Use of Instructor-Produced YouTube® Videos to Supplement Manual Skills Training in Occupational Therapy Education

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An ongoing challenge to occupational therapy educators is how to provide resources and strategies that best assist students in learning, retaining, and replicating protocols in clinical manual assessment. This pilot survey study explored how 43 first-year master’s of occupational therapy students enrolled in a kinesiology course perceived the value of implementing instructor-produced YouTube® videos of in-class assessment demonstrations. The videos, taken on a smartphone, were uploaded to a private YouTube URL created by the instructor and then linked to a pre-established Moodle learning platform. By the end of the 6-wk course, students had registered 2,573 views averaging 60 views per student. Postcourse mixed survey results revealed students perceived that the videos improved the quality of the course, increased their level of engagement and learning, and boosted confidence in their manual skills. Survey results also found that students correlated the instructor’s willingness to develop online videos with a commitment to student learning.


Today’s occupational therapy instructors teach a generation of students dubbed the “Net Generation” (Sherer & Shea, 2011). Their level of comfort with—and in many cases dependence on—wireless technology exceeds that of earlier generations. Recent estimates indicate these students spend from 6.5 to 11 hr per day multitasking on electronic devices such as smartphones, laptop computers, MP3 players, and desktop computers (Salaway, Katz, Caruso, Kvavik, & Nelson, 2006). This level of technological skill mirrors societal advances as a whole, thus making relevant the inclusion of widely available technology in the occupational therapy classroom (Breines, 2002). This technology has created the ability to construct courses that enable mobile learning, or m-learning. For instance, some nursing faculty have successfully incorporated the use of smartphones into their m-learning courses (Robb & Shellenbarger, 2012).

One online resource that may be effectively integrated into the classroom to enhance learning outcomes for science-related content is YouTube® (Eick & King, 2012). In most instances, instructors use content related to their course that has already been posted to YouTube. The link is often embedded in a PowerPoint® presentation students can copy to use at a later time. Less commonly, instructors develop their own instructional video content and post it to YouTube. This approach has traditionally required instructors to have a higher level of technological skill and equipment, and perhaps institutional funding and support. However, with the advent of smartphones and inexpensive digital video cameras, this barrier has been dramatically lowered. As a result, university
instructors have started to develop evidence that supports the use of this technology as a practical teaching tool (Miller & Redman, 2010).

Online videos have many positive attributes. Students can play them multiple times and stop them at any point to process important information. This aspect of student control, or self-directed learning, adds time efficiency and convenience, both of which are critical for learning (Lysaght & Bent, 2005). Videos can effectively supplement traditional classroom lectures by engaging both left and right halves of the brain (Berk, 2009). This engagement is achieved by utilizing imagery and dialogue and may assist students who rely more heavily on visual input. Another important aspect of videos concerns repetition, which has been identified as a key contributor to “deep” learning (Tolçu, 2008). In addition, the use of asynchronous technology provides the opportunity for repetition and feedback at the student’s preferred pace (Perlman, Weston, & Gisel, 2010). Finally, the learning opportunities provided by videos may offer additional opportunities for students to engage in a critical reflective process that promotes knowledge and skill development (Schols, 2012).

Within occupational therapy curricula, the use of online learning platforms such as Blackboard or Moodle has been widely adopted. Although these learning platforms allow for integration of Web-based content, a literature review produced no articles that explored student perceptions of the value of integrating instructor-produced videos into coursework within master’s-level occupational therapy curricula. The purpose of this study was to investigate student perceptions of the effectiveness of low-cost, instructor-produced video demonstrations made available on a Moodle learning platform through a private YouTube link on their level of learning and replicating protocols in clinical manual assessment.

**Method**

**Participants**

A total of 43 participants (35 women and 8 men) were enrolled as first-year master’s degree students in the occupational therapy curriculum of a Midwestern university in fall 2012. The mean age of the group was 27 yr, 91% were White, and 9% were African-American. These students were required to have successfully completed a rigorous musculoskeletal anatomy course before enrolling in the kinesiology course. The kinesiology course was designed to develop students’ ability to analyze tasks related to areas of occupation, performance skills, performance patterns, activity demands, contexts, and client factors. An important aspect of this skill development process involves learning manual skills assessments such as how to assess a person’s strength and range of motion (ROM) for the neck, trunk, upper extremities, lower extremities, and hands. The course’s lecture component presented previously learned human musculoskeletal anatomy information but with an emphasis on how the human body moves in space and which anatomical structures are involved. The course’s lab component consisted of goniometric measurements of joint ROM and hands-on evaluation of muscle strength.

**Video Creation**

An Apple iPhone 4s was used to video in-class demonstrations of manual muscle testing and ROM techniques. Because previous research suggested that students prefer short, targeted videos (Eick & King, 2012), all videos were from 90 to 120 s, and nearly all were first takes. No out-of-class sessions were required to record the demonstrations, and no special lighting equipment or microphones were used. Each isolated muscle test and ROM measurement was captured and uploaded to YouTube using free smartphone application software. The videos were then linked to a pre-established Moodle learning platform to which only students enrolled in the course had access. Students were able to view these videos any time or place on either a desktop computer or mobile device capable of connecting to the Internet.

**Instructional Procedure**

All students attended a 100-min lecture 4 times per week and a 100-min lab 2 times per week for 6 wk. The didactic lecture component presented students with information about kinesiology concepts that would subsequently be explored in a hands-on laboratory. For the lab, students were divided into two equal groups so that the student-to-faculty ratio was approximately 1:10. At the beginning of each lab, students were provided with a handout listing the material to be learned for the day. The instructors modeled all of the assessment procedures to be covered for the day and then allowed time for questions. Students then paired up and learned at their own pace. Faculty were available to provide individual assistance for clarification when requested. At the end of each 2-wk unit, students took a written and lab practical exam, for a total of three lecture and three lab exams.

**Survey Instrument**

This study was approved by the institutional review board of the participating university. Occupational therapy students’
perceptions regarding the effectiveness and use of the video demonstrations as a tool for learning and replicating manual assessments were obtained through an online questionnaire administered during the final week of the 6-wk session. Face validity for the survey was obtained by consulting university faculty experienced with the development of online survey instruments. The questionnaire contained two 5-point Likert scale questions about the frequency of video utilization (Questions 1 and 2) and seven 5-point Likert scale questions about students’ perceptions (Questions 3–9; see Appendix). Additionally, two qualitative questions asked how students used the videos and what could be done to improve them. Data were collected through the online program QuestionPro (QuestionPro Inc., Seattle, WA). As an incentive for participating in the study, students were advised that they would receive 2 extra points on a 100-point exam. Students were informed that non-participation would not harm their exam grade in any way. Before students answered any survey questions, they were advised in writing that participation in the study was voluntary and responses would remain confidential and be used only in the aggregation of data.

Results
The online QuestionPro survey was completed by 41 of 43 students within the required time frame, resulting in a 95% completion rate. Laptop computers were used to watch the videos 83% of the time, whereas 7% of students used desktop computers and 7% used tablets. Only 1 student (3%) used a smartphone. By the end of the 6-wk course, the class of 43 students had registered 2,573 YouTube views, averaging approximately 60 views per student. Table 1 displays the mean scores and standard deviations for Questions 3–9. Questions 7 and 9, “Being able to repeatedly view a demonstration of a clinical technique enhanced my learning” and “Posting clinical technique videos to Moodle demonstrated my instructor’s commitment to my learning,” received the highest ratings at 4.73. Question 6, “I felt comfortable viewing my mobile device for video demonstrations” received the lowest at 4.24.

Thematic analysis of the two qualitative questions yielded information regarding how students used the videos and how the videos could be improved, with key themes summarized in Table 2. Students reported the videos were helpful for addressing questions that developed outside of class when practicing the goniometry and muscle-testing assessments. The audio portion of the videos reinforced the proper use of anatomical landmark terminology for correct hand and instrument placement. Students also reported that the ability to start and stop the video, take notes, and practice midway through the assessment was very helpful. Some students reported that to learn the correct technique, they mimicked or shadowed the demonstration by placing the goniometer near the computer screen. Finally, students found the videos more helpful than books because “being able to follow the movement throughout helped clarify my confusion about how to perform the movement.” Suggestions for video improvement centered on two themes: improve video quality by using a videographer and lapel microphone for clearer audio and include more information when demonstrating muscle testing, including prime movers for muscle testing and how and where to palpate those muscles.

Discussion
This study explored student perceptions of the effectiveness of video demonstrations posted on YouTube and linked to a Moodle learning platform. Survey results suggest students perceived that the videos improved the overall quality of the course, enhanced learning, and increased their confidence during lab practical exams. Additionally, these results support the findings of previous researchers who found that students believe YouTube videos facilitate learning and help them maintain interest in course content (Eick & King, 2012).

A key finding in this study was that students appreciated the ability to repeatedly view video demonstrations. An average of six viewings per demonstration suggests students valued the opportunity to closely scrutinize each demonstration. Students’ asynchronous viewing indicates they took advantage of around-the-clock video availability to learn when they were most motivated (Toççu, 2008).
This ability of students to find reliable answers in real time during practice sessions outside of class may have allowed more “teachable moments” to be satisfactorily fulfilled throughout the course, thus increasing students’ confidence level for lab practical exams (Desai & Graves, 2008).

Qualitative comments implied that some learners preferred to watch, rather than read, how to perform manual kinesiology assessments. A complementary rationale supporting this preference involves a Net Generation quality, that is, course content presented using video increases student engagement (Sherer & Shea, 2011). One possible explanation for this preference involves the mirror neuron system, which is activated when a motor task that must be learned is observed. Evidence suggests that a person acquires motor skills by watching another person perform an activity and then imitating that activity (Elliott, Hayes, Grierson, & Lyons, 2011). This mode of learning is in contrast to a student reading a description of how to perform an assessment and then problem solving either alone or with a classmate to determine the proper technique.

These videos were originally planned to be used to “flip” the classroom. In the flipped classroom model, what used to be classwork (i.e., instructor-led lectures and student note taking) is done before class and what used to be homework (typically, assigned problems) is done during class (Pierce & Fox, 2012). However, although videos and all class materials were made available before class, students emphatically requested that all assessments be demonstrated live. It was concluded that this particular content was not well suited for the flipped classroom model.

For education programs on a constrained budget, the very low cost of YouTube video production is a compelling factor. No additional time outside of class was required to produce the videos, and no specialized equipment was required. More Americans (53%) now own a smartphone than a cell phone (Moscaritolo, 2012), and virtually all smartphones have a video camera. Although this study used an iPhone app to upload video, Android devices have similar software. Thus, instructors who are interested in providing demonstration videos for their lab courses may already be equipped to do so. The process for uploading a video to YouTube is simple, and a Moodle or Blackboard platform is convenient but not required.

Limitations

Although online video demonstrations to supplement in-class learning have many benefits, they also have drawbacks. Chief among the drawbacks is the dependence on technology such as computers, websites, and mobile devices to the exclusion of traditional textbooks. Websites and other technologies occasionally fail; therefore, total reliance on them could be problematic. Also, although instructors may view videos as supplemental, students may perceive them as a primary learning tool they are entitled to have in other courses in which videos may be pedagogically inappropriate.

Implications for Occupational Therapy Education

The findings of this study have the following implications for occupational therapy education:

- Students perceived that having around-the-clock access to online video demonstrations enhanced learning, increased confidence, and improved course quality.
- Video demonstrations increased student engagement, perhaps because students were able to control the pace of the demonstration and play it multiple times, if necessary, to ensure comprehension.
- Because YouTube is a free service and self-produced videos may be easily uploaded to the Internet, financial and technical barriers for the creation of video content are extremely low.
- Students correlated the instructor’s willingness to develop online videos with a commitment to student learning.

### Table 2. Summary of Qualitative Response Themes

<table>
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<tr>
<th>Question</th>
<th>Sample Responses</th>
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<tr>
<td>How were the videos used?</td>
<td>- The videos were very helpful when questions arose outside of class.</td>
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<td></td>
<td>- I would watch the videos when practicing the movements with classmates and while reviewing for the lab practicals.</td>
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<td></td>
<td>- The videos were my main study tool for the lab practicals.</td>
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<td></td>
<td>- I am someone who has to see things over and over. Having these videos was the ideal tool in helping me with studying for lab practicals and written exams.</td>
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<td></td>
<td>- They helped eliminate concerns I had with conflicting visual information.</td>
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<tr>
<td>How can the videos be improved?</td>
<td>- <strong>Audio:</strong> Speak louder or use a microphone.</td>
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<td></td>
<td>- <strong>Video angles:</strong> Position the camera closer so that hand placements are clearer.</td>
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<td></td>
<td>- <strong>Anatomy:</strong> Mention prime movers when performing muscle tests.</td>
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Conclusion

This study found that occupational therapy students perceived the inclusion of supplemental YouTube videos of in-class kinesiology assessment demonstrations to be very helpful to their learning. Survey results revealed that students thought the videos improved the quality of the course and their level of confidence in manual skills. In addition, students correlated the instructor’s willingness to develop online videos with a commitment to student learning. Because producing and uploading digital videos to YouTube is inexpensive and straightforward, occupational therapy instructors searching for innovative ways to enhance their courses may want to consider this option. 

References


Appendix. Online Questionnaire

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<th>Question</th>
<th>Options</th>
<th>Score Options</th>
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<tr>
<td>1. If you watched the video demonstrations offered in OT 515, what type of device did you MOST OFTEN use to view them?</td>
<td>1 = Smartphone, 2 = iPad or tablet computer, 3 = Laptop computer, 4 = Desktop computer, 5 = Other device</td>
<td>1 = Strongly disagree, 2 = Disagree, 3 = Not sure, 4 = Agree, 5 = Strongly agree</td>
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<tr>
<td>2. How often did you review the demonstration videos on your mobile device in preparation for the lab exam?</td>
<td>1 = None, 2 = 1–2 times, 3 = 3–4 times, 4 = 5–6 times, 5 = 6 times or more</td>
<td>1 = Strongly disagree, 2 = Disagree, 3 = Not sure, 4 = Agree, 5 = Strongly agree</td>
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<tr>
<td>3. Having the ability to review video demonstrations on mobile devices improved my grade on the lab practical.</td>
<td>1 = Strongly disagree, 2 = Disagree, 3 = Not sure, 4 = Agree, 5 = Strongly agree</td>
<td></td>
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<tr>
<td>4. I feel that having access to video demonstrations improved the overall quality of this course.</td>
<td>1 = Strongly disagree, 2 = Disagree, 3 = Not sure, 4 = Agree, 5 = Strongly agree</td>
<td></td>
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<tr>
<td>5. Providing demonstration videos increased my engagement (participation) in class.</td>
<td>1 = Strongly disagree, 2 = Disagree, 3 = Not sure, 4 = Agree, 5 = Strongly agree</td>
<td></td>
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<tr>
<td>6. I felt comfortable viewing my mobile device for video demonstrations.</td>
<td>1 = Strongly disagree, 2 = Disagree, 3 = Not sure, 4 = Agree, 5 = Strongly agree</td>
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<tr>
<td>7. Being able to repeatedly view a demonstration of a clinical technique enhanced my learning.</td>
<td>1 = Strongly disagree, 2 = Disagree, 3 = Not sure, 4 = Agree, 5 = Strongly agree</td>
<td></td>
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<tr>
<td>8. Being able to repeatedly view a demonstration of a clinical technique improved my confidence in performing the technique correctly.</td>
<td>1 = Strongly disagree, 2 = Disagree, 3 = Not sure, 4 = Agree, 5 = Strongly agree</td>
<td></td>
</tr>
<tr>
<td>9. Posting clinical technique videos to Moodle demonstrated my instructor’s commitment to my learning.</td>
<td>1 = Strongly disagree, 2 = Disagree, 3 = Not sure, 4 = Agree, 5 = Strongly agree</td>
<td></td>
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