Effects of Screen-recording and Conversational Cartoon Animations on Learning Performance and User Experience: A Pilot Study

Feng-Ru Sheu
Kent State University
fsheu@kent.edu

Abstract
Videos are one of the most common media formats for online learning. The impacts of different presentation styles on student performance and experiences have not been widely studied before. Therefore, this study explores how two commonly used video types, screen-capture with narratives vs. cartoon animation, can affect student performance and experiences. A user study with first-year college students (n=56) was conducted to examine the effects of both types of videos on learning performance and experiences. The study results suggested that both the screen capture videos and the conversation-based animation videos were equally effective for the immediate learning outcome. However, there was a qualitative difference in the student responses. More students who watched the cartoon animation videos included more specific library terminology or lingo in their responses.

Keywords: action research; story-based learning; user study; library instruction; tutorial video

Background
The front-line educators, including academic librarians, constantly encounter the challenges of selecting proper instructional techniques or media in the various learning environments; especially in an asynchronized online environment. Some methods have been traditionally applied to compose learning materials, including text, graphic, video, and audio (DeVaney, 2009; Lusk & Atkinson, 2007; Mayer, 1999, 2001, 2002; Ploetzner & Lowe, 2004). In broad definition, technology for video alone includes films, animations (Rieber, 1990; Tversky & Morrison, 2002), and screen-capture instructional technology (Smith & Smith, 2012; Walker, 2010; Yuen, 2004). The development of multimedia technology enables educators to respond to the challenges and the needs that arise from the evolving circumstances. Incorporating animated pedagogical agents is a relatively newer instructional delivery method that facilitates learners to obtain information and skills using lifelike characters within a multimedia-learning environment (Lusk & Atkinson, 2007). All these pedagogical technology techniques are considered as a means to integrate different modalities together to aid learning (DeVaney, 2009; Lusk & Atkinson, 2007; Mayer, 2001).

Attending college is one of the most critical life transitions for a lot of people. In the first year of college, students encounter various changes and challenges during their transitions and adjustments to a new life. Research suggests that first-year undergraduates had higher levels of ongoing and chronic stress when compared to other academic years (Misra & McKe...
Towbes & Cohen, 1996). Additionally, Trautwein and Bosse (2017) pointed out the difficulties related to: 1) personal aspect, such as balancing studying, part-time work, and family time, 2) studying aspect, such as high-curricular demands and pace, 3) organizational aspect, such as adjusting to new teaching and learning environments, and 4) social aspect, such as building new peer relationships. With further respect to a student’s study capacity, study results showed that first-year students tend to have limited information on literacy or research skills (Gross & Latham, 2012; Montgomery & Wray, 2020; Zimu, 2020). Gross and Latham (2012) further indicated a deviation between the information on literacy skills of first-year students and their self-perceptions of their abilities, which means that they have an exaggerated understanding of their own abilities (i.e., they "think" that they possess sufficient information literacy skills, but in fact they do not).

Without proper support to manage the college transition, these challenges and difficulties may further impact students’ health and may result in other mental health concerns and behavioral issues. These issues included sleep disturbance, binge drinking (American College Health Association, 2014; Jensen, 2003; Mallett et al., 2013), and ultimately, affected their academic performance and well-being (Singleton & Wolfson, 2009).

The university library is a helpful resource for students to develop study skills, which supports their academic performance. For example, researchers indicated that first-year students’ use of library services were positively associated with academic outcomes, engagement, and skills (Soria, Fransen, & Nackerud, 2013, 2017). Similarly, Hughes, Hall, and Pozzi (2017) reported that the use of library services supported the students’ information needs for academic purposes. The above suggests the important role of the university librarian who could play a part in the lives of the first-year students. They may stimulate the students’ learning interests, respond to their learning needs, and ultimately, support their academic success.

In response to the rapidly changing learning environments, new instructional strategies like story-based animations were employed to redesign a set of library video tutorials. Storytelling is an effective form of communication and it has been used for learning for decades, if not centuries. In contrast to the conventional screen recorded video tutorials with narratives, story-based animation videos convey content information through a conversation style between two cartoon characters. In particular, the same content was carried out with an animated story. For example, instead of using a librarian’s voice telling how to search a database with screen recording, the video was set up as a conversation between two students. The scenario is one student would tell another student who was having trouble finding information how to search an article from the library’s website. These kinds of situations are real-life stories.

In this paper, we describe the pilot project, our assessment study on the students’ reactions to both types of video presentations and opportunities for future development. Specifically, the study explored the following questions:

1. What is the impact of a story-based strategy on the user experience when using online video tutorials?
2. What are the learning outcomes from such a story-based approach?
Research Design

According to Merriam (2002), basic interpretive study can be used to understand the way people interpret and attribute their experiences and construct their lives. Therefore, the approach was deemed appropriate as the author attempted to learn more about students’ experiences of watching library video tutorials in two different styles (screen recording with a single voice narrative vs. animation with two voices/conversations). Particularly, this approach allowed the study to gain a better understanding of the potential influence of presentation styles on learning outcomes. Specifically, the content information they received from the two videos and how they received the information was interpreted.

The Videos

Two library video tutorials with different visual/presentation styles were displayed to 56 college freshmen in two separate times. One video was a “conventional” show-and-tell screen capture video narrated by a librarian. The other video was conversation-based animation video with cartoon characters. The content of both videos were the same, which involved: (1) finding a specific database (in this case, PsycINFO) from the library homepage, (2) conducting a keyword search for journal articles on given topics, and (3) refining a search to peer review journal articles. The lengths of time for the two videos were approximately the same (2 minutes) with only a few seconds difference.

Participants

The population of the current study is the first-year undergraduate students, who are normally the target audience of library instruction. After obtaining IRB approval, an email invitation was sent to all the first-year students at a public research university in the Midwest region. Interested participants contacted the researcher to schedule a session in a lab to watch the videos. Fifty-six students were recruited and were randomly assigned into two groups: one was a story-based group. Participants in this group watched the animated video with two characters in conversation style, while the other was a non-story-based group. Participants in this group watched the screen recording video with single voice narrative.

Procedure

In each individual session, the participants were greeted and given a consent form with the study information that was being presented. The study information was explained both orally and in print (the study information sheet). Participants were allowed time to read through it and ask questions if they had any. The research was voluntary-based. The participants could have left at any time if they did not wish to participate. For the study, the participants were asked to view the video, perform tasks with a worksheet, and then fill out a survey. The primary task was to conduct a database search with the given information, which was covered in the tutorial, and then write down the bibliographic information of their choice, specifically the title and author(s). In addition, students were asked to recall what the video was about.
Data Analysis

The primary data include students’ performance on the tasks and their responses to one open-ended question: what was the video about? Both quantitative and qualitative analysis methods were applied in the study. Descriptive analytics and coding were applied to provide the insight and the patterns of the students’ performance.

Interpretation was the general approach to analyze data. Interpretation means producing reasonable meaning, which is created by researchers with their best efforts from the social phenomena they studied (Hatch, 2002). The goal was to explore the experiences of watching different presentation style videos among first-year students. Interpretation helps to understand what information the students perceived from the two library video tutorials and how they applied the perceived information.

Descriptive statistics (i.e., mean, frequency, and percentage) and open coding were the primary methods for data analysis, which provide insight and discovery to the patterns of the students’ performance. Opening coding is a systematic process of sorting the collected data through identifying concepts, naming, and categorizing them based on its dimensions in order to establish major themes (Corbin & Strauss, 2010; McCaslin, n.d.; Merriam, 2002). Themes and sub-themes were produced from the analogous responses of worksheets and recurring behavior patterns of the article-search task. The responses recorded in the worksheets were coded from the following aspects: the level of detail and the completion of the article-search task. The observation notes provided the information on the participants’ performance.

Coding results were present in the following results section, consisting of students’ article-search task performance and their responses of an open-ended question. Peer debriefing was used in the study to ensure the validity and credibility of the study and to make sure the themes and research questions were aligned.

Results & Discussions

A total of 56 students participated in the current study, thirty of them watched a screen capture with single voice narrative video, and the others watched a conversation-based animation video. Results showed that there was no significant difference in immediate learning outcomes between the two types of videos, generally. Coded data from the observation notes and worksheets showed that all participants recorded bibliographic information of their article-search results. It suggested that they performed a successful database search after watching the tutorials. Furthermore, coded data from the worksheets showed that all the students were able to describe what the videos were about.

The level of detailed responses on the worksheets was coded from two aspects, including the number of word counts and the degree of key points covered. Results showed that the average word counts of the participants’ written responses were 17.7 words. Participants who watched the screen capture video used an average of 18.1 words in their answers, and those who watched a conversation-based animation video used an average of 17.2 words. The results
suggest that there were no significant differences in the number of word counts the students wrote regardless of the types of videos the students watched.

Table 1

Average Word Count of the Open-Ended Question (n=56)

<table>
<thead>
<tr>
<th>Watched Video</th>
<th>Frequency</th>
<th>Average word counts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screen capture Video</td>
<td>30</td>
<td>18.13</td>
</tr>
<tr>
<td>Conversation-based animation video</td>
<td>26</td>
<td>17.23</td>
</tr>
</tbody>
</table>

However, some qualitative differences in the degree of key points covered in the students’ responses emerged from the coded data. The level of details of key points covered in the students' responses were sorted into five categories/levels. The first category is regarded as a very general response, which included the least amount of information related to the video watched. Responses that fell into this category meant that no key points (i.e., specific purpose, tool, databases, library jargon) were included. A sample response was: “It was a tutorial video on how to complete a certain task.” Responses that fell into the second category included only one key point mentioned in the video. A sample response of the second category was: “The video I just watched was about how to navigate and use PsychINFO.” Responses of the third category included two key points covered in the videos. A sample response of this category was: “The video showed how to research articles on the university library website.”

Responses that fell into the fourth and fifth categories included more detailed video information. Responses of the fourth category consisted of three key points relevant to the videos. A sample response of the fourth category was: “The video showed how to get to the PsycInfo site and how to narrow your search.” Similarly, responses in the fifth category consisted of three key points, but further included library jargons (i.e., keywords, quotation point). A sample response of the fifth category was: “The video was an informative video, that showed us how to utilize keywords and databases in order to find the resources to write a paper.”

As shown in Table 2, results suggested that more than half of the worksheet responses included video information with a medium degree or less. Twenty of the fifty-six students' responses (37%) fell into the third category, eleven of the fifty-six worksheet responses (20.4%) accounted for the second category, and one student (1.9%) response accounted for the first category. Additionally, results showed that twenty of the fifty-six responses (37%) accounted for the fourth category, and four of the fifty-six responses (7.4%) accounted for the fifth category. The results suggested that two in five students could provide the detailed video information, and a small portion of the students further used library jargons in their responses. Additionally, twenty of the fifty-six worksheet responses (44.4%) covered more detailed information from the videos, and four of them further used library jargons in their responses.
### Table 2

**Level of Key Points Covered in Students’ responses (n=56)**

<table>
<thead>
<tr>
<th>Groups/types of videos watched</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1</td>
<td>1</td>
<td>1.9</td>
</tr>
<tr>
<td>Screen capture Video</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Conversation-based animation video</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Category 2</td>
<td>11</td>
<td>20.4</td>
</tr>
<tr>
<td>Screen capture Video</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Conversation-based animation video</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Category 3</td>
<td>20</td>
<td>37.0</td>
</tr>
<tr>
<td>Screen capture Video</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Conversation-based animation video</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Category 4</td>
<td>20</td>
<td>37.0</td>
</tr>
<tr>
<td>Screen capture Video</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Conversation-based animation video</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Category 5</td>
<td>4</td>
<td>7.4</td>
</tr>
<tr>
<td>Screen capture Video</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Conversation-based animation video</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

An interesting theme emerged when further looking into the level of details from their recall about the video content, and the types of video watched. Results showed that three of the four responses in the fifth category (i.e., responses that covered the most video details and library jargon) were from students who watched the conversation-based animation video, and one was from those who watched the screen capture video. On the other hand, nine of the eleven responses of the first category came from students who watched the screen capture video, while two came from those who watched the conversation-based animation video. It is uncertain if the students were more impressed with the conversation-based animation video or if they had already known the video content very well. Further research is needed to explore the association between the presentation types of videos and students’ responses and to clarify the students’ background knowledge in research skills and library resources. Furthermore, the one response of the first category came from a student who watched the conversation-based animation video. The result implies that the student may not have paid attention to the video or did not understand the video content.

The author acknowledges the limitations of the pilot study. For example, the level of difficulty on the article-search task may be too easy for the students. Its simplicity may disguise the possible impacts of the different presentation style videos on the students’ learning experiences.
Conclusion

The pilot study explored the library video viewing experience with actual users, first-year students who have relatively few or no university library experience or research skills. In summary, the results show that there were no significant differences on the immediate learning outcomes between the two types of videos (i.e., screen capture with single voice narrative vs. conversation-based cartoon animation). All participants performed a successful database search after watching the tutorials. Most of the students were able to describe what the videos were about and how they would teach their peers on how to conduct a library database search. Coding results of the first open-ended question showed that the majority of the students were able to describe what the video was about.

In conclusion, the study results suggest that both the screen capture video and the conversation-based animation video were equally effective. However, there was a qualitative difference in the students’ responses. More students who watched the cartoon animation video included more specific library terminology or lingo in their responses.

The unique aspect of this study was to investigate the questions with multiple perspectives and with actual first-year students who have relatively few or no university library experience. We believe that the conversation-based cartoon animation approach for video instruction has great potential to enhance student engagement as well as learning in online and blended settings. This study explored the approach in an academic library setting with first-year college students. The results of the study can potentially lead to improvements in information literacy programs and to improve library practices, especially those pertaining to designing, developing, and implementing better, more high-impact and innovative story-based approaches.

References


Zimu-Biyela, A. N. (2020). Information literacy skills of first-year students at the Mangosuthu University of Technology at a pre-library orientation and instruction phase. *Innovation, 60*, 55-75.