Compression of On-Site and Video Taped Lesson Efficiency

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Abstract—*Communicating knowledge and skills on-land versus electronically was examined. There is variation in how successful e-learning methodologies are with lessons that include complex instructions and intricate hand manipulations. The reported study demonstrates this difficulty. One group viewed instruction of a complex task on-land and a second group viewed the task in a simulated e-learning version of the lesson. Participant completion of the task was examined. The on-land instruction resulted in more accurate completion of the task than when a group viewed a simulated e-learning version of the task. E-learning information apparently needs to be supplemented with clear written guidelines. Continual testing of e-learning methodologies is needed.*

Index Terms—*distance education, e-learning education, digital video instruction*

1. INTRODUCTION

Research into the methodologies that are most effective in communicating intricate details to others is the focus of this article. Such knowledge and skills have traditionally been transferred by on-sight demonstration and student repetition with simultaneous critique to insure accuracy. With new methodologies due to increase in technological abilities, instructors are often faced with additional roles as technical specialists and instructional designer [1].

As the education community explores the avenues of alternative instructional methodologies, the authors were involved in application of best practice education methods in electronic instruction even before convincing research results were available to direct choices. Neuner and Landtsheer [2] [1]describe websites associated with on-line courses, as "an inherently visual medium that enable us to combine text, images, audio and video in an innovative way" (p. 57). Having taught electronic instruction that was already created, the authors know major pitfalls to avoid, but, due to the content, the course under development was to have “hands-on” application of multi-media instruction for intricate details included. Only limited resources were identified to assist with the selection of best practice methodologies. The results of this recent search of the literature were similar to that found by Wright [3] who found that there were mixed reviews of the technological systems available, especially in the field of education, where it was expected that recent research would define best practice methodologies for current use in distance (e-learning) education. Being researchers at heart, the authors decided to conduct a study to supplement the evidence available regarding the use of digital video for the e-learning student as a substitute instructional method compared to the traditional demonstration compared to the on-land student.

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2. PROBLEM STATEMENT

The purpose of this study is to compare effectiveness of a presentation of a complex lesson with hand dexterity in a simulated e-learning situation to effectiveness of the same lesson in an on-land learning situation.

3. LITERATURE REVIEW

Electronic education has been identified as helpful to reach out to students in cases where physical presence is not available. Reisetter and Boris [4] evaluated students about design elements that students believe are needed for successful e-learning experiences. They found that course coherence, clear goals, teacher voice, and extensive teacher feedback were the most important elements for learner success. Student-to student communications were not considered important, a surprise finding according to Reisetter, et al.

Concomitant instruction may be needed to make e-learning instruction successful with, for example, contextual retrieving services for distance learners and different distance learning methodology. Nakayama, Vicari, and Coelho [5] reported that the contextual search process can aid the student who can clearly describe their need, resulting in fewer, but more relevant documents geared toward the solution. Instruction in effective search process may need to be included in a course syllabus if retrieval for special projects is to be a component of a given course.

Gawronska [6] identified the major issue resulting from information searches, called information retrieval (IR). The difficulty in sorting through the results, information extraction (IE)

may be computed. She explored the possibility of a computer program to organize information being studied (compared) from similar texts, but out of two different domains and recommends this program be refined.

Efficiency is one of the hallmarks of distance (e-learning) education in terms of temporal and spatial issues. Shyu [7] studied efficiency in distance learning. Shyu's findings relevant to this project include the fact that "distance learning models do not provide a uniform learning pattern" but that they "depend on the course arrangement and the educator's teaching style." Given that Shyu's study focused on distance education, it reports being surprised at the finding that learning "inefficiency is in fact an intrinsic property of the traditional education model." p. 69 After comparing active learning and passive teaching (this is where the instruction/instructor poses a problem and lets students search to solve it) with active teaching and passive learning (traditional lecture or teacher dominated and student absorbs), Shyu concluded that the latter is more efficient. Eventually, Shyu gave the highest recommendation to a methodology called CD-type learning model, which focuses on high learning efficiency and low learning cost. To accomplish this high efficiency and low cost, the CD-type model enables the integration of the roles of the text, the instructor, and the computer and can capture multi-media materials as well as text. This encouraged the experiment that the authors conducted.

Assessment of effectiveness is also a major component of e-learning instruction. Tietjen [8] reported that e-learning can be measured by key benchmarks as well as alternative assessment procedures which may be used in best instructional practices. Fowler [9] compared on-site with e-learning courses and found several advantages for the online course, contrary to the results often presumed.

4. METHOD

4.1 Conditions

The following experiment was conducted to examine the effectiveness of classroom teaching versus instruction via a digital video recording, which could easily become the mode of delivery for this instruction in a distance learning course. In order to understand the early design elements of clothing, the lesson was complex involving visual acuity and manual dexterity. Students were asked to drape a toga on a doll. This lesson is often completed during a class about historic costume. Although specific to historic costume class, the lesson was to represent other hand manipulation lessons in a wide range of disciplines, such as simulation of surgery in medical school, creating models in architecture, and creating a sculpture in art. To drape a toga on a doll, the following steps must be completed: (1) the fabric must be draped over the left arm, (2) the remaining fabric is pulled over the shoulder, (3) this fabric is then folded in a series of pleats or tucks, (4) this fabric is wrapped under the right arm, (5) it is pulled over the left shoulder; allowing the pleats or tucks to fall creating loose circular shapes at the front called a sinus (6) the initial fabric from step 1 is pulled up under the loose folds to the top to create a knob [10] (see Figures 1 and 2).

Fig. 1. Steps to drape toga [11]

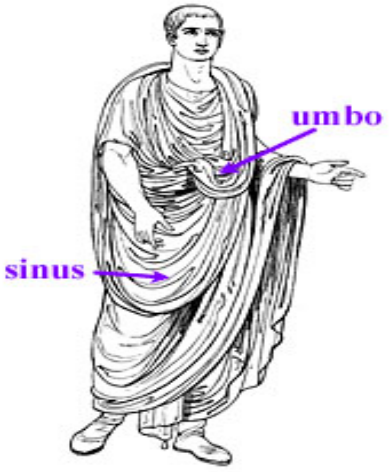

Fig. 2. Toga wrap. Picture courtesy of VRoma project [12]

In the on-land class, an instructor presented the steps to a group of 30 students. Students were chosen randomly from a class that was unrelated to historic costume. The students were college level. The majority of the students had limited sewing experience. Each student was provided with a doll and fabric. They were asked to dress the doll in a toga with the provided fabric. The instructor started the lesson by introducing the toga. It is an outer wrap worn by government officials and citizens during Ancient Rome. After

an introduction, the visuals in figure 1 were shown to the students. In addition, the instructor demonstrated the toga drape by draping a piece of fabric over a student. The instructor also verbally described each step. Another student volunteered to digital videotape the session, a preferred means of information transfer recommended by Mullen, Britten, & McFadden [13]. During this on-land session, students were allowed to ask the instructor questions.

After this on-land model session, the taped session was shown to another 15 students simulating the e-learning student instructional mode. These students were from the same university with comparable skills as the students who participated in the on-land experiment. They were students in a different class also unrelated to historic costume. Fifteen students were available to complete this task. The instructor who conducted the initial session was not present when the students watched the tape. They viewed the tape once and were asked to drape the toga with provided fabric around a doll.

The instructor assessed the drape of the fabric around the dolls. The results were evaluated for each group. The on-land results included 30 students who completed the exercise with the instructor and the e-learning results included 15 students who completed the exercise by watching a taped recording. Dolls were evaluated for the accuracy of the drape.

4.2 Analysis

More students draped the toga accurately following the live presentation than following the viewing of the taped presentation. Twenty-five out of 30 students (83%) draped the toga accurately during the live presentation. The five students who did not drape the toga accurately, completed part of the toga drape correctly. For example, one student draped the toga accurately around the doll, but did not complete the last step. One student was completely incorrect, tying the fabric into a knot around the doll.

Following the taped presentation, only three out of the 15 participants (20%) draped the toga accurately. The students generally understood that the toga was draped over the left shoulder and under the right arm. However, they did not include the sinus and the folds that are found at the front of the toga. Several of those participants tied the fabric in a bow, creating a box shape at the front of the garment. Others gave up by the last step, allowing the fabric to fall loosely around the doll. The three who did tie it accurately tied it too tightly, so that the results for the communication of knowledge and skills by means of contemporary digital video recording does not compare positively with face-to-face (on-land) instruction.

4. CONCLUSION

Best practice methodologies for distance (e-learning) education were investigated. Methods were compared for an intricate knowledge and skills exercise.

Progress has been made in identifying the design elements needed for successful e-learning experiences. These include course coherence, clear goals, teacher voice, and extensive feedback. Student-to-student communication was not considered important [1].

The contextual search process procedures recommended for refining student directed learning is commendable [4]. However, access to computer assisted information extraction is not yet available.

Some of the on-land success or failure of a course attributed to the instruction seemed to be evident in e-learning instruction and is apparently built into the model by the instructor's design of e-learning modules.

The research reported in this article compared on-land student comprehension of intricate detailed knowledge and skills communicated by face-to-face delivery with the same instruction communicated to a simulated e-learning student group by digital video recording. The face-to-face instruction was significantly more effective at the.01 level with 83% success from the e-learning instruction and only 20% from the simulated e-learning instruction.

Simulated e-learning experiences were not as effective. This result may be partly due to the difficulty of clear communication as suggested by Restauri [1]. The students learning by video could not ask teacher questions for feedback. The main steps were present and seen in the video, but students watching the simulated e-learning version had a limited view of the demonstration. Student-to-student interaction during the taped section did not improve results. However, the adult students' reacted to interaction with a live teacher. Students learning on-land may have been motivated to complete the steps accurately because the teacher was present.

Continued research in this area is needed to refine the methods for e-learning instruction. Perhaps, supplementing the recorded instruction with an additional e-learning handbook that includes diagrams and step-by-step instructions would influence the results to be more comparable to face-to-face instruction, such as multiple views of the hand manipulation.

While this research project did not show the success the authors anticipated, it did reveal substantially more differences of on-land and e-learning instruction than anticipated and the results reaffirmed the need to test assumptions.

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