than do learners who received animation and on-screen text.

Researchers have also studied technology that provides audio-based instruction with pictorial/visual instructional materials. Mayer and Moreno (2003) define the redundancy effect as the finding that "students understand a multimedia presentation better when words are presented as narration rather than as narration and on-screen text. Besides, in the modality effect, multimedia presentation results in superior learning when pictorial information (i.e., visual modality) is accompanied by narration (i.e., auditory modality) rather than by on-screen text (i.e., dual verbal presentations in the visual and auditory modalities) (Low & Sweller, 2005; Moreno & Mayer, 1999). Audio-based instruction can be maximized as online instructors can incorporate audio and pictorial information into online instruction. Simultaneous audio and visual information (i.e., pictorial information) may be experienced as non-redundancy and the overload of information may be avoided (Debuse et al., 2009)

Video-based Instruction and Learning

Video technology can convey information or knowledge in a more interesting way and portray complicated contexts for learning complex skills (Anderson et al., 1989;

Cognition and Technology Group, 1992; Overbough, 1995). However, video-based instruction cannot always make much better results in learning and achievement. Results from half of the studies show that learning is better when both audio and video information is presented, while the other half of studies show that learning is not a significantly different (Debuse et al., 2009). For example, Tantrarungroj (2008) suggests that no significant difference between embedded streaming video instruction and static graphics only with online text is found as measured by the content-related immediate posttest. In addition, Choi and Johnson (2005) hold that there is no significant difference between video-based context and traditional text-based instruction in online courses on learners' understanding.

Even though many studies suggest different results regarding the use of audiovisual technology tools in instructional designs, instructors and learners can receive many benefits from using video-based instruction. Video has become less expensive and less complicated. With video clips, complex and abstract concepts can be simplified through visualization, and vicarious experiences and visual access to a world outside the classroom could be provided to learners (Brown & Fortosky, 1986; Heinich, Molenda, & Russell, 1989; Oliver, 1994). Video should be considered in designing instruction because of its rich capabilities to combine motion, images, and auditory information in realistic ways to help students reach the higher levels of learning (Wetzel et al., 1994).

Video-based media employ visual, audio, and other representational symbol systems that allow viewers to see actual objects and realistic scenes that would be difficult to convey through a textbook or lecture format. It also enables them to see sequences in motion, and view perspectives that are difficult or impossible to observe in

real life (Wetzel et al., 1994). Moreover, a broader availability of technologies such as broadcasts, teleconferencing, videotapes, videodiscs, and emerging multimedia combinations of computer have led to an increasing use of visual forms of instruction (Wetzel et al., 1994).

Video technology or video-based instruction can help learners easily understand and remember educational contents because the audiovisual instruction is more memorable than the traditional text based instruction (Choi & Johnson, 2005; Jonassen et al., 1999). For example, Baggett (1984) explains that information obtained visually is more memorable based on her finding that summaries written a week after viewing a movie are judged to be more complete than those written a week after listening to the audio-only version. Kozma (1991) also supports the fact that simultaneous processing of auditory and visual information is memorable.

Video-based instruction is important to improve students' understanding in learning. Video clips act as a learning reinforcement, as students could replay sections that they need to repeat (Cofield, 2002). The students who accessed streaming video respond that it helped them have a better understanding of content. Salomon (1994) postulates that learners who have limited prior knowledge might benefit from information in the multiple-symbol system of video technology because it can promote their understanding. In addition, video might be superior for learning complex skills because it exposes learners to problems, equipment, and events that cannot be easily demonstrated and understood verbally (Anderson et al., 1989; Overbuagh, 1995).

Using video may lead to better learning outcomes and be more memorable than text-based instruction, but results are dependent upon how to use video technology in

learning (Wetzel et al., 1994). It is critical to review the diverse positive results (i.e., learning, retention, understanding, academic achievement, etc) with using video technology or video-based instruction. In this study relevant to comparing different media, Gram and Struve (2009) held that video-supported knowledge acquisition is better than the knowledge acquisition from a text because image cues have a higher impact during the learning process. In addition, Lin and Hsieh (2006) as well as Mykityshyn, Fish, and Rogers (2002) showed in experiments that elderly people profit more from applied animated or video-based instructions in the use of technical devices than from written manuals because audiovisual presentations can compensate for reduced working memory capacities, reduced integration, and slow cognitive speed.

Advocates of streaming video claim that video increases attention and improves learning environments which lead to increased understanding and achievement (Herron, Cole, Corrie, & Dubreil, 1999; Reed, 2003). According to studies on the impact of streaming video on learning effectiveness and retention, using streaming video within the online learning environment leads to better learning outcomes and higher learner satisfaction (Choi & Johnson, 2005; Zhang et al., 2006).

Boster and his colleagues (2006) maintain that video can be used as an effective supplement to instruction that has a high probability of improving learning. For instance, Boster and his colleagues (2006) explore the effectiveness of streaming video on student achievement in a rural area of the southeastern United States. The design of the study is a pretest-posttest control group design. The research finds that streaming video introduction has a substantial impact on student examination performances of third graders in social studies ($F(1, 627) = 98.85$, $p<.001$), eighth graders in social studies (F(1,

425)=233.02, p<.001), and third graders in science (F(1, 631) = 28.59, p<.001). In sum, they suggest that streaming video may enhance student attention, and increase students' academic achievement.

In particular, it might be also necessary to review interactive application of video technology in online learning such as interactive video. For example, students are randomly assigned to one of four different settings: online learning with interactive video, online learning with non-interactive video, online learning without instructional video, and traditional classroom environment. There are significant differences in posttest scores and levels of satisfaction between the e-learning group with interactive video and the other three groups. In general, students have a better learning outcome and higher learner satisfaction toward the interactive video (Zhang et al., 2006). Furthermore, Abadir, Anglin, and Gooden (1993) suggest that interactive video instruction had a positive educational influence on students' achievement in basic mathematics skills. Interactive video that provides individual control over random access to content may lead to better learning outcomes and higher learner satisfaction (Zhang et al., 2006).

In studies related to video-based anchored instruction (Cognition and Technology Group at Vanderbilt, 1992; Shyu, 2000; Van Haneghan et al., 1992), students report that the video-based anchored instruction makes classes more enjoyable and helps them better appreciate the usefulness of what they learn from the instruction. Students also perceive that the video-based anchored instruction motivates them to more actively engage in the class. In summary, video technology tools or streaming video can be superior for learning complex skills to one of the diverse technologies (e.g., streaming audio, slides with/without audio, text-based instruction, etc) because they can help enhance students'

understanding by exposing learners to problems, equipment, and events that could not be easily demonstrated or understood verbally (Anderson et al., 1989; Overbaught, 1995; Salomon, 1994).

Summary of the Literature

This chapter is composed of five sections. The first section focuses on theoretical framework as follows: (a) the cognitive theory of multimedia learning (CTML); (b) important theories based on CTML; (c) learning process; (d) critical effects of CTML; and (e) effects of incorporating proper instructional method into teaching and learning. The second section addresses online learning as follows: (a) important elements; (b) learner-centered instruction; and (c) independent learning and diverse activities. The third section presents instructional technology tools and media in online education including a proper educational method. The fourth section reviews technology and motivation by describing: audio-based instruction and motivation; video-based instruction and motivation; and how to use diverse technologies to enhance students' learning and motivation. The fifth section reviews technology and learning based on video-based instruction and learning and audio-based instruction and learning.

The review of literature in this chapter helps provide the scholarly framework for this study. The first section of this chapter focuses on a review of the literature related to cognitivism and constructivism. In particular, Mayer's Cognitive Theory of Multimedia Learning (2003) is reviewed with several important elements, which are based on multimedia learning (i.e., dual coding theory, load theory, learning processing, and critical main effects).

The second section of this chapter briefly addresses important elements to enhance learning in online learning. Rodriguez and Montanez (2008) suggest that motivation and satisfaction could be determining factors for the success of online courses. In addition, the instruction in online learning is getting more learner-centered and independent to online students so that they have the capacity to control the pace of learning independently (Howell et al., 2003; Moore & Kearsley, 2005).

The third section of this chapter focuses on instructional technology tools and media which have been getting more convenient and important for delivery of educational content and resources efficiently. In addition, online students could benefit from positive effects of instructional technology tools and media that help learners self-pace their learning with positive motivation (Hartsell & Yuen, 2006). Online instructors are required to integrate technologies and media into online learning with proper instructional method so that online learners can enhance their independent learning with motivation and satisfaction.

The fourth section of this chapter puts emphasis on relationship between technology and motivation by reviewing positive results of audio-based and video-based instruction toward motivation. Motivation is a critical issue since online instructors and researchers can identify that self-directed online learning is significantly related to students' motivation (Quinn, 2007). Besides, many studies show that streaming media and technology help students to have attention, and to increase their motivation (Bennett & Glover, 2008; Reisslein et al., 2005; Zhang et al., 2006).

Many studies suggest how online instructional techniques and appropriate instructional design could impact students' achievement (Smith, Smith, & Boone, 2000).

Video instructional media can help enhance students' understanding by exposing learners to problems, equipment, and events that could not be easily demonstrated (Anderson et al., 1989; Overbaught, 1995; Salomon, 1994). The last section of this chapter reviews positive results of audio-based and video-based instruction toward students' learning achievement. The following chapter provides the research design used to guide the research in this study.

CHAPTER 3: METHODOLOGY

Research Questions

Data were collected to compare the comprehension and instructional motivation of online students who received three different types of instructional delivery with or without using streaming media (e.g., video clips or audio files). The following research questions are addressed :

Research question one: Do the three different types of instructional media (text-based, audio-based, and video-based instruction) have a different effect on student motivation with Korean college students?

Research question two: Do the different types of instructional media (text-based, audio-based, and video-based instruction) have a different effect on content-related comprehension for Korean college students?

Research Design

This study used an experimental design with quantitative data. A between-groups experimental design with self-evaluation of a short form of IMMS and comprehension test was employed. This study included two experimental groups and one comparison group in a two-week period. This research design was as follows:

1. Students were randomly assigned to one of three groups: Two experimental groups with streaming media or a control group without streaming media.
2. In two experimental groups, one set of students received the video-based instruction (VBI) and the other group received audio-based instruction (ABI) with online text based on Cognitive Theory of Multimedia Learning (Mayer, 2001).

Independent Variable

The independent variable in this study was the different mode of instructional delivery with or without streaming media (e.g., video clips or audio files).

(a) Video-based instruction with online text (VBI) - This treatment is an experimental group. The instructional streaming video was inserted into a webpage based on instructional texts in an online lecture.

(b) Audio-based instruction with online text (ABI) - This treatment is an experimental group. The instructional streaming audio file was inserted into a webpage based on instructional texts.

(c) Text-based instruction (TBI) –This treatment is a control group. It consisted of web-based texts without streaming audio or video.

Dependent Variable

Two dependent variables in this study were motivation and comprehension on the students' knowledge in health counseling psychology. Two weeks later to complete online lectures, students took a content-related posttest and a short form of the Instructional Materials Motivation Survey (IMMS). The posttest was designed to examine online students' comprehension based on online lectures. The short form of IMMS was used to measure online students' instructional motivation.

In the first meeting with an instructor and students, a basic questionnaire was administered on the Web to collect demographic information and experiences in online courses (see Appendix B).

The posttests to measure students' instructional motivation and comprehension were administered as soon as the treatments in three groups were completed (see Appendix C and D). This specific plan helped the researcher acquire prompt responses and information in immediate learning and affective outcomes relevant to the three different types of instructional design with streaming media or web-based text only. This study took a two-week time period to obtain online students' comprehension and motivation according to different designed instructions. Besides, the comprehension test and modified IMMS were collected by using a paper-and-pencil questionnaire and examination.

Online students attended an online lecture via Course Management System at the Seoul Cyber University (CMSSCU). Participants' demographics (e.g., gender, age, and student year in a school) were collected for 237 online students who registered the online course of health counseling psychology. Participants for this study were randomly assigned to one of the three groups for two weeks. Table 1 depicts the design used in this study.

Table 1

Experimental Design (A Between-Groups Experimental Design with Three Levels)

Two week lesson	Before lesson	Right after completing Online lesson
X_{VBI}	O(Q)	E (C + M)
X_{ABI}	O(Q)	E (C + M)
X_{TBI}	O(Q)	E (C + M)

Note. XVBI = Video Based Instruction with Online Text (Experimental Treatment), XABI = Audio Based Instruction with Online Text (Experimental Treatment), XTBI = Text Based Instruction, O= Observation, Q= Questionnaire for Demographic Information of Participants, E= Examination (Test or Survey), C= Comprehension Test, M= Instructional Motivation.

Population and Sample

The target population of this study included the online college students majoring in the field of counseling and psychology at the Seoul Cyber University in Korea. A sample was selected through a convenience sampling procedure in an experimental design (McMillan, 2007).

An instructor who teaches a course titled “Health Counseling Psychology” helped administer this study. The participants in this study were the students who registered for this online course in fall 2011.

Participants were randomly assigned to one of three treatment groups. The sample groups are assumed to be homogeneous in their cognitive and learning abilities since

students were randomly assigned to one of three treatment groups. According to Cohen (1988), 30 participants per group is the minimum size required for the study using a one-way ANOVA. Consequently, the sample size for each group should be at least 30 in this study.

A total of 237 students registered for the course entitled "Health Counseling Psychology" in fall 2011 and were eligible voluntary participants for this study. Finally, a total of 172 students received the two-week online lectures for three treatment groups in this study and completed two posttests (e.g., modified motivation questionnaire and content-related comprehension test). This resulted in a response rate of 72.6%. Response rates in the 70% to 85% range can be viewed as very good (as cited in Choi, 2006). Table 2 shows the demographic information for the online students who registered in the online course.

Table 2

Frequencies and Distribution of the Online Students on Demographic Variables

Variable		*n*	*%*
Gender	Female	192	81.0
	Male	45	19.0
Age	21-30	37	15.8
	31-40	82	35.1
	41-50	91	38.8
	51-60	24	10.3
	Valid (missing)	234(3)	
School Year	*First Year*	*53*	22.4
	Second Year	9	3.8
	Third Year	134	56.5
	Fourth Year	41	17.3
Career	Professional job	55	23.2
	Officials	52	21.9
	Craft workers	3	1.3
	Housewives	61	25.7
	College students (without job)	66	27.8
Socioeconomic Status	Higher class	4	1.7
	Middle class	194	82.9
	Lower class	36	15.4
	Valid (missing)	234(3)	

Note. N= 237 (The number of students who registered for the course of Health Counseling Psychology)

Instructional Materials

In order to make equivalent instructional environments in online learning with control and experimental groups, the researcher used the Course Management System of Seoul Cyber University (CMSSCU) to deliver instructional materials with or without the use of streaming media. Interaction and feedback were maintained via email and a discussion board as given to the control and experimental groups by an instructor and two graduate assistants. Each online lecture was composed of four main sections. Section one contains a welcome message with lesson purposes and instructional guidelines. Section two features instructional content in a verbal channel in a conversational style with static graphics. Section three includes streaming media for the experimental groups. Section four is a short quiz to help the online students complete and understand their lessons in a self evaluation. The four sections are presented in Figures 1 and 2.

Figure 1. A screen capture of the online section one, two, and three (Translated into English)

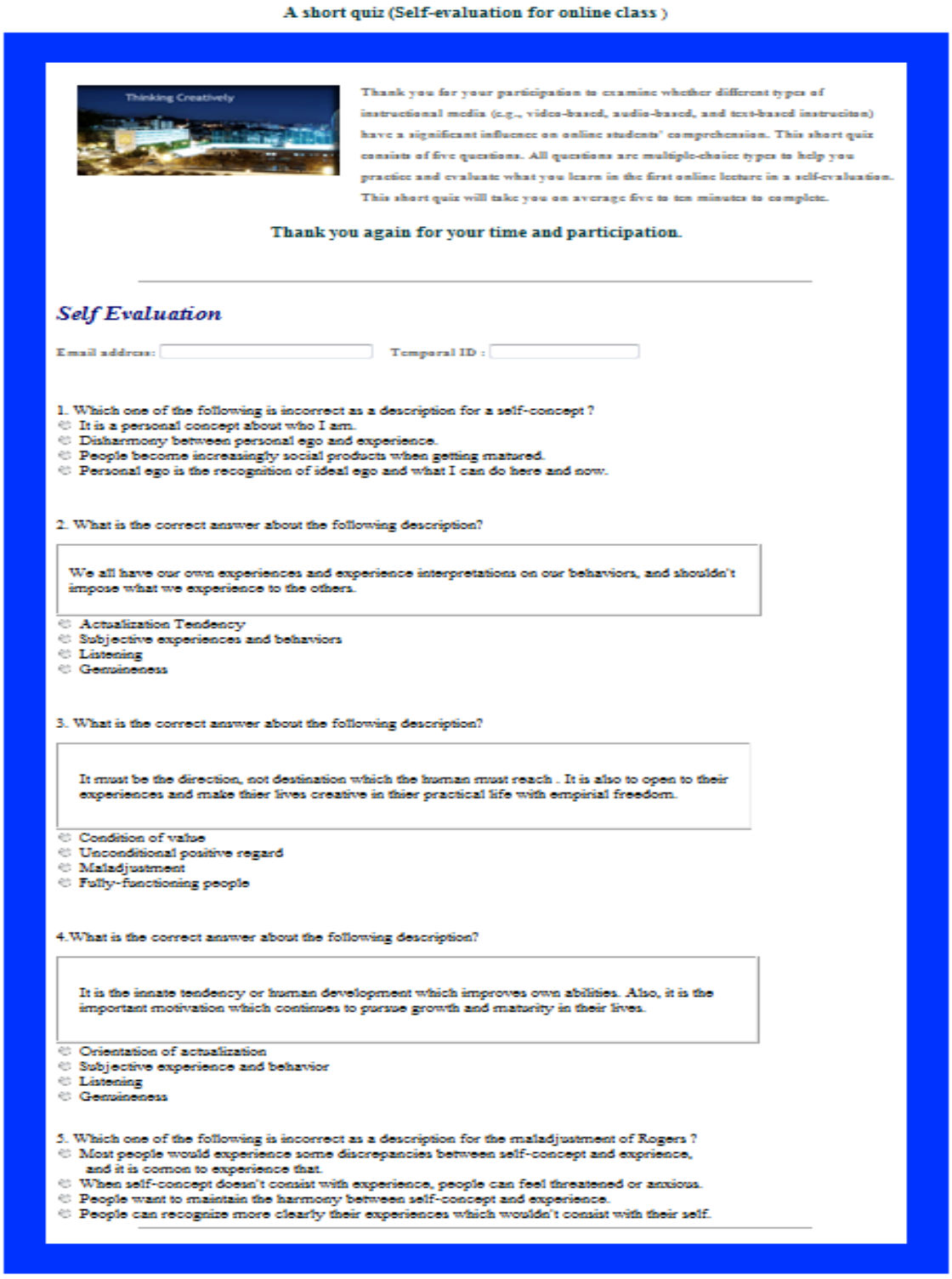

Figure 2. A screen capture of the online section four (Translated into English)

Design of the Screen

Skylar (2006) suggests that additional consideration for effective online learning includes effective instructional design. Therefore, each webpage with online text (or web text) was designed with several important design rules as follows: (a) each webpage including online content and graphics was developed by using fewer than five colors; (b) development of online text was considered with proper font-size (i.e., 16 for main heading and subheading, 14 for main text and content); and (c) online texts were represented in a good summarization and avoided overloading the same instructional content and concepts to reduce negative redundancy effects.

An instructional design rule is that reading web-based text by online participants should precede watching streaming video or audio instruction, so that students activate a basic schema to support subsequent understanding with perceptual and imagery-based materials (Beitzel & Derry, 2009). Consequently, online students used streaming video or audio after reading online content based on effective online design. The web-based teaching modules (i.e., online lectures) for three different groups were the same in a screen design except for embedded streaming video or audio (see Appendix E).

Streaming Media Production

Editing applications of video clips and audio files were done using Windows Movie Maker, Adobe Premiere Pro, and Camtasia Studio 5. First, the multimedia developer videotaped two lectures in a studio and transfer the video files into mpg files. Then the recorded files were edited by the above video editing programs and developed into educational streaming media. The final edited streaming media were uploaded to the

institutional server at SCU. The video or audio was embedded into Web-based Teaching Modules. And then, the WTMs were hyper-linked in CMSSCU.

Instruments

For this research, two kinds of tests in self assessment were used to evaluate instructional motivation and content-related comprehension from online lecture.

Short Form of Instructional Materials Motivation Survey (IMMS)

Keller's Instructional Materials Motivation Survey (IMMS). Keller developed two instruments that measure ARCS components of motivation (i.e., Attention, Relevance, Confidence, and Satisfaction), the Instructional Materials Motivation Survey (IMMS) and the Course Interest Survey (CIS). The IMMS is a 36 item survey with a Likert-type scale (Keller, 1993). Participants are asked to think about each statement in relation to the instructional materials they have just studied, and to indicate how true each statement is. The response scale ranges from 1 (Not True) to 5 (Very True). Thus, the minimum score on the 36 item survey is 36, and the maximum is 180 with a midpoint of 108. The minimums, maximums, and midpoints for each subscale vary because they do not have the same number of items. There are 4 subscales: one for each of the ARCS components (Attention, Relevance, Confidence, and Satisfaction). Ten of the 36 items are reversed. The development of the IMMS is detailed in Keller (1993). The IMMS measures the situational components of learning motivation with regard to specific instructional materials. Keller (2008) also puts an emphasis on self-regulation and interaction with the four critical subcategories (Attention, Relevance, Confidence, and Satisfaction) to explain instructional materials motivation in e-learning.

Manual (Short Form of IMMS). The Short Form of IMMS is a 20-item survey with a Likert-type scale. Participants are asked to think about each statement related to the course itself, and to indicate how true each statement is. The response scale ranges from 1 (not true) to 5 (very true). Therefore, the minimum score on the 20 item survey is 20, and the maximum is 100 with a midpoint of 60. There are five components: Four of the ARCS components (Attention, Relevance, Confidence, Satisfaction) and one for external motivation. To measure online students' instructional motivation, the short form of IMMS was modified by Heo (2010). Seventeen items out of 36 items of IMMS were used and nine questions were eliminated since the items were similar and repeated. Besides, three items were added to measure the last subcategory for external motivation.

External motivation consists of four items relevant to usability and the self-regulation of Keller (e.g., flexibility and interaction) in e-learning. Keller (2008) suggests that motivation is promoted and maintained when learners are able to use self-regulation to promote their intentions. He also holds that technology and interaction promote the motivation of students in e-learning. Extrinsic elements of interaction and technologies are added to the subcategory of self-regulation because interaction and using technologies are critical for the promotion of students' motivation with students' self-regulation in online learning (Keller, 2008; Rodrigues et al., 2008; Skylar, 2004). Finally, the self-regulation is changed into the external motivation by Heo (2010). The external motivation includes critical extrinsic elements (e.g., time flexibility, place flexibility, interaction and technology) because the extrinsic elements can explain instructional materials motivation in online learning (Keller, 2008; Rodrigues et al., 2008). Two out of

the 20 items are reversed. In Table 3, the method of grading for the Short Form IMMS is presented with reverse coding for two items.

Table 3

How to Grade with 20 Questions

Subscale	Questions	Grade
Attention	1	(1 to 5)
	2	(1 to 5)
	3	(1 to 5)
	4	(1 t0 5)
Relevance	5	(1 to 5)
	6	(1 to 5)
	7	(1 to 5)
	8	(Reverse; one is five and five will be one)
Confidence	9	(1 to 5)
	10	(1 to 5)
	11	(Reverse; one is five and five will be one)
	12	(1 to 5)
Satisfaction	13	(1 to 5)
	14	(1 to 5)
	15	(1 to 5)
	16	(1 to 5)
External Motivation	17	(1 to 5)
	18	(1 to 5)
	19	(1 to 5)
	20	(1 to 5)

Questionnaire in subscales for the short form of IMMS. There are five subscales including external motivation. The five subscales are as follows:

1. Attention: Motivation to learn is promoted when a learner's curiosity is aroused due to a perceived gap in current knowledge.
2. Relevance: Motivation to learn is promoted when the knowledge to be learned is perceived to be meaningfully related to a learner's goals.

3. Confidence: Motivation to learn is promoted when learners believe they can succeed in mastering learning tasks (or mastering the tasks to be required for their learning courses).
4. Satisfaction: Motivation to learn is promoted when learners anticipate and experience satisfying outcomes to a learning task.
5. External Motivation: Motivation to learn is promoted when learners can get time flexibility, place flexibility, and significant interaction. External motivation is modified from self-regulation of Keller including critical extrinsic elements of interaction and technology (Keller, 2008; Rodrigues et al., 2008).

In Table 4, specific items are presented with questions which consist of motivation according to five subscales.

Table 4

Questions according to Five Subscales

Subscale	Elements	Questions
Attention	Curiosity	(A-1) It is important for learners to be curious about learning materials and lessons.
	Perceptual Attention	(A-2) The quality of the instruction or course should be constructed to hold learners' attention.
	Interest	(A-3) It is important for learners to have interest in a course.
	Variability	(A-4) Variability in a course is important to prevent boredom or frustration to learners.
Relevance	Learner's Goal	(R-1) The instruction is related to learners' goal.
	Useful Contents	(R-2) Useful content and strategies in the lessons could encourage learners to achieve learner's goal.
	Familiarity	(R-3) The instruction is related to learners' experiences which motivate learner's learning.
	Needs	(R-4) The instruction is related to learner's needs and competency.
Confidence	Obvious Instruction	(C-1) An obvious instruction is to provide learner with clear learning objectives and expected outcomes of the instruction.
	Positive Consequence	(C-2) Positive consequences occur when learners accept the course successfully with great instruction and lessons.
	Positive Expectancy	(C-3) Learners can succeed in mastering their learning tasks when students can build up positive personal

		expectancy.
	Positive Learning Experience	(C-4) Positive learning experiences in the lesson promote learners to succeed in mastering their learning tasks.
Satisfaction	Positive Feeling	(S-1)Learners can get positive feeling when they anticipate and experience satisfying outcomes in a learning task.
	Positive Opportunities	(S-2) Learners can be motivated when they will be provided with opportunities to apply what they have learned.
	Extrinsic Rewards	(S-3) Learners are recognized for their accomplishment, either verbally or through actual rewards.
	Well-designed Instruction	(S-4) The well-designed instruction reinforces students' learning satisfying outcomes in a learning task.
External Motivation	Usability	(E-1) Usability is related to motivation in learning.
	Time Flexibility	(E-2) Time Flexibility is related to motivation in learning.
	Place Flexibility	(E-3) Place Flexibility is related to motivation in learning.
	Interaction (Relationship)	(E-4) Learners are motivated when interaction can be given effectively in their learning progress.

Validity and Reliability. A modified short form of IMMS was used to evaluate instructional motivation with Korean college students in an online course. The statements of Keller's IMMS were adjusted to meet the need of this study; 19 statements were removed, and three statements were added. The statements in the short form of IMMS were translated into the Korean language and examined by four professors to pursue

content validity (Heo & Han, 2011). Prior reliability testing of the IMMS instrument using Cronbach's alpha measure is greater than .81 in all 4 subscales (Attention, Relevance, Confidence, and Satisfaction) and ARCS total score in Keller (1993). The short form of the IMMS (20 items) also yielded a high reliability coefficient (Cronbach's alpha = .92) (Heo & Han, 2011). In addition, a field test was conducted to evaluate the short form of IMMS for an online course. The reliability analysis of the modified IMMS produced a Cronbach's coefficient alpha of .86.

Comprehension Examination

This study employed the comprehension examination that reflected the learning objectives of the online lessons for which different treatments in three groups were given. A comprehension test was also constructed to measure the content-related comprehension of online lectures on health counseling psychology. The test is composed of 20 questions related to lesson objectives as shown in Table 5. The comprehension examination also consists of 20 multiple-choice questions. The comprehension test was developed by a researcher and an instructor who had a professional experience in necessary assessment related to these online courses. Four professors related to these educational realms for counseling and psychology reviewed the test of comprehension to check whether questions corresponded to learning objectives of these online lectures, so that the content validity of comprehension test was ensured.

Table 5

Learning Objectives and Content

Online Lecture		Objectives	Learning Content
First Lecture (First week)	Lesson one	A student should be able to understand the theory of human-centered counseling through Carl Rogers' life. A student will be able to understand human behaviors in the human-centered counseling.	a. The life of Carl R. Rogers 91902-1987) b. The perspective of Rogers on human nature c. Human tendency of self-actualization as the motive
	Lesson two	A learner should be able to understand the basic theoretical concepts of the theory such as self-actualization tendency, unconditional positive regard, the condition of value, and self-concept. A student will be able to explain and discuss about what is adaptation and maladjustment in human-centered counseling learning content.	a. Self-concept b. The desire of positive regards or treatments c. Unconditional positive regard d. Maladjustment: the experience of threats and defense mechanism
Second Lecture (Second week)	Lesson one	A student will understand the goals of counseling for a client in human-centered counseling. A learner should be able to understand the important roles of a counselor and the change process of a client in human-centered counseling.	a. The goals of human-centered counseling b. The important roles of a counselor in human-centered counseling c. Congruence or genuineness c. Unconditional positive regard e. Empathetic understanding
	Lesson two	A student should be able to explain and discuss about therapeutic relationship between a client and a counselor and how to express clients' emotions.	a. Therapeutic relationship b. Relief of feelings

Validity and reliability for the content-related comprehension. A content-related comprehension test was used to evaluate students' comprehension after two-week online lectures in their online courses. The comprehension examination which consisted of 20 multiple-choice questions were examined by the four professors to pursue face and content validity. In addition, a field test was conducted to evaluate the content-related comprehension test for online students. The split-half reliability of the comprehension test was .87.

Treatments or Implementation Procedures

Main stages for implementation procedures included the field test of instructional materials and main experiment to completely accomplish the well-designed online lectures for this study.

Field Test

A field test was conducted prior to the main experiment. Five student volunteers participated in video-based instruction with online text. Another 5 participants took part in audio-based instruction with online text.

The purposes of the field test were as follows: (a) the evaluation of easy accessibility and the functionality of online lessons or web-based teaching modules; (b) the prevention of flaws and unexpected problems of the sequence of the online learning with technology tools; and (c) the estimation of the amount of time that online students spend to complete each online lecture and complete the learning procedure for this research.

After that, the evaluation of the field test was performed with observation of the field test students, interview, and short form of questionnaire relevant to easy accessibility and functionality. Revisions were made based on the feedback of volunteers. In particular, each online lecture (or web-based teaching module) was evaluated and refined with several critical issues as follows: (a) effectiveness on using streaming media to enhance students' learning; (b) easy accessibility and design of streaming media; and (c) interaction and feedback.

The following feedback regarding the effectiveness for use was observed and the instructional media was refined:

1. After reading online texts based on online webpage, the length of each video clip and audio file was considered to avoid the distraction of attention and interest.
2. To prevent the disconnection or the frequent buffering of streaming media because of the limitation of Internet speed and bandwidth, total 30-minute video and audio lecture were split into three 10-minute video clips or audio files for each online lecture.

The following observations in easy accessibility and efficient design with streaming media were evaluated and the design of streaming media was refined:

1. The frame size of 640 x 480 pixel was used to help students watch the video clips comfortably.
2. Sound files were recorded in a well-prepared studio to prevent any noises and keep a good quality recording.

Interaction ways via discussion board and Email were used to help learners interact with students, and effective ways to interact with an instructor were refined.

1. Online students tended to want to get feedback as soon as possible in their online classes. Therefore, an online instructor and assistants tried to give feedback within 24 hours when questions through discussion board or Email were sent to the instructor.
2. The instructor promoted students to interact actively between a teacher and a student, and among students.

After the revision of the online lecture considering technology tools and interaction, two professionals reviewed online lectures to be refined for two weeks with several important issues as follows: (a) the development of online text based on critical effects of multimedia learning (e.g., multimedia effect and personalization effect); (b) easy accessibility and functionality of technology tools; (c) the instructional design of online text webpage and streaming media; (d) effectiveness of interaction via discussion board and Email; and (e) proper time length for each video clip or audio file including reading of online text in each online lecture. The review of professionals on the revised online lectures with streaming media resulted in positive feedback so that students could follow revised online text and instructional media with positive motivation. In addition, the content-related posttest was examined by content experts to determine content validity.

Main Experiment

This study was conducted in the fall semester of 2011. Table 6 shows activities that were performed during this study. One professor taught and controlled a large online class for about 237 students. The researcher made the first contact with students by

explaining the purpose of this study. Participants were also asked to complete a written consent form and the basic questionnaire regarding their demographic background and experiences in online learning. The informed consent letter based on the review approval from the committee of the Institutional Review Board is attached in Appendix A.

A researcher asked students to participate in this study with their full agreement and selected eligible students for this study. The participants were randomly assigned into one control and two experimental groups with 79 students for each group. On the first day of the study, participants received a short message including instructions. During two weeks to accomplish online lectures, online learning and interaction in a discussion board were monitored by the researcher. In addition, an instructor motivated participants to complete online lectures with short quizzes, and encouraged them to activate interaction between an instructor and a student, and among students via discussion board and Email.

Participants in a control group used online texts with static graphics and attached files which could allow students to print out instructional content in online lectures, while experimental groups received the same instruction with embedded streaming video clips or audio files. After the completion of two online lectures, the participants were directed to take a content-related posttest and instructional motivation questionnaire. The posttests to measure students' comprehension and instructional motivation were administered when each treatment for two weeks was completed by participants. The posttest and modified IMMS were also collected by using a paper-and-pencil questionnaire and examination. Table 6 depicts critical activities with participants.

Table 6

Activities of the Study

Time	Activities
First Meeting	1.The researcher informs the students about the purposes and procedures for this study. 2. Participants sign a written consent for the voluntary participation in this study. 3. Participants complete the basic questionnaire about the demographic information and online learning experiences. 4. The researcher assigns students into three treatment groups in different instructional designs with/without streaming media.
Second Meeting (Second week after the treatment)	1. Participants take a content-related comprehension test. 2. Participants take a short form of IMMS to evaluate students' motivation.

Data Analysis

For this study, an alpha level of .05 was used as the level of confidence for all statistical tests. For the first research question, a one-way ANOVA was conducted to determine if there were any significant differences in student motivation across three different types of instructional media. For the second research question, ANOVA was also used to determine if there were any significant differences in content-related comprehension examination according to different instructional technology tools.

In addition, demographics and results from the students' responses were reported using frequencies and percentages. The collection of data and the results of the statistical analysis for this study are reported in the following chapter.

CHAPTER 4: RESULTS

The primary purpose of this study is to examine the effectiveness of three types of instructional media to deliver online instructional content. With this purpose, this study investigated whether there are significant mean differences in motivation and content-related comprehension by different types of media in three instructional designs : (a) video-based instruction; (b) audio-based instruction; (c) text-based instruction.

One modified measure for learner's instructional material motivation and one created measure for learner's comprehension were used to collect data from the sample of 172 online students. For this study, a one-way ANOVA was conducted to analyze the data with two research questions.

This chapter is composed of three sections. The first section contains demographic data (e.g., gender, school year, age, career, socioeconomic status, and preference on instructional media in online courses) for online students who participate in this study. The second section contains the results of the descriptive statistics in preliminary analyses. The third one contains the results of the analyses designed to answer two research questions (e.g., the results of ANOVA in IMMS by different instructional designs and ANOVA in comprehension test for different design groups).

Demographic Data

Online students were asked at the beginning of the two-week online course to provide their gender, school year, age, career, economic class, and preference with regard to the use of instructional media. Of the 172 online students who participated, 141 students (82%) were female and 31 (18%) were male in this study. The age range of the

online students who participated was 21 to 57 for this study (*M*=39.96) with two missing values. Of these, 39 students (22.7%) were in their first school year; five students (2.9%) were in their second year; 89 students (51.7%) were in their third year; and 39 students (22.7%), in their fourth year. The participants' career distributions are as follows: 44 participants (25.6%) hold a professional job; 38 participants (22.1%) work as officials; three participants are craft workers (1.7%); 43 participants (25.0%) are housewives; and 44 participants (25.6%) are college students without a career. Almost half of the online students (49.4%) are college students who have working jobs. In the distribution of socioeconomic status with online participants in their self-reported evaluations with three missing values, three students (1.8%) belong to the upper class; 139 students (82.2%) belong to the middle class; and 27 students (16.0%) belong to the lower class. For the preference on the use of diverse instructional media with seven missing values, 11 students (6.7%) preferred instructional images or graphics;13 students (7.9%) preferred instructional texts for reading materials; 95 students (57.6%) preferred diverse instructional video clips; 20 students (12.1%) preferred instructional audio files; and 26 students (15.8%) stated no preference in online courses.

Preliminary Analyses

This section contains descriptive data (e.g., minimum scores, maximum scores, means, and standard deviation) on two dependent variables: (a) motivation; (b) content-related comprehension.

Dependent variable: Motivation

A survey questionnaire with a five-point Likert scale that consisted of 20 items was used to measure students' instructional materials motivation. Modified IMMS was used for the measure of motivation with three different groups: (a) the video-based instruction in an online course, (b) the audio-based instruction in an online course, and (c) the text-based instruction in an online course. Table 7 represents the means, standard deviations, minimum scores, and maximum scores for the motivation of each group.

Table 7

Means and Standard Deviation for Motivation

Group (*n*)	*M*	*SD*	Maximum	Minimum
Video-based instruction (*n*= 60)	79.02	7.63	94	60
Audio-based instruction (*n*=56)	77.36	8.84	94	59
Text-based instruction (*n*=56)	72.88	9.14	94	59

Note. a five-point Likert scale in motivation (e.g., 5 = always true, 4 = often true, 3=generally true, 2=occasionally true, and 1=never true).

According to the results in Table7, three different groups with or without streaming media revealed higher motivation than the midpoint of 60 for IMMS in a two-week online course. The mean of the video-based instruction group in students' motivation was 79.02 on a five-point Likert scale with 20 items. The range of individual scores was from 60 to 94 in the VBI group (*SD*=7.63). The mean of the audio-based instruction group was 77.36, ranging from 59 to 94 (*SD*=8.84). The text-based instruction group presented the lowest group mean (*M*=72.88) among the three different

groups with or without streaming media for the instructional motivation. The range of individual scores was also from 59 to 94 in the TBI group (*SD*=9.14).

Dependent Variable: Content-related Comprehension

This study also used a comprehension exam consisting of 20 multiple choice questions to measure online students' comprehension. One point was given for each correct answer in all 20 multiple choice questions. Therefore, a maximum point was 20 for the content-related comprehension examination. Table 8 displays means, standard deviations, maximum scores, and minimum scores for the comprehension examination with three different types of instructional media.

Table 8

Means and Standard Deviations for Comprehension Test

Group (*n*)	*M*	*SD*	Maximum	Minimum
VBI (*n*=60)	17.28	1.75	20.00	13.00
ABI (*n*=56)	17.27	2.11	20.00	13.00
TBI (*n*=56)	17.36	2.18	20.00	13.00

Note. Maximum score of comprehension examination = 20.

According to results in Table 8, mean scores for three different groups were close to *M*=17.00 for a content-related comprehension test. The mean of a video-based instruction group was 17.28 in a posttest with 20 questions for students' comprehension. The range of individual scores was from 13.00 to 20.00 in the VBI group (*SD*=1.75). The mean of the audio-based instruction group was 17.27, and the range was from 13.00

to 20.00 (*SD* = 2.11). The group of text-based instruction revealed the highest mean (*M*=17.36) for the comprehension test among the three different groups, ranging from 13.00 to 20.00 (*SD*=2.18).

Findings in Two Research Questions

This section contains the results of two research questions: (a) do the three different types of instructional media (text-based, audio-based and video-based instruction) have a different effect on student motivation with Korean college students? and (b) do the different types of instructional media (traditional text-based instruction, audio-based and video-based instruction) have a different effect on content-related comprehension for Korean college students? The results of the first and second research questions are based on quantitative data.

Research question one: Do the three different types of instructional media (text-based, audio-based and video-based instruction) have a different effect on student motivation with Korean college students?

The first research question investigated the effect of three types of instructional media on students' motivation in an online course with Korean college students. For the research question, this study examined the significant differences in the Instructional Materials Motivation by three different groups in an online course (e.g., health counseling psychology). To answer the first research question, a one-way ANOVA was conducted as a means to detect the significant differences in the variable of motivation among the three different types of instructional media that may affect a between-group variance. The results of the one-way ANOVA presented whether there are significant

differences in motivation by three different types to deliver instructional materials (e.g., video-based instruction, audio-based instruction, and text-based instruction).

To investigate the mean differences of groups in IMMS, data were screened for missing data and outliers, and then the data were examined for the fulfillment of test assumptions. Data screening led to the transformation of imms to imms2 as a means of reducing the number of outliers; those less than or equal to 58 were recorded 59, and those greater than or equal to 93 were recorded 94. Although the normality of distribution of these transformed scores is still questionable, group sample sizes are quite large and fairly equivalent. Generally, ANOVA is robust to violations of the normality, when the sample size is relatively large. Therefore, the normality will be assumed. Homogeneity of variance was tested with Leven's test (p=.17). Thus, the homogeneity will be assumed.

A one-way analysis of variance (ANOVA) was conducted to examine students' motivation differences in the different types of instructional media in their online courses. Table 9 reveals the results of whether there are significant differences in students' motivation among three different groups that received different types of instructional technology tools. According to Table 10, the results of a treatment effect revealed that students' motivation was significantly different among the three different groups that received one of three instructional designs with streaming media or text only, $F(2, 169)=7.94$, $p<.01$, partial $\eta^2=.086$. The estimate of effect size indicated a medium strength. Bonferroni's post hoc test was conducted to determine which three groups relevant to the different types of instructional media were significantly different in students' motivation. In Table 10, results revealed that the motivation of the text-based instruction was significantly different from all treatment groups that used streaming

media with online texts (e.g., video-based instruction and audio-based instruction). In addition, the motivation of VBI wasn't significantly different from the group that received the audio-based instruction. According to a mean-line chart in Figure 3, the mean of the group that received the video-based instruction (*M*=79.02) was the highest mean among the three types of instructional media, ABI (*M*=77.36), TBI (*M*=72.88).

Table 9

One Way ANOVA for Student Motivation by Three Types of Instructional Media

Source	Type III *SS*	*df*	*MS*	*F*	*p*	*ES*
Group	1156.94	2	578.47	7.93	.001*	.086
Error	12325.97	169	72.94			
Total	13482.91	171				

* $p<.05$.

Table 10

Multiple Comparisons among the Groups on the Students' Motivation (Bonferroni)

(I) group	(J) group	Mean Difference (I-J)	Std. Error	*p*
VBI	ABI	1.66	1.59	.891
	TBI	6.14*	1.59	.000
ABI	VBI	-1.66	1.59	.891
	TBI	4.48*	1.61	.018

Note. *. The mean difference is significant at the .05 level.

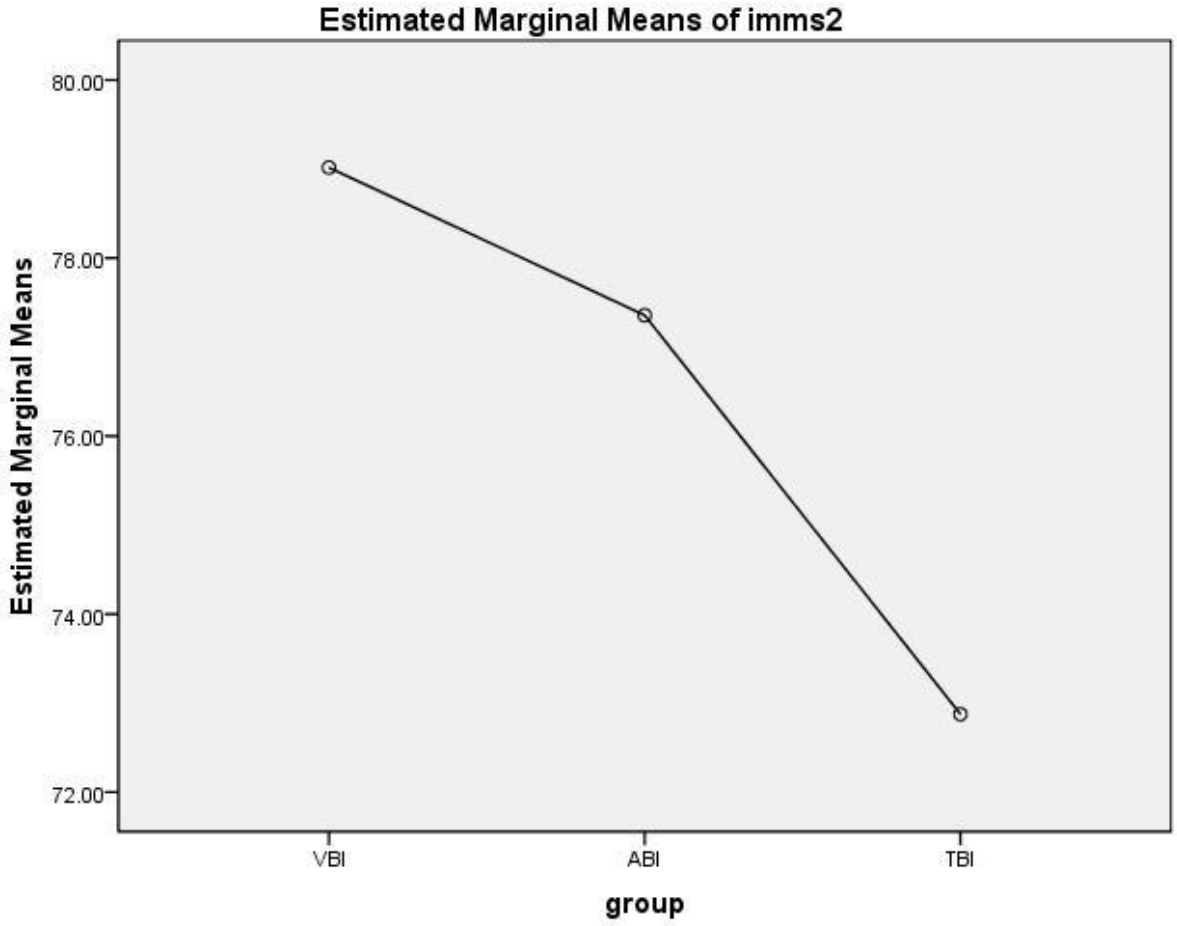

Figure 3. Mean line by three groups in students' motivation.

Research question two: Do the different types of instructional media (traditional text-based instruction, audio-based and video-based instruction) have a different effect on content-related comprehension for Korean college students?

A second research question examined significant differences in three types of instructional media on content-related comprehension. A study investigated whether the three types of instructional media had a significant effect on a comprehension test. To answer the second research question, a one-way analysis of variance (ANOVA) was conducted to detect the significant differences in the variable of comprehension. The

results of the one-way ANOVA presented whether the differences of content-related comprehension are statistically significant among three different treatment groups (e.g., video-based, audio-based, and text-based instruction).

Data were screened for missing data and outliers, and then the data were examined for the fulfillment of crucial assumptions. In data screening, the ct was transformed to ct2 as a means of reducing the number of outliers. The cases with the scores less than or equal to 12 were recorded 13. Although the normality of distribution of these transformed scores is still questionable, group sample sizes are quite large and fairly equivalent. In addition, when the sample size is relatively large, the ANOVA is robust to the violation of the normality. Thus, the normality will be assumed. The homogeneity of variance was tested with Leven's test (p=.06). Therefore, the homogeneity will be assumed.

A one-way analysis of variance (ANOVA) was used to investigate content-related comprehension differences among the three different types of instructional media with online participants. Table 11 shows the results of whether the treatment groups with streaming media or not have a different effect on a comprehension test in an online course with Korean college students. According to Table 11, results revealed that there were no statistically significant differences in the content-related comprehension by the three types of instructional media, F(2.169)=.07, p=.93, partial η^2 =.001. According to a mean-line chart in Figure 4, the mean of the group that received a text-based instruction (M=17.36) was not significantly different from VBI (M=17.22) and ABI (M=17.27).

Table 11

One Way ANOVA for Students' Comprehension by Three Types of Instructional Media

Source	Type III *SS*	*df*	*MS*	*F*	*p*	*ES*
Group	.58	2	.29	.07	.93	.001
Error	686.02	169	4.06			
Total	681.61	171				

* $p<.05$.

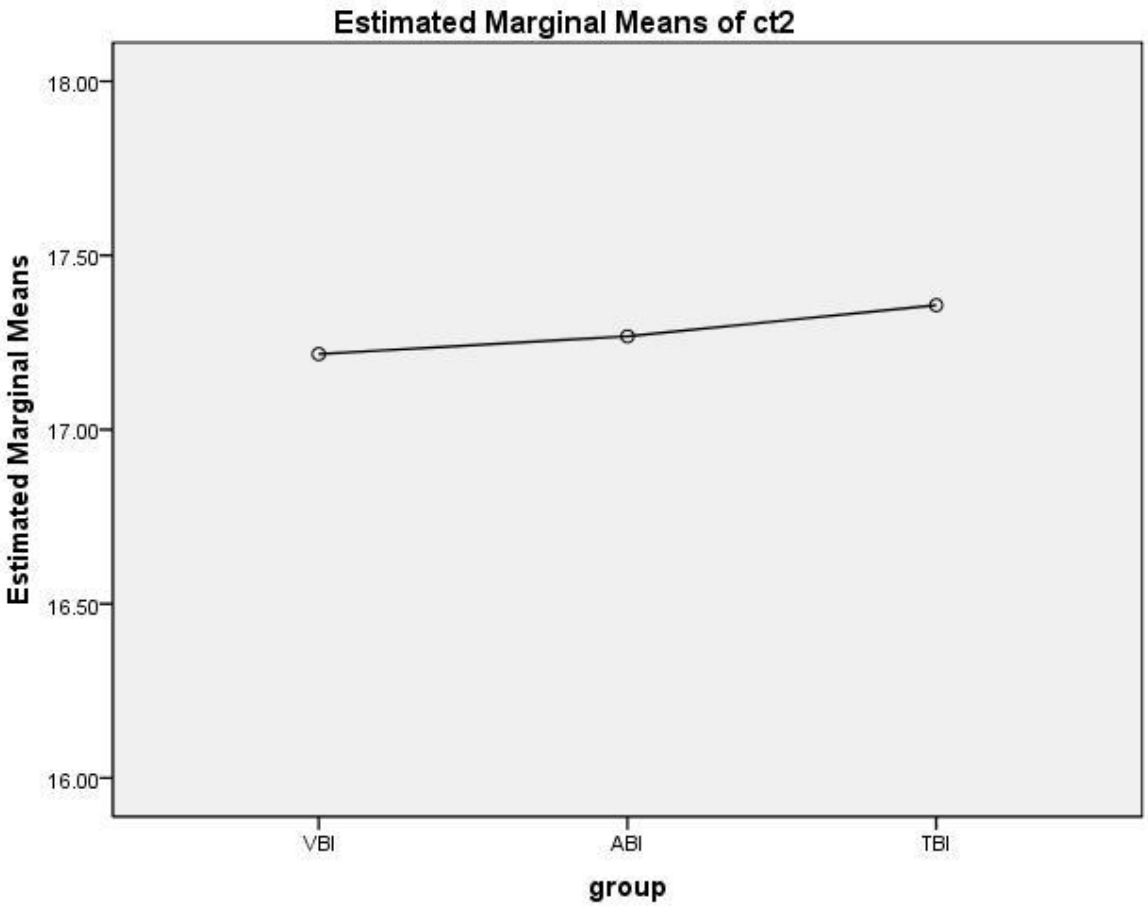

Figure 4. Mean line by three groups in students' comprehension.

CHAPTER 5: DISCUSSION

The primary purpose of this study is to examine whether there are significant mean differences in comprehension and the motivation of online students by the three different types of instructional media: (a) video-based instruction; (b) audio-based instruction; (c) text-based instruction. Data were also collected to compare the online students' comprehension and motivation and analyzed by a one-way ANOVA. To achieve this purpose, the following research questions are discussed in the results of this study:

Research question one: Do the three different types of instructional media (text-based, audio-based and video-based instruction) have a different effect on student motivation with Korean college students?

Research question two: Do the different types of instructional media (traditional text-based instruction, audio-based and video-based instruction) have a different effect on content-related comprehension for Korean college students?

This chapter presents the conclusions derived from the findings with the discussion of these conclusions, including recommendations for educational practitioners and researchers. The conclusions and discussion are addressed in the first section, and recommendations for further research and practice are presented in the second section.

Conclusions

This study established two conclusions from the findings based on the research questions. This discussion follows each crucial conclusion in this section.

1. Student Motivation Analysis in Different Instructional Designs with Streaming Media

In the first research question, results show that instructional video clips as a means of streaming media can be a more effective instructional medium than text to enhance students' motivation in an online course. In addition, streaming media (e.g., video clips and audio files) can be efficient instructional technology tools to motivate online students positively in diverse online courses. According to the results of the study, the video-based instruction in online education is more effective for students' motivation than the text-based instruction. This result is supported by previous studies comparing video-based instruction and text-based instruction in on/off-line classes.

First of all, in terms of off-line traditional educational settings, results for student motivation are congruent with many previous studies that present students feel more positive when using instructional video technology tool (CTGV, 1992; Shyu, 2000). Video technologies can help students to increase their attention and motivation (Bennett & Glover, 2008;Cofield, 2002; Green et al., 2003; Jha et al., 2002; Reisslein et al., 2005; Zhang et al., 2006).

Secondly, in on-line educational circumstances, findings for student motivation support that students can be motivated positively toward using streaming media (e.g., streaming video and streaming audio). Embedded streaming video in online instruction or lectures can be a suitable learning rehearsal tool because it conveys information in a more interesting way than using plain text alone (Tantrarungroj, 2008). In other words, video technologies or streaming media help students to have instructional motivation more positively than using instructional text only in online education (Choi & Johnson, 2005;. Tantrarungroj, 2008).

Finally, in terms of constructivism, teachers suggest applying diverse multimedia and technologies to construct knowledge and promote students' motivation in their learning and teaching (Brown, Collins, & Dugid, 1989; Petraglia, 1998). In particular, Kozma (1994) argues that using instructional media as a vehicle for delivering instruction can have an effect on learning influencing crucial interaction with other educational factors (e.g., contexts, social processes, motivation, and satisfaction). In other words, to the extent which instructional technologies are intelligently designed, they are able to serve as powerful aids to encourage learners to construct their knowledge (Kozma, 1994; Mayer, 1999; Mayer, 2003).

Consequently, the results of the first research question show that streaming video or audio in an instructional design can be a more effective medium than text only for online instruction to promote learner motivation. The video-based instruction can promote the students' motivation more positively than the text-based instruction in online educational settings. In short, the streaming media (e.g., video and audio) in a instructional design can be used as a means of instructional delivery tools to help online students to be successfully motivated in online learning.

2. Student Comprehension Analysis in Diverse Instructional Designs with Streaming Media

In the results of the second research question, the three different types of instructional media do not have a significant effect on student comprehension. Instructional streaming media (video and audio) are not more efficient instructional technology tools to enhance online students' comprehension than online text only in an

online course. In particular, video-based instruction and audio-based instruction as different types of designs with instructional streaming media do not enhance student comprehension more effectively than text-based instruction in online education. There are three major explanations that using the instructional media as a critical means in delivering instructional content in instructional designs are not beneficial to student comprehension in the evaluation of student achievement.

First of all, from the perspective of traditional educational circumstances, results for student comprehension are congruent with previous studies that reveal that adding instructional media does not benefit students to enhance their learning in a cognitive realm (Koehler et al., 2005; Koroghlanian & Sullivan, 2000). Debuse and his colleagues suggest that instructional technology tools (video clips and audio files) do not enhance the student comprehension more efficiently than the traditional text only in an instructional design.

Secondly, in an online educational setting, critical findings for student comprehension or learning suggest that instructional streaming media (streaming video and audio) in different types of designs do not help learners enhance their achievement in online courses (Choi & Johnson, 2005; Tantraungroj, 2008). Choi and Johnson (2005) suggested that context-based videos in online courses have the potential to enhance students' retention and motivation. However, there was no significant difference between video-based and traditional text-based instruction in online courses on learners' understanding. Consequently, video technologies or streaming media do not promote learners' comprehension or learning more efficiently than online text only in online educational circumstances.

Thirdly, from the perspectives of cognitive theory and constructivism, Clark (1994) insists that effective instructional methods will be effectively working into students' learning regardless of using instructional media. Furthermore, even though using different technologies can serve as powerful aids to learning, they do not change the fundamental nature of how the human mind works (Mayer, 2003). Adding media or technologies to instruction is effective according to the cue summation theory that learning can increase as the number of available cues or stimuli are increased (Barron & Kysilka, 1993; Koroghlanian & Sullivan, 2000). Nonetheless, using instructional media or technologies in learning can have a negative effect of redundancy (Mayer & Moreno, 2003). Video-based instruction and audio-based instruction can be overloaded due to the redundancy of auditory/verbal channel in streaming media. Thus, adding streaming media in instructional designs can be negative to the efficiency of learning and reduce student comprehension or understanding.

Consequently, the results of the study for students' comprehension show that the three different types of instructional media do not have a different effect on students' learning even though using instructional technology tools can cause a positive effect like a cue summation theory to enhance student comprehension. In the different types of instructional design, using instructional technology tools do not have an effect on the student comprehension as a means to increase student understanding cognitively in an online educational setting.

According to the results from this study, both video based instruction and audio based instruction do not enhance students' comprehension more effectively than text-based instruction in online educational setting. Nonetheless, even though effective

application of diverse instructional media does not have the potential to enhance the students' learning for content-related comprehension, diverse streaming media or instructional technologies in the different types of instructional design can be successful aids to affect the interaction with critical educational factors (e.g., retention and satisfaction). Smith and Ragan (1999) maintain that the advantages of streaming media (i.e., exposition and easy explanation of problems, equipment, and diverse learning materials and encoding new knowledge into long-term memory in a meaningful way) can enhance learners' retention and motivation.

Summary of the Conclusions

Conclusions from the findings and results of this study can be summarized as follows:

1. In the results of the first research question, video-based and audio-based instruction can be more effective in instructional designs with streaming media than text-based instruction to promote students' motivation in an online course.
2. In the results of the second research question, diverse instructional design with or without streaming media do not have a different effect on online students' comprehension. Thus, in the different types of instructional media, streaming media (e.g., video clips and audio files) are not efficient instructional technology tools to enhance students' comprehension in online courses.

3. In the results of this study, streaming media or instructional technology tools can be incorporated effectively in different instructional designs to motivate online students positively in the online courses. In addition, most online students (79.7%) think that streaming media is useful as a means to deliver instructional materials in online learning and teaching.

Recommendations

In this section, recommendations are suggested for educational practitioners and educational researchers for their further studies on the practical use of diverse instructional designs with technology tools to enhance students' learning in online educational circumstances.

Recommendations for Educational Practitioners in Online Education

According to findings of this study, the use of video in online education promotes motivation for online students. Learners can be given the diverse types of instructional design with effective instructional technologies or streaming media. The findings of this study also suggest that there are no significant differences among the different types of instructional media for students' comprehension in online education.

In online education through web-based course management system, instructors can efficiently provide their learners with diverse instructional media or web-based technologies without the knowledge of internet programming (Emiroglu, 2007). Besides, online students can gain personalized access to the diverse types of instructional design with effective streaming media or technologies according to their learning styles and preferences for different instructional media. Thus, applying diverse instructional media

in online instruction will be important to satisfy various online students with different learning styles. In an online educational setting, the use of various instructional media should be increased for students and teachers. The media also contribute to create better learning circumstances with the instructional design of multimedia learning (D'Arcy, Eastburn, & Bruce, 2009).

Findings of this study can give online instructors insights that streaming video and audio in an instructional design can be used to promote students' motivation. Thus, online educators should be able to incorporate diverse streaming media and/or instructional technologies in online instruction. As a result, diverse media can serve as powerful aids to interact with crucial educational factors (contexts, goals, interaction, feedback, satisfaction, retention, etc.).

Recommendations for Further Research

This study used the analysis of quantitative data to investigate whether the three different types of instructional media have an effect on learners' motivation and content-related comprehension. An analysis of quantitative data can be useful to examine whether there are significant mean differences among the different types of instructional media in motivation and comprehension. However, the statistical analysis of quantitative data is not enough to explain different personal experiences and attitudes when online students use diverse media in diverse instructional designs. Thus, further studies will be able to use diverse qualitative data from observation, interview, and survey in order to investigate various educational factors (interesting, attitude, cognitive approach, positive experience, effectiveness, etc.) with different personal opinions.

This study placed an emphasis on statistical analyses of student motivation and comprehension. This study does not explain whether the different types of instructional media can have an effect on the other educational factors. Feedback, comfortableness on the use of diverse technologies, responsibility, teacher-student interaction, and successful learning experiences will be critical elements for success of independent learning in online education (McVay, 2000; Navarro & Shoemaker, 2000; Rodriguez et al., 2008) . Accordingly, further studies should be able to investigate whether diverse streaming media or technologies in an instructional design have a different effect on the crucial factors for the success of online education. Diverse educational instruments can be used to measure various educational factors.

This study administered different treatments with three groups in two-week lessons. The results of this study revealed that there were no significant mean differences among different media in instructional designs for online students' comprehension. In other words, administering different treatment groups for two weeks may not have been enough to prove whether the different instructional designs with streaming media or text only can have an effect on the students' comprehension or understanding in online educational setting. Thus, further studies for a longer term can investigate whether diverse streaming media or instructional technologies have a different effect on the students' comprehension or understanding in online learning.

This study investigated whether the three types of instructional media had an effect on students' motivation and comprehension without considering different independent variables or important target populations such as gender, age category, and living region relevant to easy access with a high-speed Internet service. Different

streaming media and various target populations can have a different effect on students' motivation and comprehension in online educational circumstances. Thus, further researchers will be able to examine the interaction effect between streaming media and different target populations in online instruction.

This study used three types of instructional media to differently deliver and present instructional content and/or instructional materials. For effective multimedia learning, diverse media or technology tools can be used and designed to increase motivation and cognitive comprehension. Furthermore, the next studies in online learning can be focused on application and effects of compact smart machines or tools. The researchers can be interested in the studies that investigate whether different accesses using diverse compact smart tools have an influence on affective and cognitive realms since diverse smart gadgets such as iPod, tablets, and Smart-Phone will be developed and be used popularly in online educational settings.

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APPENDIX A

CONSENT LETTERS

CONSENT LETTER TO PARTICIPATE IN A RESEARCH STUDY

TITLE OF STUDY: Comparative Study of the Effect of Three Types of Instructional Media with Korean College Students in an Online Course in Health Psychology

INVESTIGATOR(S): (1) Principal Investigator: Leping Liu, Ph.D., 775-682-5511

(2) Student Investigator: JeongChul Heo, M.Ed., 775-972-3335

PROTOCOL #: S10/11-108

SPONSOR:

PURPOSE

You are being asked to participate in a research study: Comparative Study of the Effect of Three Types of Instructional Media with Korean College Students in an Online Course in Health Psychology. The purpose of this study is to examine whether different types of instructional media (i.e., video-based instruction, audio-based instruction, and text-based instruction) based on the same cognitive theory of multimedia learning has a significant influence on online students' motivation and content-related comprehension. In sum, this study will focus on exploring whether one instructional media (e.g., video-based instruction) is better than another (e.g., audio-based instruction or text-based instruction) in self-motivation and comprehension texts.

PARTICIPANTS

You are being asked to participate because you are an adult Seoul Cyber University (SCU) student who is enrolled Health Psychology online class in 2011 summer session. The expected number of subjects for this study is estimated to be around 240. Participating in two-week online classes will be the research activity for this research and separated from a Health Psychology class.

PROCEDURES

If you agree to participate in this research, please keep in mind the following.
There are two meetings to collect data and a main experiment for three weeks. There are specific procedures and the approximate duration for the main experiment as follows;

1. First meeting
   The total time for the first meeting will be approximately 40-50 minutes. You will be asked to provide demographic/background information before starting a main experiment. This basic background survey will take you on average 5 to 10 minutes to complete. After then, you will be randomly assigned into one of three different groups (e.g., video-based instruction, audio-based instruction, and text-based instruction) using a convenience sampling procedure (e.g., random sampling by using Microsoft Excel)
2. Main experiment
   You will be asked to take total two online lectures for two weeks. Participants who are assigned into the first experimental group based on video will be asked to take a video-based instruction in the online Health Psychology class. Students

who are assigned into another experimental group based on an audio will take audio-based instruction in the online class. Subjects who are assigned into the control group based on online texts will be asked to take a text-based instruction in the online class. Each online lecture will take you approximately 50 to 80 minutes to complete the four main sections (e.g., guidelines, reading online texts, watching streaming media, and a short quiz in a self-evaluation).

3. Second meeting
   The third week, you will be asked to take a content-related comprehension test and motivation questionnaire using paper-and- pencil. The total time for the second meeting will be approximately 70-80 minutes. The comprehension text consists of 15 multiple-choice questions and 5 short-answer questions. It will take you 40 to 50 minutes to complete all 20 questions. A short form of instructional motivation includes 20 questions. It will also take you 10 to 20 minutes to complete the motivation questionnaire.

This study has been approved by the University of Nevada, Reno Institutional Review Board (IRB#00000216).

DISCOMFORTS, INCONVENIENCES, AND/OR RISKS

You might be likely to experience inconvenient learning and teaching because of unfamiliar type of instructional media. Your participation is entirely voluntary and a code

number (or temporary ID) will be used to protect your privacy. You can terminate your participation whenever you feel uncomfortable about this experiment.

BENEFITS

There may be no direct benefits to you as a participant in this study. With your participation in this study, however, we could get valuable results about critical effects relevant to three types of instructional media with Korean college students. The exploration of different types of instructional media will contribute to develop more effective online instruction by promoting motivation and satisfaction in online learning.

CONFIDENTIALITY

Your identity will be protected to the extent allowed by law. You will neither be asked for your name, nor be recorded it anywhere. You will also be identified by a code number only during the process of this research. You will not be personally identified in any reports or publications that may result from this study.

The Department of Health and Human Service (HHS), other federal agencies as necessary, the University of Nevada, Reno Social Behavioral Institutional Review Board may inspect your study records.

All of the information you give will be kept confidential and used only for research purposes. The consent forms, code files, and study data will be stored separately. Code files will be kept in the student investigator's personal computer which can be accessed only with the student investigator's personal id and password. Hard copies also will be treated as confidential and will be locked in the investigator's private filing cabinets. The computer files, hard copies, and the consent forms will be kept for at least 5 years and then destroyed completely upon the conclusion of the study.

COSTS/COMPENSATION

There will be no cost to you, nor will you be compensated for participating in this research study.

DISCLOSURE OF FINANCIAL INTERESTS

The student investigator has no financial interests that will be affected by the research.

RIGHT TO REFUSE OR WITHDRAW

You may refuse to participate or withdraw from this study at any time and still receive the care you would normally receive if you are not in the study. If the study design or use of the data is changed, you will be so informed and your consent shall be re-obtained. You will be told of any significant new findings developed during the course of this study,

which may relate to your willingness to continue participation. Besides, if you have difficulties to gain access to your internet in order to take online lectures approximately 1 to 2 hours every week because of lack of access to the Internet and unexpected problems in the Internet services, you may refuse to participate in this study and be removed by the researchers.

QUESTIONS

If you have questions about this study, please contact directly Sumi Han, Ph.D. or JeongChul Heo, M.Ed. at (011) 318-0647 or (02) 944-5026 at any time.

You may ask about your rights as a research subject or you may report (anonymously if you so choose) any comments, concerns, or complaints to the University of Nevada, Reno Social Behavioral Institutional Review Board, telephone number 1-775- 327-2368, or by addressing a letter to the Chair of the Board, / UNR Office of Human Research Protection, 205 Ross Hall / 331, University of Nevada, Reno, 89557.

CLOSING STATEMENT

I have read ( ) this consent form or have had it read to me ( ). [Check one.]

_____has explained the study to me and all of my questions have been answered. I have been told of the risks or discomforts and possible benefits of the study.

If I do not take part in this study, my refusal to participate will involve no penalty or loss of rights to which I am entitled. I may withdraw from this study at any time without penalty [or loss of other benefits to which I am entitled].

I have been told my rights as a research subject, and I voluntarily consent to participate in this study. I have been told what the study is about and how and why it is being done. All my questions have been answered.

I will receive a signed and dated copy of this consent form.

Signature of Participant	Date
Signature of Person Obtaining Consent	Date
Signature of Investigator	Date

APPENDIX B

SURVEY

SURVEY

Demographic/Background Information (Translation in English)

Thank you for your participation in this study.

This study is designed to examine whether different types of instructional media (i.e., video-based instruction, audio-based instruction, and text-based instruction) based on the same cognitive theory of multimedia learning has a significant influence on online students' motivation.

On the following pages, you will be asked to provide demographic information. This survey will take you on average 5 minutes to complete.

Your participation is entirely voluntary and you may withdraw consent and terminate participation at any time without consequence.

This study has been approved by the University of Nevada, Reno Institutional Review Board (IRB# _____).

Thank you again for your time and participation.

Sincerely,
JoengChul, Heo M.Ed.
Doctoral Candidate
University of Nevada, Reno
jeongchulh@unr.edu

1. Email Address (_____)

2. Your temporary ID (_____)

3. Gender
①Female
②Male

4. Age
①Less than 30
②31 to 40
③41 to 50
④More than 51

5. School Year
① Freshman
② Sophomore
③ Junior
④ Senior

6. Career (What is your current job?)
① Professional job
② Official
③ Craft worker
④ Housewife
⑤ College student (without a full-time job)
⑥ Other ( )

7. Socioeconomic Status
① Higher class
② Middle class
③ Lower class

***Check one of the items close to your experience or attitude**

8. Expectation
① I strongly expect that a variety of technology or educational media can be helpful to online counseling classes
② I expect that a variety of technology or educational media can be helpful to online counseling classes

③ I don’t expect that a variety of technology or educational media can be helpful to online counseling classes

9. Which instructional media do you prefer in online courses?
①Photo (or images)
② Web-based text
③ Video
④ Audio
⑤ No preference

Background Information

Email address: Your temporary ID :

Gender: Male Female

Age:

School Year : Freshman Sophomore Junior Senior

Career:

- Professional Job
- Official
- Craft worker
- Housewife
- College student(without a full-time job)
- Other

Socioeconomic Status : Higher Class Middle Class Lower Class

*** Check one of the items close to your experience or attitude**

Expectation

- I strongly expect that a variety of techbology or educational media can be helpful to online counseling classes
- I expect that a variety of technology or educational media can be helpful to online counseling classes
- I don't expect that a variety of technology or educational media can be helpful to online conseling classes

Which instructional media do you prefer in online courses?

- Photo(or images)
- Web-based text
- Video
- Audio
- No preference

When you check out all questions about your background information, please click the button of submit below.

Submit *SEND INFORMATION*

APPENDIX C

MOTIVATION INSTRUMENT

MOTIVATION INSTRUMENT

STUDENT SURVEY

Thank you for your participation in this study.

This study is designed to examine whether different types of instructional media (i.e., video-based instruction, audio-based instruction, and text-based instruction) based on the same cognitive theory of multimedia learning has a significant influence on online students' motivation.

On the following pages, you will be asked to provide demographic information and complete a survey about your perceptions and needs toward online class or online learning.

This survey packet will take you on average 10 to 15 minutes to complete.

Your participation is entirely voluntary and you may withdraw consent and terminate participation at any time without consequence.

This study has been approved by the University of Nevada, Reno Institutional Review Board (IRB# **S10/11-108**).

Thank you again for your time and participation.

Sincerely,
JoengChul, Heo M.Ed.
Doctoral Candidate
University of Nevada, Reno
jeongchulh@unr.edu

A Short Form of IMMS

Please read the statement and check the response that most closely matches your attitude toward the statement.

1. The materials and lessons were curious (or eye-catching).

①Almost always true

②Often true

③Generally true

④Occasionally true

⑤Almost never true

2. The quality of the instruction or course helped to hold my attention.

①Almost always true

②Often true

③Generally true

④Occasionally true

⑤Almost never true

3. The content of the instruction or course is relevant to my interests.

①Almost always true

②Often true

③Generally true

④Occasionally true

⑤Almost never true

4. The variety of exercise, materials, illustrations, etc., helped keep my attention on the lesson.

①Almost always true

②Often true

③Generally true

④Occasionally true

⑤Almost never true

5. The content and instruction are related to my learning goals.

①Almost always true

②Often true

③Generally true

④Occasionally true

⑤Almost never true

6. Contents of instruction or course will be useful to achieve my learning goals.

①Almost always true

②Often true

③Generally true

④Occasionally true

⑤Almost never true

7. It is clear to me how the content of the instruction or course is related to things I already know.

①Almost always true

②Often true

③Generally true

④Occasionally true

⑤Almost never true

8. The instruction or course was not relevant to my needs because I already know most of it.

①Almost always true

②Often true

③Generally true

④Occasionally true

⑤Almost never true

9. The instruction or course lesson were so clear that it is easy to keep my study successfully.

①Almost always true

②Often true

③Generally true

④Occasionally true

⑤Almost never true

10. Completing the instruction or course successfully was important to me.

①Almost always true

②Often true

③Generally true

④Occasionally true

⑤Almost never true

11. This instruction or course was more difficult to understand that I would like for it to be.

①Almost always true

②Often true

③Generally true

④Occasionally true

⑤Almost never true

12. As I worked on assignments and group activities, I was confident that I could learn the material.

①Almost always true

②Often true

③Generally true

④Occasionally true

⑤Almost never true

13. Practicing speaking English in this course gave me a satisfying feeling of accomplishment.

①Almost always true

②Often true

③Generally true

④Occasionally true

⑤Almost never true

14. After working on the instruction or course lessons, I was satisfied with using some of instructions in my class.

①Almost always true

②Often true

③Generally true

④Occasionally true

⑤Almost never true

15. The feedback after assignments and exercises, or other comments in the course helped me feel rewarded for my effort.

①Almost always true

②Often true

③Generally true

④Occasionally true

⑤Almost never true

16. I was satisfied in such a well-designed instruction.

①Almost always true

②Often true

③Generally true

④Occasionally true

⑤Almost never true

17. Online class (or virtual class) is very useful for my study.

①Almost always true

②Often true

③Generally true

④Occasionally true

⑤Almost never true

18. Time Flexibility is helpful my study.

①Almost always true

②Often true

③Generally true

④Occasionally true

⑤Almost never true

19. Place Flexibility is helpful my study.

①Almost always true

②Often true

③Generally true

④Occasionally true

⑤Almost never true

20. Online interaction with peers or teachers helps my study.

①Almost always true

②Often true

③Generally true

④Occasionally true

⑤Almost never true

APPENDIX D

COMPREHENSION INSTRUMENT

COMPREHENSION INSTRUMENT

Comprehension Test for Online Counseling Course (Translation in English)

Thank you for your participation to test your level of comprehension about two online lectures.

This study is designed to examine whether different types of instructional media (i.e., video-based instruction, audio-based instruction, and text-based instruction) based on the same cognitive theory of multimedia learning has a significant influence on online students' comprehension. The comprehension test consists of total 20 questions. All 20 questions are multiple-choice types to measure how much participants understand the instruction of heath counseling psychology through two online lectures.

This comprehension test will take you on average 40 to 45 minutes to complete.

Your participation is entirely voluntary and you may withdraw consent and terminate participation at any time without consequence.

This study has been approved by the University of Nevada, Reno Institutional Review Board (IRB# **S10/11-108**).

Thank you again for your time and participation.
Sincerely,

JoengChul, Heo M.Ed.
Doctoral Candidate
University of Nevada, Reno
jeongchulh@unr.edu

1. Which one of the following is incorrect as a description for self-concept?

   a. It is a personal concept about who I am
   b. Disharmony between personal ego and experience
   c. People become increasingly social products when getting matured
   d. Personal ego is the recognition of ideal ego and what I can do here and now

2. Which one of the following is correct as a description for the role of a counselor?

   a. A directive counselor
   b. Focusing on counseling techniques, theories, and knowledge rather than the person's attitude
   c. Counselors make use of their growth as a tool to create an atmosphere of counseling with their clients.
   d. A person-centered counselor plays the role of persuasion

3. What is the correct answer about the following description?

We all experience our own experiences and interpretations of behavior, and shouldn't impose what we experience to the others.

   a. Actualization Tendency
   b. Subjective experiences and behaviors
   c. Listening
   d. Genuineness

4. Which one of the following is incorrect as a description for maladjustment of Rogers?

   a. Most people would experience some discrepancies between self-concept and experience, and it is common to experience
   b. When self-concept doesn't consist with experience, people can feel threatened or anxious
   c. People want to maintain the harmony between self-concept and experience
   d. People can recognize more clearly the experiences which wouldn't consist with their self

5. Which one of the following empathic understanding is incorrect as a description?

a. The appropriate level of empathy is important (not too high or not too low level of empathy)
b. It is that the advisor controls over a client under counseling
c. It is important to consider the timing and the context of empathic understanding
d. There are different empathic patterns according to situations of clients

6. What is the correct answer about the following description?

It must be the direction, not destination which the human must reach. It is also to open to their experiences and make their lives creative in the practical life with the empirical freedom.

a. Condition of value
b. Unconditional positive regards
c. Maladjustment
d. Fully-functioning people

7. Which one of the following is incorrect as a description for the goals of person-centered counseling?

a. Focusing on the client's past
b. Acceptance of himself and others
c. Self-quest and improvement of openness
d. Fully-functioning human

8. What is the correct answer about the following description?

It is the innate tendency or human development which improves own abilities. Also, it is an important motivation which continues to pursue the growth and maturity in the life.

a. Orientation of actualization
b. Subjective experience and behavior
c. Listening
d. Genuineness

9. Which one of the following is incorrect as a description for the unconditional positive regards?

a. It is to respect and accept people without bias
b. It is to give the positive regards to him/her regardless of their values
c. It is to accept all behaviors of the individual unconditionally
d. It makes an individual who is fully-functional

10. Which one of the following is incorrect as a description for the tendency of self-actualization?

a. Human beings tend to improve all their abilities.
b. The tendency of self-actualization is innate to people.
c. It is done through a process of organic evaluation.
d. It is limited by the part of the body in the process.

11. Which one of the following is incorrect as a description of the person-centered counseling?

a. Focusing on the emotional aspects in the client's statement under the counseling
b. A counselor will be the best guide to show the direction of the counseling
c. The therapist will encourage clients to freely express themselves.
d. A counselor helps a client to recognize their ambivalence clearly

12. What is the correct answer about the following description?

People often make the conditional positive treatment to others. As a result, they tend to fit

the criteria of others rather than themselves.

a. Condition of value
b. Unconditional positive regards
c. Maladjustment
d. Fully-functional human

13. Which one of the following is correct as a description for the counseling relationship between a therapist and a client?

a. Allowable relationship
b. Doctor and patient relationship
c. Minister and saint relationship
d. Parent and child relationship

14. Which one of the following is incorrect as a description for the human true nature of Rogers?

a. The existence with the self-actualization
b. Human can be reliable and good essentially
c. When a client has a problem, the client and the therapist are a core key to solve the problem
d. Human can govern their destinies with their own opinions and thoughts

15. Which one of the following is incorrect as a description for the therapeutic relationship in a person-centered counseling?

a. It is a freedom from any kinds of pressure and obligation
b. It is allowable relationship which can make clients feel free to express themselves with their feelings
c. There is no limit to therapeutic relationship
d. A therapist forms a rapport to a client with warmth and reaction

16. The following is a description of who?

He was the founder of the person-centered counseling. He suggested congruence, unconditional positive regards, and empathic understanding as the counselor's main roles.

a. Carl Rogers
b. Jung
c. Freud
d. Rousseau

17. What is the correct answer about the following description?

It is the urgency to become what and tendency to express their skills in orientation. It is also an important motivation to seek personal growth and maturity.

a. Congruence
b. Rapport
c. Tendency of self-actualization
d. Empathetic understanding

18 The following is a description of what counselor's attitude?

It means that a counselor is genuine, integral, and innocent without pretense.

a. Tendency of self-actualization
b. Congruence
c. Unconditional positive regards
d. Empathetic understanding

19. The following is a description of what counselor's attitude?

Therapists try to respect and accept clients in their position.

a. Client respect
b. Self-actualization
c. Unconditional positive regards
d. Empathetic understanding

20. The following is a description of what counselor's attitude?

A counselor can understand the client's emotion as if he feels like her own feeling.

a. Rapport
b. Tendency of self-actualization
c. Unconditional positive regards
d. Empathetic understanding

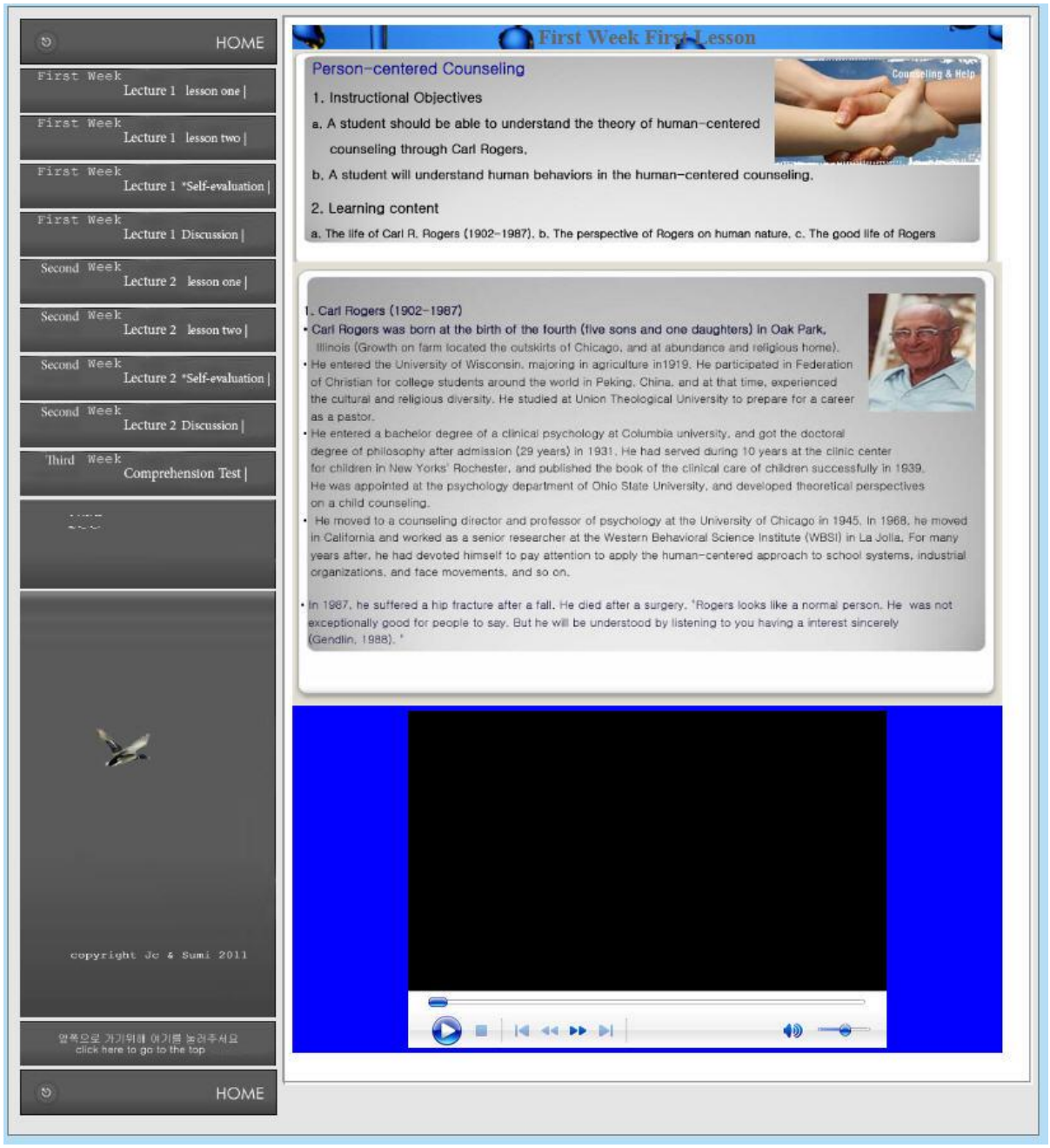
APPENDIX E

WEB-BASED TEACHING MODULES

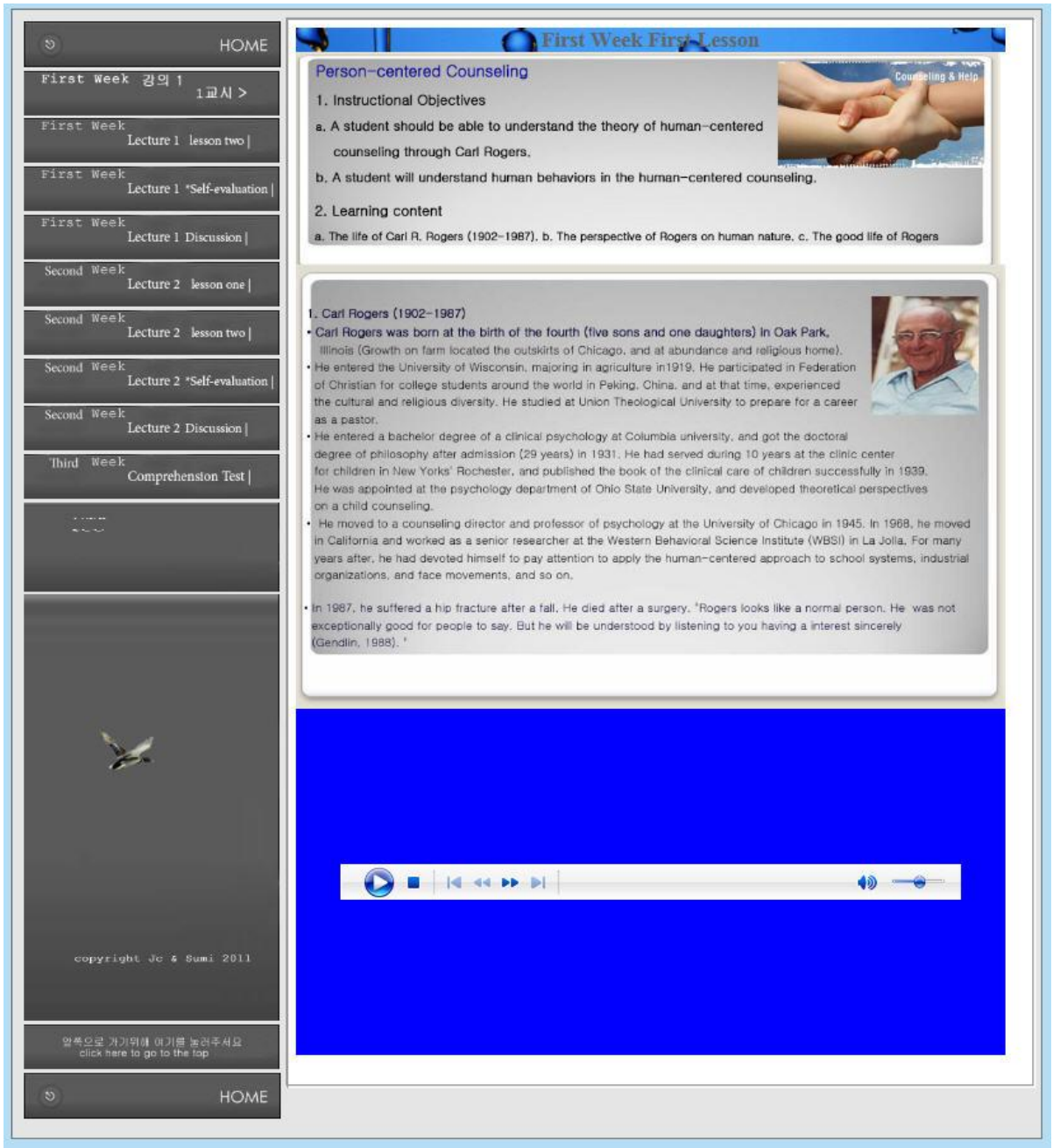
WEB-BASED TEACHING MODULES

Three Different Kinds of Web-based Teaching Modules

1. A Web-based Teaching Module for VBI



2. A Web-based Teaching Module for ABI



3. A Web-based Teaching Module for TBI