Review on impact of webinars in higher education and professional training

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Abstract – **Digital learning environments are increasingly popular in higher education and professional training. Teaching and learning via webinars, and web conferencing more broadly, represents one widely used approach. Webinars are defined as web-based seminars, in which participants and facilitators communicate live over the Internet across distant geographical locations using shared virtual platforms and interact ubiquitously and synchronously in real time via voice over IP technology and web camera equipment. . The implications of the study's findings can inform school teachers, lecturers, trainers, technologists, and theorists interested in the computer-supported design, implementation, delivery, tutoring, and assessment of webinar-based learning environments.**

Keywords— webinar, professional training, higher eductation, technologists, web conference.

INTRODUCTION

How effective are webinars in promoting student achievement in higher education and professional training? And which char- acteristics moderate webinar effectiveness? The use of webinars and web conferencing systems in education has gained growing attention in recent years [1,2,3,4] largely because webinars offer digital learning environments that students can access ubiquitously from anywhere with computer devices [5,6]. For example, Nicklen, Keating, Paynter, Storr, and Maloney [11] examined webinar-based learning by physiotherapy students, and Harned et al. [12] evaluated mental context of professional training. Webinars are frequently integrated into the curricula of distance education and blended learning programs [13,14,15,16,17].

One problem with research on webinars and web conferencing in the educational technology literature is the typically small sample size. Individual study findings are therefore likely to be influenced by sampling error. This may explain some of the dis- agreements in the literature. In particular, some authors reported that webinar participants had higher learning outcomes than control participants [18,19. Others reported findings in the opposite direction [20,21]. To account for effect size heterogeneity, the present study used meta-analytic methods to cumulate individual research findings on webinar effectiveness after controlling for sampling error. The goal was to synthesize the best available evidence from randomized controlled trials (RCTs). A second purpose was to estimate the extent to which moderator characteristics—features of the webinar, their participants, how achievement outcomes were assessed, or when and where the study was published—would moderate the extent of webinar effectiveness.

WEBINARS

The global trend of digitalization has also transformed the way in which education is designed, delivered, and implemented [22,23,24,25]. Webinars are a common choice from the kaleidoscope of digital learning environments. Being an emerging field of research, however, the termi- nology is yet inexact. The term WEBINAR is a neologism and portmanteau of the words web and seminar. In its simplest understanding, a webinar is a seminar that happens online over the Internet rather than offline in a traditional classroom. Like in all cases of *web conferencing*, communication among webinar participants (students and teachers) is mediated technologically via web cameras and voice over IP. Students and teachers can interact online from virtually anywhere

worldwide; there is no need to travel to a physical seminar room. This ubiquity and geographical flexibility is an obvious advantage of webinars over traditional, offline face-to-face lectures. A webinar is considered a special case of web conferencing insofar as the function of a webinar is intrinsically educational in nature. While web conferences as an umbrella term can include, among others, meetings between business partners or video chats among friends or peers, webinars serve the purposes of learning and teaching. As such, webinars stand in contrast to WEBCASTS, such as the streaming of online TV or radio or company presentations which are used for leisure, entertainment, or business but not necessarily for education. Interaction in webcasts is
typically designed for single-to-many while interaction in webinars is typically designed for many-to-many. Furthermore, interaction in webinars is live, synchronous, and in real time, unlike interaction in LEARNING MANAGEMENT systems in which interaction is typically asynchronous [26]. All of these digital environments are considered artifacts that afford and mediate the processes and practices of learning and teaching. As [16] puts it, "technologies are not just representations of the world, rather they are constitutive elements of the enactment of thinking and reasoning in social practices."

Typically, the timeline of a webinar starts with the planning phase which incorporates scheduling the webinar event and inviting participants to register online. Today, one webinar can technically host up to 3,000 participants, yet it seems likely that this number will expand in the future. Webinars with a smaller number of students are far more common, however [27,28,29,30,31]. For participants, the technical requirements include a fast internet connection as well as a browser or app installed on their digital device, such as a laptop, mobile phone, or tablet. A single teacher or a team of multiple teachers and/or technologists then prepare the virtual meeting room. This room is typically afforded within a web conferencing platform; examples include Adobe Connect and Cisco WebEx. During the webinar, features can include didactical or instructional activities that were also performed in a traditional, offline seminar. Typical online features afforded by contemporary webinar technology include screen sharing, video, slides, chats, Q&A, polls, virtual rooms for group work, and real-time feedback among students and teachers to facilitate webinar-based learning. At the end of a webinar event, teachers, facilitators, and technologists can perform follow-up analyses and evaluations of the webinar effectiveness.

EFFECTIVENESS OF WEBBASED SEMINAR

Students, tutors, and lecturers frequently report that they are satisfied with or enjoyed participating in webinar-based learning environments [32,33]. To date, however, no systematic review or meta-analysis has specifically focused on the effectiveness of webinar-based learning environments in promoting student achievement. Previous reviews covered, for example, blended learning [34,35,36,37], computer-supported collaborative learning distance education [38], online education [39], simulation-based learning, web-based learning [41], different treatment interactions [42] training methods in human resource development [43], or particular populations, including health care professionals[44], post-sec- ondary students (Schmid, Bernard, Borokhovski, Tamim, Abrami, et al., 2016), or medical students [41,42]. Given that no systematic literature review or meta-analysis has yet targeted webinars, a meta-analytic review on webinar effectiveness in promoting student achievement seems timely.

When students participate in a webinar-based learning environment, the effectiveness of webinars can be assessed in several ways. First, it can be assessed in terms of participants' development from pretest to posttest, measuring their relative increase in knowledge and skills. For example, Alnabelsi et al. [19] examined medical students' knowledge of otolaryngological emergencies before and after attending a webinar. In the present meta-analytic review, this first analysis is labeled the *PrePost* analysis of webinar effec- tiveness.

Second, webinar effectiveness can be assessed as the difference in achievement outcomes between webinar and control partici- pants at posttest. For example, [44] examined nursing students' intercultural competence at the end of a webinar inter- vention and compared their competence levels with a group of randomly assigned control participants. This second analysis is labeled the WEBINARCONTROL analysis.

Third, and arguably the most relevant for determining the effectiveness of webinars in promoting student achievement, we can compare how much webinar and control participants gained in knowledge and skills from

pretest to posttest, taking into account their levels of prior knowledge before the intervention started. For example, Harned et al. (2014) randomly assigned therapy trainees to treatment conditions, measured their knowledge at baseline, and then estimated their relative gains in each condition. This third analysis is labeled the *GAIN* analysis of webinar effectiveness. The major difference to the *WEBINARCONTROL* analysis is that the *GAIN* analysis considers the level of prior knowledge before the intervention.

The meta-analytic review reported here compares webinar effectiveness on all three levels: PrePost, WebinarControl, and Gain. Effectiveness estimates are cumulated and synthesized from the best evidence reported in an RCT. In RCTs, participants are randomly assigned to treatment and control conditions. Studies that follow the RCT design limit sampling selection biases and are thus con- sidered to offer the most robust scientific evidence, in terms of methodology [45,46,47]]noted that effect sizes from randomized experiments are more conservative than quasi-experimental studies, which report higher mean effect sizes: "If quasi-experiments tend to overstate effect sizes, this implies that mean effect sizes from reviews that average randomized and quasi-experimental effect sizes are likely to be reporting inflated mean effect sizes" (p. 288). For these reasons (49), the present meta-analytic review focuses on the best evidence and synthesizes effect sizes reported in RCTs to estimate how effective webinar-based learning environments are in promoting student achievement.

CONCLUSION

we summarize the main findings of the effectiveness of webinars and what moderates such effectiveness, the practical relevance of the findings for educational technologists who design and implement webinar-based learning environments, and limitations and future research directions that follow from the presented meta-analytic evidence, further research can aim to systematically vary the instructional approach within and across webinars to estimate the extent to which different designs of interactive treatment can promote (or hinder) gains in knowledge and skills of webinar participants Future research is encouraged to extend the analyses reported here to the examination of webinar effectiveness under varying interaction treatments.

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