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Reviews in instructional video

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ABSTRACT

This study investigates the effectiveness of a video tutorial for software training whose construction was based on a combination of insights from multimedia learning and Demonstration-Based Training. In the videos, a model of task performance was enhanced with instructional features that were intended to be particularly effective insofar as they addressed four key processes in observational learning (i.e., attention, retention, reproduction and motivation). An experiment with two conditions was reported. The control condition consisted of only demonstration videos. The experimental condition included a review after task demonstration to provide additional support for retention. The videos taught Word formatting tasks. The 73 participants came from elementary and secondary school. During training, video playing was followed by task practice. After training, a post-test was administered. Engagement data showed that demonstration videos were played almost completely (93%). Reviews fared worse (32%). Motivation increased significantly with training regardless of condition. Task performance also increased significantly from pre-test (29%) to training (84%) and post-test (71%). In addition, results for performance during and after training were significantly better for the experimental condition than the control condition. The discussion argues that the demonstration videos provide a viable way to support task completion. To further improve learning, better understanding of learners' retention processes is needed.

1. Introduction

Videos have rapidly become immensely popular. Technological developments have contributed to their growth in popularity, with computers becoming substantially cheaper, faster and equipped with storage capacities that have expanded from megabytes to gigabytes and terabytes. Likewise, programs for producing videos have become cheaper and easier to use. Improved possibilities for sharing have further contributed to the rising popularity of videos. Ready distribution is now commonplace, with YouTube remaining the top source for all types of videos.

This paper's focus is on how-to videos. Their primary function is to support task performance; they are job aids whose foremost purpose is to enable or guide task completion (Kim et al., 2014). Examples of how-to videos that support task completion can be found on the websites of manufacturing companies, among other places. Ikea is one firm that has produced such videos. Ikea videos can be found in a “How to build” section on the company website, but the same videos are more conveniently located on YouTube (Ikea, 2017; May 1). All Ikea assembly videos on YouTube have the same look and feel (and background music). A brief introduction shows the materials, tools and people (1 or 2) needed for assembly. Step-by-step

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instructions follow, in which real people model correct task completion. The actors, dressed in Ikea uniform, silently demonstrate what to do; there is no spoken narrative. Their modeling actions are supported with brief captioned descriptions (e.g., "Make sure grooved sides are facing in"), signaling techniques (arrows, zooming in and out) and small, on-screen displays of the required (or wrong) materials. The statistics for the YouTube video on, say, the assembly of the PAX wardrobe, reveal that it has been viewed 316,200 times, which illustrates its popularity. Other Ikea assembly videos had reached between 59,175 and 447,961 views when last checked.

Some how-to videos must also serve an additional role, however; namely, to support learning. In addition to enabling task completion, these videos should support procedural knowledge development. In these cases, the videos are tutorials that must establish a basic level of task competence that equips users with the capacity to (quickly learn to) perform other, similar tasks (e.g., Carroll & Rosson, 1987; Fu & Gray, 2004). Videos for software training often fall within this category.

Production of such videos can be a profitable business, as shown by the example of Lynda, an online education company. In 2015, LinkedIn purchased the website Lynda.com for the amount of $1.5 billion. One reason for the deal was so that the LinkedIn website could indicate an available job plus skills requirements, and direct a possible applicant to a video tutorial from Lynda.com that trained the desired skills (Kosoff, 2017; May 2). Software makers also produce video tutorials for their users. For instance, Adobe offers several video tutorials on Premiere Pro (Adobe, 2017; May 12), Microsoft does the same for Word (Microsoft, 2017; May 12) as does TechSmith for Camtasia (TechSmith, 2017; May 10).

On the Lynda, Adobe, Microsoft and TechSmith websites, tutorials for software training are framed as recorded demonstrations. They display an animated screen recording that is accompanied by a spoken narrative. This is considered the standard and preferred format for video instruction for software usage (Plaisant & Shneiderman, 2005). Unfortunately, there is no published information about the design characteristics and effectiveness of the tutorials on these company websites, to our knowledge. The question thus arises what are the design characteristics of an effective software tutorial. This paper suggests that a primary vehicle for facilitating immediate task performance in such a tutorial is a demonstration. Because software tutorials are a special type of how-to video that must also facilitate learning, additional instructional support is needed. This study investigates whether complementary video reviews enhance retention over and above other instructional features.

2. A theoretical model for software training with video

Combined insights from Demonstration-Based Training (DBT) and multimedia learning theory form the basis for our construction of a video tutorial for software training. DBT claims that a model of task performance that the user can mimic should form the heart of a DBT-based video tutorial for software training. It further states that instructional support is needed to increase learning from such a model (Grossman, Salas, Pavlas, & Rosen, 2013; Rosen et al., 2010). According to DBT, these supportive features should address the main processes involved in observational learning that were distinguished by Bandura (1986), namely, attention, retention, practice and motivation. Multimedia learning theory (see Mayer, 2014a) complements the DBT view with important insights on (limitations of) cognitive processing and with empirically tested design principles. The influence of both views is seen in the theoretical model for video construction that formed the basis for the videos that were constructed and tested in the present study (see Fig. 1). A recent paper by Brar and van der Meij (2017) gives a detailed account of the model. The interested reader is referred to that paper for a description.

Notice that the theoretical model includes both user characteristics and situational variables. One user characteristic that should always be considered when seeking to optimize observational learning is prior knowledge. Multimedia research generally shows that low prior knowledge users benefit considerably from instructional support, while high prior knowledge users may not need such support, and can even be hindered by its presence (Kalyuga, 2007; Mayer, 2014a). Situational variables constrain the design guidelines that can be applied. For example, the theoretical model presented in Fig. 1 concentrates on the individual user working alone at his or her computer. We have therefore excluded instructional features that involve instructor-led support.

In the theoretical model, the instructional features are connected to the observational learning process on which they presumably have the strongest impact, but clearly they can affect more than a single process. To support learning, a minimum requirement would be that at least one instructional feature should be included for each of the four observational learning processes. But in a more realistic, practical scenario, several features for each process should be incorporated in the design.

3. On including reviews in instructional videos for software training

Several recent studies (H. van der Meij, 2014; H. van der Meij & van der Meij, 2014; J. van der Meij & van der Meij, 2015) have investigated the effectiveness of video tutorials for software training that were designed according to the theoretical model presented in Fig. 1. These studies all involved very similar demonstration videos for software training, with regard to both the content they taught (i.e., formatting tasks in Word), and the presence of certain instructional features coupled with the demonstration of task performance. Mean success rates of over 80% for (aided) task performance during training were consistently reported. In other words, the data revealed that users understood the videos well enough to let them perform the modeled procedures. However, when learning of the instructed tasks was tested, a significant decline was found, with mean success rates often dropping to below 70% for (unaided) task performance. This finding points to a lack of retention-related