

Can Cartoon Characters Help? Enhancing Student Engagement with Story-Based Animation

Feng-Ru Sheu

University Libraries, Kent State University

Abstract

In response to evolving changes in the teaching and learning and in contrast to conventional screen recorded video tutorials with narratives, story-based videos were developed with cartoon characters, settings, and contexts similar to student life. Both types of videos are used for library instruction. A user study with 53 first-year students was conducted to examine student learning experiences with both types of videos. The present paper shares detailed results and comments from students, including their feedback on engagement, satisfaction, confidence level, and video style preference. Results show that both types of instructional videos are equally effective in terms of immediately learning outcomes. However, students rated higher on engagement, satisfaction, confidence level on story-based/cartoon animation video and prefer story-based/cartoon animation if they were given an option.

Keywords: action research; engagement; animation

Introduction

Online learning is a trend in changing learning environment and, in some cases (e.g., rural areas), deliver learning materials through the Internet is the only or the most efficient way to provide services for students at distances. As a result, it is important to design and create effective learning materials for online delivery. It is no exception to academic libraries in supporting student success through multiple modes and provide access to materials in variable formats (Arola, Sheppard, & Ball, 2014, Carlito, 2018, Cordes, 2009, Kress, 2010). Carlito (2018) suggested librarian may implement multimodal support to improve information literacy through a multimodal model, which consists of four strata, including discourse, design, production, and distribution. Video tutorials are one of mode that libraries use to deliver library instruction in helping students learn about library resources and how to effectively identify and utilize them for their academic needs. For example, Xiao, Pietraszewski, & Goodwin (2004) used online database instructional videos to provide contextual and relevant assistance in a just-in-time manner. Malone (2015) synchronous video were provided to online library instruction to respond the increased request for research consultations from online courses students. Librarians are familiar with multimodal deliveries of instructions and services. Carlito (2018) further suggested that the use of video clips, image, colors were the strategies to implement design element in library instruction.

Like other teaching and learning professions, academic libraries follow best practices and several trends in the field of instructional design and scholarship of teaching and learning. This includes to utilize sounds instructional approaches (e.g., story-based learning) as well as effective educational technology (e.g. multimedia, animation, AR, VR, etc.)

In education literature, successful experiments regarding the effectiveness of story-based learning have been reported (Kose, Koc, & Youcesoy, 2013; Kroth & Cranton, 2014; Shaw, Lind, & Ewashen, 2017; Wong & Poon, 2013; Wong et al., 2019). Story-based learning refers to the learning approach applied attractive stories on human learning process. In the field of education, stories have been considered as special and supportive elements to facilitate educational processes (Kose et al., 2013). A study of Shaw and colleagues (2017) found story-based learning enable nursing students enhance advanced communication skills in pediatric nursing. Moreover, researchers have indicated that stories possess a powerful to engaging the audience's emotions and affective, and the potential to transform their perspectives and actions (Kroth & Cranton, 2014; Wong & Poon, 2012; Wong et al., 2019). In short, story-based approach helps to make connection between the learners and the content by making the materials relevant.

Another long proofing practice is the application of animation in education. Animation video clips can be effective instruction (especially young learners) because it: (1) provides students opportunities to involve in specific content interactively; (2) offers learns an opportunity to be engaged in their own learning process; and (3) allows students to share information through social media channels with friends around the world (Gurvitch & Lund, 2014). Yeh et al. (2012) suggested that applying animation appropriately is beneficial for reducing extraneous cognitive

load and improving students' understanding of complex phenomena. Cook (2006) also suggested an animation-based approach is beneficial for students learning science.

The value of engagement in student learning is no longer questioned (Trowler & Trowler, 2010). There is positive association between engagement level and learning outcome, the deeper engagement levels, the better learning outcome (Grissom, McNally, & Naps, 2003). In order to enhance the engagement and in response to evolving changes in the teaching and learning environment, our libraries re-designed several videos to promote a more engaging learning experience by incorporating new instructional strategies, such as micro-learning, story-based learning, and problem-based learning. A set of video-based library tutorials were created and designed to support distance education students and independent learners who want to learn the content themselves. This poster reports a practice of instructional design and development on a creation of library tutorial videos using story-based approach, specifically using cartoon characters and animations to present content that has been traditionally delivery through screencast with narrative.

The study aims to collect information about learners' perceptions of the different representations (e.g., video presentation style) with respect to student's viewing experiences. This information can hopefully provide insight into the dialogues regarding the roles and influences of animation in instruction. The study was primarily driven by the following two questions: First, what is the impact of a story-based strategy on the user learning experiences when using online video tutorials (i.e., satisfaction, engagement, confidence, and preference). Second, what is the impact on the learning outcomes from such a story-based approach?

Methods

In order to achieve our research goals, we conducted a user study with first year students who are the primary or target audiences of the library video tutorials. We utilized methods from user experience research, which focuses on understanding users' needs, behaviors, and motivations through task analysis, observation, and other feedback methodologies, including survey/questionnaire and contextual interviews.

Two library video tutorials were used with the 53 first-year students to assess their experience in video watching and understanding of the video content. One video was a "conventional" show-and-tell video with a screen recording and voiced by a librarian. The other video was story-based with conversation by characters (i.e., conversations students have with the professor in the classroom). The contents of both videos were the same, which involved: (1) finding a specific database (in this case, PsycINFO) from the library home page, (2) conducting a keyword search for journal articles on given topics, and (3) refining a search to peer review journal articles. The length of the videos is also about the same. There is only a few seconds' difference between them.

Video format is the independent variable in the study, including story-based and non-story-based. Video watching experience, the dependent variable, was assessed after watching story-based video and non-story-based video, respectively. The investigator attempted to examine if college students' watching experience in story-based tutorial video differ from non-story-based tutorial video. If one type of video was more preferable for participants, we would expect the score of watching experience is higher than the other type of video.

Participants

College students were recruited from a mid-size research university in the Midwest area in the U.S. Student is the main patron of the university libraries, as well as the main user of library tutorial video. Focusing the user experience on student allows librarian develop better understand user experience and create proper service experience for students. The current study further targeted first-year college student since they may have limited experiences in library tutorial trainings relatively compared with the students in their second- to fourth-year. In total, 53 first-year colleague students were recruited for the study with ages ranging from 18-21 years old.

Data collection procedures

Ethical approval was obtained from the Institutional Review Board (IRB) of the author's institution before the beginning for participant recruitment. Recruitment information was sent to all first-year students through email. A preliminary inquiry about participants eligibility was conducted when people contact the researcher indicated their participation interest. Written informed consent was obtained from each participant before participating in the study. Each participant participated in two sessions, one week apart. During the first session, all participants were asked to view videos, perform tasks (based on video content), and fill out a survey questionnaire regarding their video viewing experiences, including satisfaction, engagement, and preferences of video presentations. A quick follow-up

interview was followed to clarify questions raised during the session. Demographic data was also collected. At the second session, participants were asked to perform tasks based on the video content in previous session. Then watch the other video clip and fill out a survey regarding their video viewing experiences. A quick follow-up interview was followed to clarify questions raised during the session.

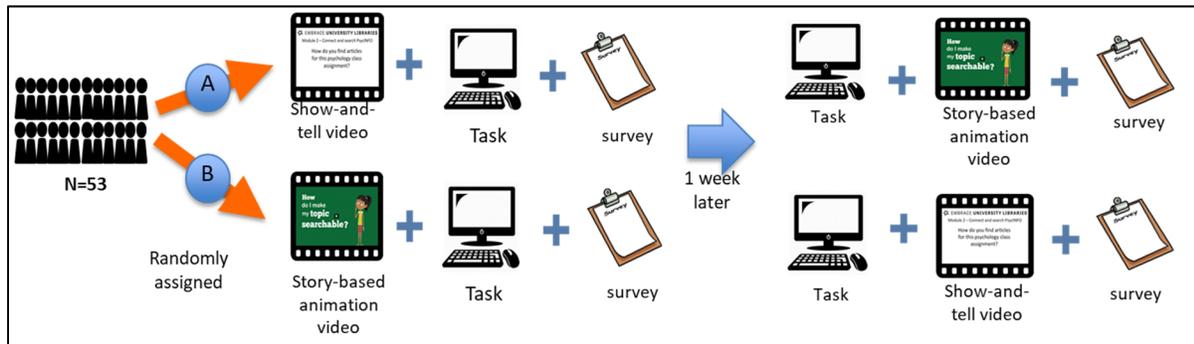


Figure 1. Data collection procedure

Data collection tool

A 22-item questionnaire was developed to assess participants' video watching experience. Four questions related to demographic characteristics, such as gender, age, and academic status, and two questions assesses participants' impression of video in general (i.e., preference and learning new). Sixteen Likert-scale questions (1= strongly disagree to 5= strongly agree) assess participants' experience and understanding of videos from three aspects including engagement, satisfaction, and confidence. Questions about engagement assess how engaging the video is based on participant's perspective. Questions related to satisfaction assess the feeling of pleasure regarding the videos. Finally, questions about confidence assess participants' confidence level to perform the task that they just watched from the video. The reliability for engagement ($\alpha = .872$), satisfaction ($\alpha = .792$), and confidence ($\alpha = .821$) scale were good respectively. The questionnaire was distributed in both sessions. However, the questionnaire in the second session did not include four demographic items.

Data Analysis

Descriptive analysis and pair-sample t-test were used for data analysis. The collected survey data was imported into SPSS. The descriptive analysis was used to present the features of the participants, and the pair-sample t-test was applied for data analysis to examine participants perception regarding the two types of video format. An alpha level of .05 was used for all statistical tests.

Result & Discussion

Demographic information

As stated earlier, a total of 53 students participated in the study. The majority of the respondents were freshmen, came to school less than one year, and aged 18 to 21 years old. Thirty percent of the students were male, fifty-six percent of participants were female, and seven students did not answer. Descriptive statistics for participants demographic characteristics were listed in Table 1.

Prior experience

We wanted to know more about their prior experiences with library video tutorials and knowledge about the content covered in the video. So, the participants were asked if they have watched library tutorials before and if they learn anything new after viewing the video. Approximately 86% of the students reported they have never watched library tutorial videos before. Some of them have watched but they did not remember what it was at all. When asked, approximately 83% of the participants indicated they learned something new from the video; while about 10% of the students indicated that they did not.

Table 1. Descriptive characteristics of the Survey Respondents (n=53)

	N	%
Academic Status		
Freshmen	50	94.3
Sophomore	3	5.7
Age		
18-21 years old	53	100.0
Gender		
Male	16	30.2
Female	30	56.6
Not answered	7	13.2

Engagement/ satisfaction/ confidence

The results of pair-sample t-test for the mean value of engaging, satisfaction, and confidence after watching the story-based and nonstory-based library tutorial videos were listed in Table 2. Results showed the mean value of engaging rating, satisfaction, and confidence for story-based tutorial video is higher than nonstory-based video. It means participants had higher rating for story-based video than nonstory-based video. Results further indicated a significant difference in the mean of engaging rating between nonstory-based and story-based tutorial videos [$t(51) = -6.15, p < .001$]. It means the participants felt more engaging in story-based tutorial video than nonstory-based tutorial video. On the other hand, the mean difference of satisfaction between story-based and nonstory-based video was not significant [$t(52) = -0.22, p = .831$]. These findings reveal that participants' level of satisfaction regarding story-based tutorial video and nonstory-based tutorial video are about the same. Similar results were found in participants' level of confidence that the mean confidence between story-based and nonstory-based videos was not significant [$t(52) = -1.67, p = .102$]. Such findings suggested that the participants' understanding of video content stayed the same after watch story-based and nonstory-based videos.

Table 2. Descriptive Statistics and t-test Results for Non-Story Based vs. Story-Based Video

Outcome	Nonstory based		Story based		n	95% CI for Mean Difference	t	df
	M	SD	M	SD				
Engaging	3.70	0.62	4.17	0.52	52	-0.63, -0.32	-6.15*	51
Satisfaction	4.26	0.83	4.29	0.79	53	-0.29, 0.24	-0.22	52
Confidence	4.54	0.57	4.66	0.50	53	-0.27, 0.03	-1.67	52

* $p < .05$.

Video Preference

When participants were asked about their preferences of presentation type (cartoon animation vs. convention screencast with narrative) if given an option, most participants (76.1%) choose cartoon presentation. The participants did not give any "deep" reasons. Most of them simply said because they like it. Some did provide a little explanation about cartoon style does not seem as heavy and "the other one was kind of boring." On the other hand, some participants feel that carton video seems "a little bit cheesy."

Performance

The unique aspect of this study was to investigate the video viewing experiences with multiple perspectives (i.e., engagement, satisfaction, confidence, and immediately learning outcome) and with actual target users, first-year students who have relatively few or no university library experience. As mentioned earlier, all participants were

able to complete the given tasks taught by the video within an average of three minutes. Both types of videos worked effectively on immediate learning outcomes (i.e., perform a similar task right after watching it).

Conclusion

Overall, students more engaged in story-based library tutorial video than nonstory-based tutorial video. Based on the results, we can conclude that the format of library tutorial video had an effect on college students' engaging rating, but not satisfaction or confidence. In general, story-based video is more attractive for freshman student than nonstory-based video. If given a choice, they prefer story-based representation. The presentation style (or the representations) of the video did not make an effect on students' understanding or impression regarding video content. In other words, both representations of video had no difference regarding the impact on immediate learning outcomes. While both types of video were equally effective, we should still try to make the viewing experience more engaging or even entertaining. However, the video clips used in the present study were less than three minutes. It would be worth exploring the effect of the video representations with longer lengths (or more content) on both immediate learning outcomes as well as retention (long term learning).

This study provides insights for the instructional designer who helps with creating multimedia in support of distance education or eLearning as well as librarians who provide information literacy instruction; in particular, those using videos for online environment, and researchers who are interested in user experiences and instructional design. The author believes the story-based approach has great potential to enhance student learning in online settings; specifically, one-shot library instructions. This study tests the approach in an academic library setting with first-year college students. The results of the study potentially can lead to improvements in information literacy programs and inform library practices; in particular, those pertaining to designing, developing, and implementing better, more high-impact and innovative story-based approaches.

References

- Arola, K. L., Sheppard, J., & Ball, C. E. (2014). *Writer/Designer: A guide to making multimodal projects*. Boston, MA: Macmillian Higher Education.
- Carlito, M. D. (2018). Supporting multimodal literacy in library instruction. *Reference Services Review*, 46(2), 164-177.
- Cook, M. P. (2006). Visual representations in science education: The influence of prior knowledge and cognitive load theory on instructional design principles. *Science Education*, 90(6), 1073-1091.
- Cordes, S. (2009). Broad horizons: The role of multimodal literacy in 21st century library instruction. In *World library and information congress: 75th IFLA general conference and council*. Retrieved from: <http://conference.ifla.org/past-wlic/2009/94-cordes-en.pdf>
- Grissom, S., McNally, M. F., & Naps, T. (2003). Algorithm visualization in CS education: Comparing levels of student engagement. In S. Diehl, J. T. Stasko, & S. N. Spencer (Eds.), *SoftVis '03: Proceedings of the 2003 ACM symposium on software visualization* (pp. 87-94). New York: ACM
- Gurvitch, R., & Lund, J. (2014). Animated video clips: Learning in the current generation. *Journal of Physical Education, Recreation and Dance*, 85(5), 8-17.
- Kose, U., Koc, D., & Yucesoy, S. A. (2013). Design and development of a sample "Computer Programming" course tool via story-based e-learning approach. *Educational Sciences: Theory and Practice*, 13(2), 1235-1250.
- Kress, G. (2009). *Multimodality: A social semiotic approach to contemporary communication*. London: Routledge.
- Kroth, M., & Cranton, P. (2014). *Stories of transformative learning*. Chicago, Sense Publishers.
- Malone, D. (2015). Using synchronous video within a learning management system for library and information literacy instruction. *Public Services Quarterly*, 11(3), 208-216.
- Shaw, A., Lind, C., & Ewashen, C. (2017). Harlequin-inspired story-based learning: An educational innovation for pediatric nursing communication. *Journal of Nursing Education*, 56(5), 300-303.
- Trowler, P., & Trowler, V. (2010). Student engagement evidence summary. Retrieved from: https://eprints.lancs.ac.uk/id/eprint/61680/1/Deliverable_2_Evidence_Summary_Nov_2010.pdf
- Wong, J. P., & Poon, M. K.-L. (2013). Challenging homophobia and heterosexism through critical dialogue and storytelling among Chinese immigrant parents. *Culture, Health & Sexuality: An International Journal for Research, Intervention and Care*, 15(1), 15-28. doi: 10.1080/13691058.2012.738310.
- Wong, J. P. H., Kteily-Hawa, R., Chambers, L. A., Hari, S., Vijaya, C., Suruthi, R., ... & Vahabi, M. (2019). Exploring the use of fact-based and story-based learning materials for HIV/STI prevention and sexual health promotion with South Asian women in Toronto, Canada. *Health education research*, 34(1), 27-37.

- Xiao, Y.D., Pietraszewski, B. A., & Goodwin, S. P. (2004). Full stream ahead: Database instruction through online videos. *Library hi tech*, 22(4), 366-374.
- Yeh, T. K., Tseng, K. Y., Cho, C. W., Barufaldi, J. P., Lin, M. S., & Chang, C. Y. (2012). Exploring the impact of prior knowledge and appropriate feedback on students' perceived cognitive load and learning outcomes: animation-based earthquakes instruction. *International Journal of Science Education*, 34(10), 1555-1570.