

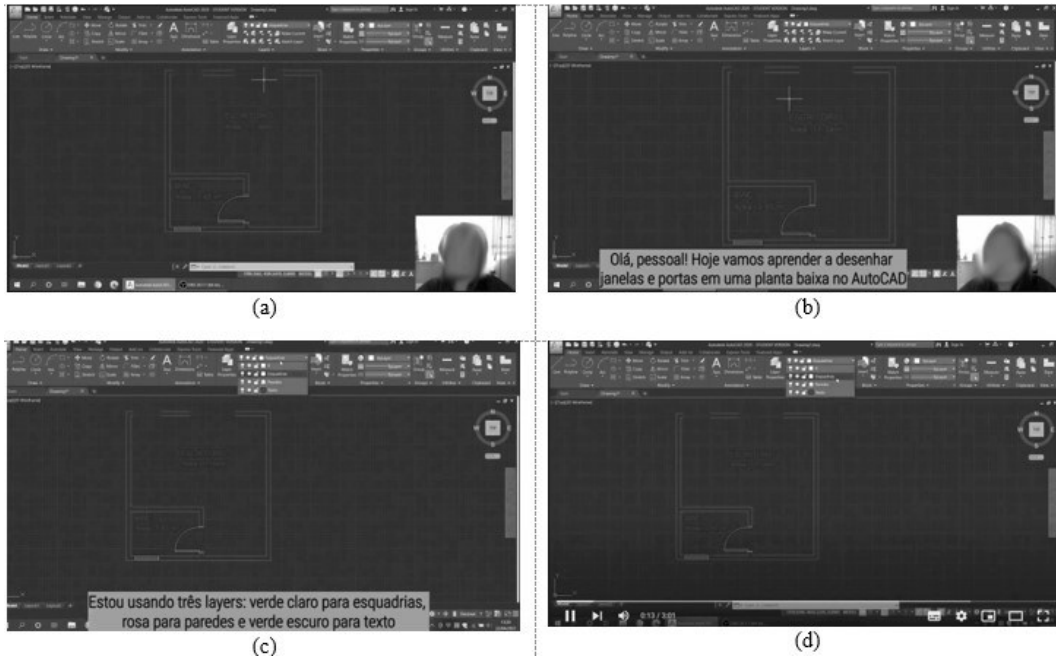


Evaluation of screencasts settings applied to CAD online teaching

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Abstract

Screencasts are video recording techniques that capture dynamic images of the computer screen. Besides that, the screen recordings are combined with audio or subtitles instructions. Originally, screencasts were developed to produce videos that aim to teach instructional content. The most frequent applications of screencasts are in videos about software tutorials. Due to these features, screencasts present potential to be employed in online classes of technical drawing, especially ones that apply Computer-Aided Design (CAD) software. However, it is fundamental to optimize the screencast settings that adjust to the teaching-learning process. This article aims to evaluate different screencast settings, directed to technical drawing online teaching with AutoCAD. Three participants evaluated four different screencast settings to find which settings are adequate for capturing the attention and the student video comprehension. As a result, the participants exposed their preference for screencasts with audio instructions due to the facility of assimilating the audio with the images simultaneously. Additionally, there were inconclusive aspects related to the instructor's webcam application in screencasts. Thus, it is recommended deep investigation in the future.

Key words

Screencast; Video Settings; CAD; Technical Drawing Online Teaching; Asynchronous Online Classes.

1. Introduction

Screencasts are video recordings of dynamic images captured from the computer screen combined with instructions. The instructions can be set in audio or subtitles. The motivation involved in the creation of screencasts was to transmit information about the instructional process.

Because of the instructional applications and their features, Screencasts have presented the potential to be employed in asynchronous online classes. Beyond that, in bachelor courses that include tutorials in their methodology, such as technical drawing, with or without Computer-Aided Design software (CAD), this potential of use is emphasized.

CADs are software developed to represent 2D and 3D technical drawings and design applications with accuracy. They are essential tools to represent engineering and architecture projects. Nevertheless, most parts of the students in these courses do not present previous knowledge about CAD. Additionally, there are few spaces in curricula dedicated to teaching CAD. Hence, an alternative to address this issue is to develop support materials in asynchronous video classes with screencasts.

This article aims to analyze several settings of screencasts directed to technical drawing online teaching with CAD. The three participants of the study evaluated the four screencasts set with different elements. Each one answered specific questionnaires about each screencast.

The article is organized into four sections. First, the literature review will be presented. Then, the method adopted in the screencasts research will be explained. Next, the results of the research will be discussed. Finally, the conclusions will be presented.

2. Literature Review

The concept Screencast applied to video recordings of a computer screen during a software execution was established by Jon Udell (Udell, 2004, 2005b, 2005a). Initially, screencasts were developed to transmit procedural information from blogs.

After that, academics start to study this new type of video recording, as a teaching resource to support online courses. Pongnumukul et al. (2011) advocate that screencast is an educational resource that provides learning autonomy to the student. It can deal with the student's speed of learning due to the possibility of his/her control. Green, Lansing, and Millunchick (2012) mentioned the four main aspects of developing screencast videos: organizing the content, video recording, video edition, and publication. Sugar, Brown, and Lutherbach (2010) suggested some tips for captivating the spectator of the screencast, to comprehend the video content.

Despite there are a significant amount of literature references about screencasts in general, there are few references directed to online teaching of software, such as CADs. In this context, Zhang et al. (2017) applied screencasts as a resource to support the teaching-learning

process of engineering students. They encourage the students to create their screencasts and evaluate the ones made by their colleagues.

Dalton (2016) utilized screencasts to review the content presented in the interior design course. He noticed that the students memorized better the content rather than without this resource.

Finally, Hardake and Rushin (2012) applied screencasts to review the content presented in the fashion design course. They concluded the use of screencasts improves the content comprehension of the students. Besides that, they emphasized that screencasts are an interesting resource to be deployed in tutorials that detailed technical content.

3. Methodology

The method applied in this research consists of three steps. First, four screencasts with different settings were created. The screencasts settings vary with the inclusion or absence of elements, such as the instructor's image by webcam, audio, or subtitles instruction. The settings of each four screencasts are described in Table 1. They are available at Almeida and Baratto (2021a, 2021b, 2021c, 2021d). Besides that, their content was a tutorial about drawing windows and doors in a floor plan with AutoCAD. Figure 1 displays the screencasts' floor plan.

Table 1: Video settings of each screencast applied in the research experiment.

Screencast	Audio Instructions	Instructor's image (webcam enabled)
1	Yes	Yes
2	Yes	No
3	No	No
4	No	Yes



Figure 1: the floor plan presented in each four screencasts.

Then, the volunteers were selected. They belonged to the students of the online training course “Introduction to AutoCAD Screencast” offered by the authors’ research group. Among eight students that volunteer to participate in the selection, three were available to evaluate the screencasts.

Next, each of the three volunteers participated in an individual videoconference. In this videoconference, the volunteers watched the four screencasts, each one with the settings described in Table 1 (Almeida and Baratto, 2021a, 2021b, 2021c, 2021d). The participants were able to control the pauses and play the videos, if necessary.

Finally, after watching each screencast, the participants answered a questionnaire to evaluate the screencast settings and report their video comprehension.

4. Results

The questionnaires answered by the participants provided results that are summarized below.

The answers indicated that screencasts with audio instruction captivated more the participants than the screencasts with subtitles. The participants reported that they needed to look at two elements simultaneously in Screencasts 2 and 3 (without audio): AutoCAD images and subtitles. Beyond that, in Screencasts 1 and 4 (with audio), they reported that they could pay attention only to audio instructions if they prefer not to watch the AutoCAD images. This property of Screencasts 1 and 4 permits to do the exercise while the student listens to the instruction. Additionally, it is easier to associate the audio instruction with images without hiding any image information. This condition is a disadvantage of setting subtitles in the screencasts.

In regards to the image settings, the four screencasts were set in the same way. The screencast recorder software was set to exhibit the videos at 30 fps (frames per second), with a Lanczos filter. All the participants classified these image settings as Good/adequate to display AutoCAD images. Only one of the participants recommend that it was helpful to set the AutoCAD layers with contrasting colors to highlight the drawing elements.

Another instigating result concerns the instructors’ image exhibition. The participants felt confident in the instructors despite the absence of his/her image. Furthermore, they report that the influence of the enabled webcam is not relevant to the screencasts’ content. Some participants mentioned that the instructors’ image in the screencasts creates proximity between the screencast audience and the instructor.

Despite the reports about the irrelevance of the instructors’ image, the participants, paused, unless once time, the screencasts without the instructor’s image (Screencasts 3 and 4). Therefore, the influence of the inclusion of instructors’ images in screencasts should be deeply investigated in the future because of the conflict between the participants’ attitude and their answers.

5. Conclusion

Based on the results presented in the section before, this article brings out the following conclusions:

- Screencasts set with audio instructions are more efficient in captivating the student attention than the ones with subtitle instructions and without audio;
- This study did not find the fundamental aspects that explain the influence of setting the instructors’ image in screencasts in the students’ attention;
- The proposed image settings in each screencast were considered adequate to elaborate AutoCAD screencasts. Furthermore, it is recommendable to set the AutoCAD interface and layers with contrasting colors to highlight the drawing elements in the recorded screens.

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