Multimedia Video Resolution, Camera Angle, and the Impact on Instructor Credibility and Immediacy

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Abstract

Instructional designers often provide leadership to their institutions and organizations, especially with respect to creating effective learning content, systems, and environments. This quantitative experiment provides empirical, research-based evidence regarding the impact of various video resolutions and camera angles on student perceptions of subject matter credibility and effective immediacy of instructors. Feedback from randomly assigned participants indicated that instructor credibility and immediacy increased when the instructor was recorded and presented using eye-level, high-definition cameras as compared to lower resolution cameras located above eye level. The findings suggest that credibility and immediacy can be enhanced when instructors are able to make virtual eye contact with learners in multimedia designs and presentations. Instructors, instructional designers, and e-learning administrators can use these findings to improve multimedia presentations, especially with respect to the use of audiovisual techniques in online and e-learning programs.

Introduction

This project investigated how the instructional message design elements of video resolution and video recording angle of an online instructor affects student perceptions of instructor credibility and immediacy. This study builds on previous research into multimedia learning theory by filling several gaps in the instructional design knowledge base. Multimedia learning theory describes and applies cognitive load theory, dual-coding theory, and working memory models to define specific heuristics that can be used to effectively present content to learners (Mayer, 2009; 2014). Students learn more efficiently when they process integrated visual and auditory content. Similarly, motivation and learning are affected by other factors such as instructor credibility and immediacy in multimedia environments that include instructor presence or recordings (Jayasinghe, Morrison, & Ross, 1997). Credibility is the learners’ perception of an instructor’s genuine concern for their students, subject matter knowledge, and ability to be an effective teacher (Myers & Martin, 2006). Immediacy is the learners’ perception of the presenter’s verbal and nonverbal communication skills (McCroskey, J., Richmond, & McCroskey, L., 2006). Based on this previous research, it appears that both credibility and immediacy variables can be positively or negatively impacted by message design, especially multimedia designs that integrate video imagery of the instructor.
Research Questions

The specific purpose of this research project was to study the impact of variations of video resolution and camera angle during the creation and delivery of audio and video multimedia modules for undergraduate and graduate students in online classes at a mid-sized, public, metropolitan university:

RQ1: What is the effect of high-resolution and eye-level camera angle, low-resolution and eye-level camera angle, high-resolution and high-camera angle, and low-resolution and high-camera angle on perceptions of instructor credibility?

RQ2: What is the effect of high-resolution and eye-level camera angle, low-resolution and eye-level camera angle, high-resolution and high-camera angle, and low-resolution and high-camera angle on perceptions of instructor immediacy?

Research Design

One hundred and eight student volunteers were randomly assigned into one of four treatment groups, resulting in at least 25 participants in each of the four trials. The consistent instructional content used during each treatment was designed specifically to be part of an online teaching with technology course, wherein, the instructor gave a brief mini-lecture on the history of social networking. The instructor’s authentic 20-minute audiovisual module for their online e-learning course was recorded from two cameras (eye-level or above) and was viewed by participants in one of two video resolutions (low or high). The combination of these two variables resulted in four treatment groups that included a high-resolution and eye-level camera angle, a low-resolution and eye-level camera angle, a high-resolution and high-camera angle, and a low-resolution and high-camera angle group. The first camera used to record the presentation was located at eye level with the instructor. The second camera was located 15-degrees above eye level to simulate being mounted higher on a classroom wall and closer to the ceiling. The videos were presented to student participants in either 1920x1080, high-definition or a lower, 320x240 resolution. The result was four variations of the same multimedia presentation where the instructor, content, and audio narration were identical with only the video resolution and camera angle changed between groups, see Figure 1.
All four independent trials viewed the video in their specific treatment group on the same classroom displays and in the same classroom to remove extraneous variables related to display type and size. Once students viewed the presentation in their group they next completed two identical surveys. The McCroskey Source Credibility Measure, an 18-item, seven-option Likert-scale instrument with a Cronbach’s alpha reliability of .94, was used to measure instructor credibility (McCroskey & Teven, 1999). The Anderson Perceived General Immediacy Scale, a nine-item, seven-option Likert scale instrument with a Cronbach’s alpha reliability of .96, was used to measure participants’ perception of the instructor’s immediacy (Anderson, 1979).
Results

A series of Analysis of Variances (ANOVAs) were used to evaluate the impact of video resolution and camera angle on instructor credibility and immediacy. McCroskey’s Source Credibility Measure resulted in a statistically significant difference between the treatment groups. A 4x1 analysis of variance (ANOVA) comparing the four groups indicated significant differences, \( F(3,104) = 3.34, p = .022 \), between viewers of the high-resolution and eye-level camera angle, low-resolution and eye-level camera angle, high-resolution and high-camera angle, and low-resolution and high-camera angle versions. A follow-up Tukey post hoc analysis indicated that participants who viewed the high-resolution, eye-level recording rated the presenter as more credible, especially in terms of the goodwill component of the construct (\( M = 4.93, SD = 1.12 \)), as compared to participants viewing the low-resolution, high-angle recording (\( M = 4.2, SD = .89 \)), see Figure 2.

![Instructor Credibility](image)

*Figure 2.* Instructor credibility: An ANOVA and Tukey post-hoc analysis indicated significant differences between the high-resolution and eye-level recording as compared to the low-resolution and high-camera angle recording.

Also, Anderson’s Perceived General Immediacy Scale revealed a statistically significant difference between the treatment groups. A 4x1 ANOVA comparing the four groups indicated significant differences, \( F(3,104) = 3.56, p = .017 \), between viewers of high-resolution and eye-level camera angle, low-resolution and eye-level camera angle, high-resolution and high-camera angle, and low-resolution and high-camera angle versions. A follow-up Tukey post hoc analysis indicated that participants who viewed the high-resolution, eye-level recording and the low-resolution, eye-level camera recording rated the presenter higher in communication immediacy (\( M = 5.28, SD = 1.35 \) and \( M = 5.25, SD = 1.27 \) respectively) as compared to participants viewing the low-resolution, high-angle recording (\( M = 4.27, SD = 1.56 \)), see Figure 3.
Figure 3. Instructor immediacy: An ANOVA and Tukey post-hoc analysis indicated significant differences between the high-resolution and eye-level and the low-resolution and eye-level recordings as compared to the low-resolution and high-camera angle recording.

Conclusions

The findings of this study suggest that camera angle and video resolution play a role in enhancing student perceptions in audiovisual modules created for e-learning programs. The high-resolution versions appeared to communicate subtler nonverbal cues than the low-resolution versions. Similarly, the eye-level versions appeared to enhance the communication effectiveness of the instructor and reduced participants’ sense of distance. Designers can use these findings to define best practices and advocate that online instructor credibility and immediacy are enhanced when audiovisual presentations are recorded from eye-level cameras and presented in high resolutions.

Investments in video production and content distribution are often expensive and time intensive. However, using effective recording resolution and camera angles can have a positive and influential impact on student satisfaction and improve the effectiveness of message design in multimedia-based e-learning programs. This present study also creates a baseline for future projects. Follow-up research will include presentation slides, additional video content, real-time telepresence, and more diverse subject content to further explore the impact and application of these variables on multimedia learning theory.

References
