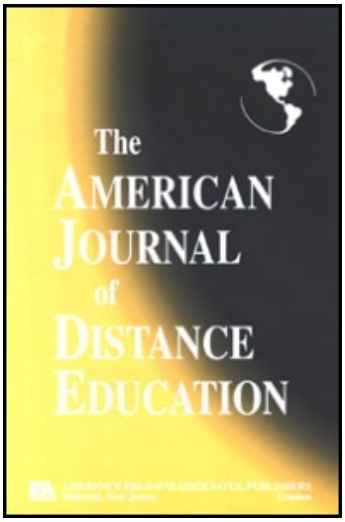

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The Effect of Context-Based Video Instruction on Learning and Motivation in Online Courses

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The purpose of this study was to investigate the potential of a constructivist approach to context-based video instruction for enhancing learning. To achieve this purpose, the authors examined whether video-based instruction that was developed using constructivist theory can affect student learning (i.e., comprehension and retention) and motivation (i.e., attention, relevance, confidence, and satisfaction) by comparing learners' perceptions of both video-based instruction and traditional text-based instruction in an online context-based lesson. There was a significant difference in learners' motivation in terms of attention between the video-based instruction and traditional text-based instruction. In addition, the learners reported that the video-based instruction was more memorable than the traditional text-based instruction. This study implies that context-based videos in online courses have the potential to enhance learners' retention and motivation.

The importance of context-based learning using real world context for enhancing learning outcomes has been emphasized by sociocultural learning theorists (Merriam and Caffarella 1999) and constructivists (Jonassen, Peck, and Wilson 1999). The dominant idea of sociocultural learning theory is that learning is not something that happens in isolation, or is just inside the head, but is shaped by the context, culture, and tools in the learning situation (Merriam and Caffarella 1999). It is believed that real world contexts, where there are social relationships, tools, and engaged experiences, can make the

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best learning environments (Lave 1996). This idea of sociocultural learning is based on Vygotsky's thought that all human activities take place in a cultural context with many levels of interactions, shared beliefs, values, knowledge, skills, structured relationships, and symbol systems (Vygotsky 1978). According to Vygotsky, these interactions and activities are mediated through the use of tools, either technical or psychological, that are provided by the culture (Wertsch, del Rio, and Alvarez 1995). Among various tools, the use of instructional technology has been rapidly adopted for the enhancement of interactions and activities.

Constructivists believe that knowledge cannot be simply transmitted from the instructor to the learners, because the learners have not experienced all that the instructor has. Although the instructor shares an experience, learners' interpretation of that experience would be very different from the instructor's because the instructor is relating it to a different set of prior experiences. Therefore, constructivists think that learning is a process of helping learners construct their own meaning from the experiences they have by providing those experiences firsthand and guiding the meaning-making process (Jonassen, Peck, and Wilson 1999). They think that information about the context is part of the knowledge that is constructed by the learner to explain or make sense of the phenomenon and that what we really understand about skills and knowledge is the application of them (Brown, Collins, and Duguid 1989). Constructivists argue that skills have more meaning if they are acquired initially and consistently in meaningful contexts to which they can be related (Jonassen, Peck, and Wilson 1999).

Context-based learning would be very effective and appropriate in teaching adult learners because they are already exposed to diverse contexts and are ready to learn in the context through a variety of experiences. In particular, constructivists contend that context-based learning through technology will be very effective for the enhancement of learners' knowledge construction, transfer, or application (Jonassen, Peck, and Wilson 1999). Among the various technologies currently available, video technology is suitable for context-based learning because it can convey the information or knowledge in a more interesting way and allows the portrayal of complicated contexts (Cognition and Technology Group 1992). In addition, compared with expository materials, stories in video can help learners easily understand and remember the content (Jonassen, Peck, and Wilson 1999).

A critical attribute of video is the ability to use both auditory and visual symbol systems (Baggett 1984). According to Baggett (1984), learners can construct a mental representation of the semantic meaning of a story from either audio or visual information alone, but it appears that when presented

together, each source provides additional and complementary information that retains some of the characteristics of the symbol system of origin. Baggett (1984) observed that information obtained visually was more memorable, on the basis of her finding that summaries written a week after viewing a movie were judged to be more complete than those written a week after listening to the audio-only version. Kozma (1991) also supported the fact that the visual component is memorable. He argued that simultaneous processing of auditory and visual information may aid learning. In addition, video might be superior for learning complex skills because it can expose learners to problems, equipment, and events that cannot be easily demonstrated (Anderson, Armbruster, and Roe 1989; Overbaugh 1995). According to Dusenbury, Hansen, and Giles (2003), video-based instruction has the benefits of standardizing messages, so it might be able to increase the fidelity of implementing instruction.

Some researchers contend that whether instruction using video technology is successful depends on how it is designed and used. Salomon (1984) found that a sample of learners rated television as an easier medium from which to learn than books. When assigned to view comparable stories from television or in print, the self-reported effort spent on learning by the group who read the stories was significantly greater than the group who viewed the television program. Both groups scored the same on a test of factual recognition, but the reading group scored higher on a test of inferences based on the story (Salomon 1984). Salomon's study implies that learners tend to fail in learning from televised instruction because they are not mentally engaged by it and are therefore passive. In other words, learning from television can be effective if learners actively process the messages from a television program. Cennamo (1993) also contended that video presentations should be designed to increase learners' mental effort and to engage learners in active learning. These tend to support constructivists' arguments that learners should be engaged in active, constructive, intentional, authentic, and cooperative learning for successful and effective learning (Jonassen, Peck, and Wilson 1999). Research conducted by the Cognition and Technology Group at Vanderbilt University supports the constructivist argument. This group developed video-based instruction that actively engages learners in reasoning, thinking, and solving problems by exposing them to real world situations. Their research has shown that the video-based instruction is successful in enhancing students' problem-solving skills (Cognition and Technology Group 1992). Their work also implies how video-based instruction should be designed and used.

Motivation could be one of the most essential factors that learners should have for successful learning. The ARCS (*a*ttention, *r*elevance, *c*onfidence, and *s*atisfaction) model of motivation was developed in response to a desire to find more effective ways of understanding the major influences on the motivation to learn and for systematic ways of identifying and solving problems with learning motivation (Keller 1983). The model defines four major conditions (attention, relevance, confidence, and satisfaction) that have to be met for people to become and remain motivated (Dick, Carey, and Carey 2001). In this vein, video-based instruction that provides attention, relevance, confidence, and satisfaction should be able to promote learners' motivation.

Purpose of the Study

The studies described earlier concluded that video-based instruction has not been sufficiently effective because learners were passive in the learning process. However, relatively few studies on video-based instruction have actually engaged learners in active learning. Thus, in this study we aimed to investigate the potential of video instruction based on constructivism that is devised to engage learners in active, authentic, and collaborative learning. To achieve this purpose, we examined whether video-based instruction can affect learning (i.e., comprehension and retention) and motivation (i.e., 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. This was an impact study primarily concerned with finding evidence of a causal relationship rather than proving the transferability of that effect to other locations.

Research Questions

To attain the purpose of this study, the following research questions were addressed:

Research Question 1: Does perceived learning (i.e., understanding and retention) in video-based instruction involving contextual examples and nonexamples differ from that in traditional text-based instruction?

Research Question 2: Does learner motivation (i.e., attention, relevance, confidence, and satisfaction) in video-based instruction differ from that in traditional text-based instruction?

Method

Research Design

This study used a quasi-experimental design with a posttest-only instrument. To attain the purpose of this study, the participants consecutively experienced video-based instruction and traditional text-based instruction within one online module that consisted of three topics. After each type of instruction was completed, the participants were asked about their perceptions of understanding and motivation (i.e., attention, relevance, satisfaction, and confidence) for the video-based instruction and traditional text-based instruction. Their perceptions of retention were determined through open-ended questions at the end of the semester (see Table 1). Data were collected by means of electronic questionnaires.

In this study, the video-based instruction preceded the text-based instruction to prevent the participants from reading about the main points in the lesson that they were supposed to discover through their asynchronous discussions after watching the video clips.

Participants

Participants ($N = 16$) were students who enrolled in an online master's degree program taught at a large university in the midwestern United States. Most of the students were currently working at a community college as a faculty or staff member or were interested in becoming a lecturer or administrator at a community college.

Instrumentation

To answer the research questions, we used two Likert-scaled questionnaires and one open-ended questionnaire. The two Likert-scaled questionnaires were designed on the basis of Keller's (1987) Instructional Materials

Table 1. Quasi-Experimental Design (Static-Group Comparison Design)

	Video-Based Instruction		Text-Based Instruction		At the End of the Semester
Experimental Group ($N = 16$)	$X_{V1, 2, \& 3}$	Os	$X_{T1, 2, \& 3}$	Os	$O_{O.E}$

Note: X_V = experimental treatment (video-based instruction); X_T = experimental treatment (text-based instruction); Os = observation (post-survey); $O_{O.E}$ = observation (open-ended question).

Motivation Survey to measure perceived learning and motivation in both types of instruction. The open-ended questionnaire was developed by the researchers to gather in-depth information on retention and video-based instruction. In particular, the open-ended question about retention was designed to compare retention in video-based instruction with that in traditional text-based instruction. To ensure the validity of the questionnaires, the questions were reviewed by three individuals who have expertise in online teaching and conducting research studies.

Treatment

The setting for this study was an online course involving a research-based exploration of effective teaching techniques for instructors of business, industry, and community college technical programs. The course consisted of sixteen modules, which were taught in six sections. One module, "Strategies to Transmit Information," was taught by using both video-based and traditional text-based instruction. The module addressed the basic strategies of three instructional methods to transmit information: (a) lecturing, (b) leading discussions, and (c) giving demonstrations. The traditional text-based instruction contained general information about the characteristics of an effective lecture, an effective group discussion, and an effective demonstration; how to correctly use lectures and group discussions to enhance student learning; and the five steps for conducting systematic one-on-one demonstrations. In addition, the students were expected to gain a deeper understanding by responding to a set of questions after reading relevant articles.

A total of six video episodes were used for the video-based portion of the module. Two kinds of video episodes were developed for each instructional method to transmit information on the basis of constructivism. One video episode involved desirable examples of transmitting information, whereas the other video episode showed nonexamples or incorrect methods. The learners were asked to view the videos and figure out the best instructional strategies for lecturing, leading discussions, and giving demonstration. The video-based instruction served as an experimental treatment that consisted of video clips that included desirable examples and nonexamples followed by asynchronous group discussions to engage the learners in active, constructive, authentic, and collaborative learning.

Data Collection Procedures

The participants consecutively experienced two types of instruction, and then they were asked about their perceptions of learning in terms of

understanding, retention, and motivation (i.e., attention, relevance, satisfaction, and confidence) in both the video-based and the traditional text-based instruction.

To answer the first research question, a questionnaire was used to measure learners' perceptions of understanding and retention with regard to the course content. The second research question was answered through a questionnaire to measure learners' motivation, particularly associated with learners' degree of satisfaction, relevance, attention, and confidence.

Data were collected with electronic questionnaires at two different times. The first questionnaire administration asked for learners' perceptions of understanding and motivation as soon as the module was completed. The second questionnaire asked for learners' perception of retention and video-based instruction at the end of semester (see Table 2).

Data Analysis

Quantitative data were analyzed with basic descriptive statistics and a paired *t* test. Descriptive statistics were used to describe the characteristics of participants; learners' level of perception of understanding and retention; and learners' level of satisfaction, relevance, attention, and confidence. A paired *t* test was used to compare learners' perceptions in the two different types of instruction. The perceptions collected for one type of instruction were not independent from those of the other type, because the

Table 2. Data Collection Approaches Used to Measure Research Variables

Research Variables		Data Collection Approaches		
		Survey for the Video-Based Learning Cycle	**Survey for the Text-Based Learning Cycles**	**Open-Ended Questions**
Perception of learning	Understanding	X	X	
	Retention			X
Perception of motivation	Attention	X	X	
	Relevance	X	X	
	Confidence	X	X	
	Satisfaction	X	X	

Note: X = measured.

perceptions were collected from the same group of learners. Therefore, a paired *t* test was used for quantitative data analysis of this study. Qualitative data from open-ended questions were also collected and analyzed using *reflective analysis,* a process in which the researcher primarily relies on intuition and judgment to portray or evaluate the phenomena (Gall, Borg, and Gall 2003).

Results

1. *Difference in perceived learning (i.e., understanding and retention) between video-based instruction and traditional text-based instruction.*

Perceived learning in video-based instruction and text-based instruction was analyzed in terms of understanding and retention. Regarding understanding, data were collected with Likert-scaled questionnaires and were analyzed with a paired *t* test. Learners' mean understanding rating was 20.06 for video-based instruction and 19.88 for text-based instruction. The difference of those means was not statistically significant (see Table 3).

Data for perceived retention were collected at the end of the semester with an open-ended question and were analyzed by reflective analysis. The validity of the analysis was corroborated by member checking of one peer researcher who has expertise in conducting this type of analysis. Nine of the sixteen participants answered the open-ended question to compare retention in video-based instruction with that in traditional text-based instruction. Most of the participants perceived that the video-based learning instruction was more effective than the text-based instruction in regard to remembering the content. Eight of nine participants indicated, in response to the open-ended question, that the video-based learning cycles were more

Table 3. Paired *t*-Test of Learners' Understanding

Learning	Type of Instruction	*N*	*M*	*SD*	*t*	*p*
Understanding	Video-based instruction	16	20.06	2.11	0.243	.811
	Text-based instruction	16	19.88	2.96		

Note: Maximum higher score of understanding = 25. Higher score indicates a deeper level of understanding.

memorable than the text-based learning cycles. Only one person responded that there was no difference in retention between the video-based instruction and the text-based instruction. The major responses of the participants were as follows:

> The combination of watching the videos and discussing those with my team members made the material easier to remember than straight reading.
>
> Because I am a visual learner, video-based learning cycles kept me more focused and actively involved.
>
> Video-based learning cycles [were] more interactive. I could see as well as respond verbally and in writing with more ease—a picture is worth a thousand words.
>
> I can easily recall parts of videos due to the visual interaction, where I am forced to think out the meaning. The videos allow me to witness, not calculate the meaning, but actually see the interaction and how it plays out.
>
> Because the video clips stick in my mind, video-based learning cycles helped me retain information.

2. *Difference in learners' motivation (i.e., attention, relevance, confidence, and satisfaction) between video-based instruction and traditional text-based instruction.*

Learners' perception of motivation was analyzed in terms of attention, relevance, confidence, and satisfaction. Data for perceived motivation were collected with Likert-scaled questionnaires and were analyzed with a paired *t* test. The mean of learners' attention in the video-based instruction was 20.38, and in the text-based instruction it was 17.44. The difference of means was statistically significant ($p < .05$). However, there were no statistically significant differences in perceived relevance and confidence between both sets of instruction. The mean of learners' satisfaction in the video-based instruction was 15.25, and in the text-based instruction it was 13.94. Although not statistically significant, this result is noticeable when considering the fact that this study is exploratory. The specific results are shown in Table 4.

Table 4. Paired *t*-Test of Learners' Motivation

Motivation	Type of Instruction	*N*	*M*	*SD*	*t*	*p*
Attention	Video-based instruction	16	20.38	1.82	2.606	.020*
	Text-based instruction	16	17.44	4.00		
Relevance	Video-based instruction	16	16.56	1.31	0.543	.595
	Text-based instruction	16	16.25	1.98		
Confidence	Video-based instruction	16	15.94	1.48	0.768	.455
	Text-based instruction	16	15.50	1.79		
Satisfaction	Video-based instruction	16	15.25	1.84	1.892	.078
	Text-based instruction	16	13.94	3.02		

Note: Maximum higher score of attention = 25. Maximum higher scores of confidence, relevance, and satisfaction = 20.

*$p < .05$.

Conclusion and Discussion

The participants' responses to the open-ended question that asked which aspect of the video-based instruction they liked the best supported the hope that the video-based instruction was based on constructivism as intended. The main responses were as follows:

> I could effectively figure out the key points after viewing videos. In addition, we could interact about our observations on the Webboard. This was the opportunity that I could learn from others.

> I was able to see a live audience in video clips. This kept my attention, and I was actively involved.

> It was good to see concrete examples and nonexamples. They served a good purpose of reinforcing our understanding in a way.

The summary of the result was as follows: There was a significant difference in learners' motivation in terms of attention between the video-based

instruction and traditional text-based instruction. In addition, the learners responded that the video-based instruction was more memorable than the traditional text-based instruction in the online context-based learning situation. However, there were no significant differences in learners' understanding and motivation in terms of relevance, confidence, and satisfaction.

The result for retention in this study is congruent with Baggett's (1984) finding that information obtained visually is more memorable even though it was not based on the statistical testing of hypotheses, as were the cases with other outcome variables. Baggett found that summaries written a week after viewing a movie were judged to be more complete than those written a week after listening to an audio version. In addition, the result for retention supports Jonassen, Peck, and Wilson's (1999) argument that stories presented via video can also help learners easily remember the content in comparison with expository materials. On the basis of the qualitative data analysis, the learners perceived that the video-based instruction was more memorable than the text-based instruction. This could be because representations derived from both auditory and visual symbol systems can be better for building mental models of the situation than representations based on only linguistic information (Baggett 1984). After all, this study implies that video-based instruction can be an effective method to enhance learners' retention in context-based learning.

Attention is one of the major influences on motivation that learners should have for successful learning (Keller 1983). In this study, there was a significant difference in learners' attention between video-based instruction and traditional text-based instruction. This result implies that video-based instruction can effectively be used to motivate learners by attracting their attention.

However, in this study there were no significant differences in understanding and the three other motivation components (i.e., relevance, confidence, and satisfaction) between the video-based instruction and traditional text-based instruction.

Recommendations and Limitations

The following limitations and recommendations are offered in regard to this study. First, this study involved administering the treatment to the experimental group for two weeks. As a result, the treatment may not have been strong enough to have a significant effect on the dependent variables. If the treatment had been administered for several months or longer, the re-

sult could have been different from one derived in this study. Future studies need to be conducted with longer experimental treatments.

Second, this study had the minimum sample size of sixteen involved in both the experimental and control groups. In general, quantitative research should use the largest sample possible to get reliable information, and there should be at least fifteen participants in each group to be compared in causal–comparative and experimental research (Gall, Borg, and Gall 2003). Although this study used a quasi-experimental design and mixed-methods analysis consisting of both quantitative and qualitative data, it should be replicated with a larger sample to enhance the generalizability of the results.

Third, this study had minor technical problems that could have influenced the results. The large file size of the video clips made it difficult for some students to open the files. The quality of streaming video and audio was also a limitation for the learners who are becoming more accustomed to the quality of high-definition television. These technical problems would have been a factor that could result in the learners having a bad impression about the video-based instruction. The results suggest they did not; however, these types of technical problems need to be anticipated and resolved in future studies.

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