Virtualizing face-2-face trainings for training senior professionals: A Comparative Case Study on Financial Auditors

Viktoria Pammer-Schindler
Know-Center & TU Graz
Graz, Austria

Stefan Thalmann, Angela Fessl
Know-Center & TU Graz
Graz, Austria

Julia Füssel
Ernst & Young
Berlin, Germany

ABSTRACT
Traditionally, professional learning for senior professionals is organized around face-2-face trainings. Virtual trainings seem to offer an opportunity to reduce costs related to travel and travel time. In this paper we present a comparative case study that investigates the differences between traditional face-2-face trainings in physical reality, and virtual trainings via WebEx. Our goal is to identify how the way of communication impacts interaction between trainees, between trainees and trainers, and how it impacts interruptions. We present qualitative results from observations and interviews of three cases in different setups (traditional classroom, web-based with all participants co-located, web-based with all participants at different locations) and with overall 25 training participants and three trainers. The study is set within one of the Big Four global auditing companies, with advanced senior auditors as learning cohort.

Author Keywords
Online training, virtual training, impact of computer-mediated communication on learning, professional training, continuing professional development

ACM Classification Keywords
Human-centered computing → Human computer interaction (HCI) → Empirical studies in HCI

Applied computing → Education → E-learning

INTRODUCTION
E-Learning in the sense of learning that uses information and communication technology tools to support learning-related activities has been available since decades. Nonetheless, it is still industry standard for professional trainings, especially for senior employees, to be organized in face-2-face trainings. On the other hand, in global companies, expenses for such trainings can be significant due to travel fares, external venues and time spent on travelling. Virtual trainings seem to offer a solution to reduce these costs while still training people in a trainer-trainee relation; thereby addressing the issue of scaling from the point of view of lowering financial and geographical barriers to accessing learning and training.

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BACKGROUND AND RELATED WORK

Virtual Training
By virtual trainings we understand trainings in which synchronous communication between training participants (trainees and trainers) is mediated by information technology; Trainees and trainers meet at a specified time in a virtual learning environment. This contrasts with traditional professional trainings which are organized face-2-face. In terms of Dix et al. (2004, p665)'s categorization of computer support for collaborative work along the two fundamental dimensions of time and space, we therefore understand virtual trainings to be temporally synchronous, but spatially distributed (remote); and traditional trainings as temporally synchronous and spatially co-located. In literature on computer-mediated learning, this may be called anything from e-Learning, distance learning or online learning (cp e.g. Moore et al., 2011).

Understanding communication as central to learning
"Mediated courses […] are […] part of a communication situation". (Schweizer et al., 2001). and the way communication is enacted impacts the perceived social presence, i.e. participation of other actors in communication (ibid, Tu & McIsaac, 2002). In this paper we explore the interaction between trainees (collaboration as means to foster individual learning in terms of Dillenbourg, 1999's spectrum of collaborative learning) and between trainees and trainer, but do not make a connection to learning outcome. The relationship between different types of interaction and learning outcome is "complex" (cp Joksimovic, 2015), but in general social presence both of teachers and peer students is understood to foster learning motivation (cp Paechter et al., 2011). At this stage, we therefore aim to qualify the difference that computer-mediation makes on synchronous communication by comparing three cases.

Interruptions

Interruptions mediated by computing technology are by now widely studied both for working (e.g., Iqbal & Horvitz, 2007) and learning situations (e.g., Bowman et al., 2010), typically associated with a negative impact on time efficiency (Iqbal & Horvitz, 2007; Bowman et al. 2010) or stress (Mark et al., 2008). Our goal in this comparative case study is first to understand the type of interruptions, the difference of interruptions in different cases, and ultimately to consider how to alleviate the impact of interruptions in different settings. With respect to the latter goal, one key starting point for our exploratory research is the knowledge that interface design may be able to provide contextual cues that supports people in switching back to the main activity (Hodgetts & Jones, 2006;Iqbal & Horvitz, 2007).

RESEARCH QUESTIONS

The goal of our research stream is design-oriented in the sense that ultimately we aim to design an effective means of organizing professional trainings for advanced senior auditors that balances costs specifically in terms of time and money spent on travelling with learning effectiveness. Based on the above literature, we explore the following dimensions as possible differentiators across cases:

- Interaction amongst trainees
- Interaction between trainees and trainers
- Interruptions

METHODOLOGY

We applied a case study research design to answer our research questions. Case study research provides the possibility to use a case, i.e. a real-world example, for identifying new criteria and for demonstrating a possible solution for the investigated real-world problems later on (Benbasat et al. 1987; Yin 2009). A case study builds on empirical data, which can be gathered by different methods, such as interviews, questionnaires or observations. A comparative case study investigates several cases to compare the suitability of possible solutions to different contexts or to identify the conditions for deployment in different contexts (Shavit & Muller, 1998).

SETTING: TRAINING MID-LEVEL FINANCIAL AUDITORS IN A GLOBAL AUDITING COMPANY

Our study is set in the context of a global financial auditing company (one of the big four audit companies), with participants from the region of Germany, Austria and Switzerland (DACH region).

The **trainees** in our case study are mid-level financial auditors (advanced seniors) who are expected to make the next step in their career within the following year, when they are promoted to manager. They also usually take the professional examination for Certified Public Accountants in Germany, Austria and Switzerland before the promotion to manager. Passing the examination and being promoted will allow the participants to sign an audit report of a financial audit. The participants of the training usually supervise junior staff who collect and analyze data at clients, and typically work on site of clients. The **learning subject** is the treatment of misstatements identified in the financial statements of an auditor's client company. Such misstatements constitute one of the main areas that are subject to auditor judgment: Typically, misstatements are first collected by staff and seniors (learning cohort for our study). Lists of misstatements are then discussed amongst the audit team with responsible managers, senior managers and partners, and are afterwards presented to the clients. Identifying and deciding on the impact of single misstatements and required follow-up actions is a complex work activity, which requires regulatory (accounting and auditing), mathematical and statistical, legal, organizational (organizational guidelines) knowledge as well as good communication skills (mostly: towards the client). The learning subject in this study is therefore of key professional interest to the trainees and the employer organization; and it is a complex subject. **Trainings** in the company are designed globally and deployed locally. This means, learning goals, learning content, and examples are designed globally; but local trainers may adapt content to the local regulatory framework and needs, and especially examples used in trainings; and of course trainings may be held in the local language despite material being in English. The training set-up consists of a **preparatory phase** (pre-work) before the training, and the training itself. In the pre-work phase, a motivational video is sent to trainees, in addition to web-based content that explains the individual learning subject. The length of the introductory video is 2 minutes. The web-based content is designed to take two hours to work through. It sets out the regulatory requirements for the topic that are a prerequisite to participate effectively in the classroom. Overall, participants tend to need more time to consume the web-based learning. The trainings start with a reflection session on the content of the web based training course. The training then consists of three blocks, each consisting of theory input from the trainers (typically: two per training), interleaved with polls (which even in physical face-2-face trainings are done via an online form so as to guarantee anonymity in case of wrong answers) and concluded by groupwork (three group exercises).

Three cases

Case 1 - physical training was a traditional classroom training in a room reserved at one office to which all participants travelled. However, the majority of trainees didn't have far to travel; whilst both trainers had to travel a significant time. In the physical training, groupwork was organized by physically putting different groups to work on different tables in the room.
Case 2 - virtual training used WebEx to mediate communication between training participants (trainers and trainees). All participants were spatially distributed.

Case 3 - *virtual training* used WebEx to mediate communication between training participants, but all trainees were co-located in one room at one company site ("virtual lab"), trainer A being located in another room at the same office to facilitate a joint reflection after the training, and trainer B being located at a different office. The rationale for co-locating trainees in one office is twofold: First, this is a meaningful setting from the point of view of the employer organization, in that trainers are experts in high demand, and the training activities are pooled under a relatively small amount of experienced trainers; on the other hand, there are many seniors being in different office spread over the region. So while the seniors (= trainees) may be able to be brought together at one office, it may make sense to save on the more costly working time (= travel time) of trainers. Secondly, from a didactical perspective, it may make sense to co-locate trainees in order to facilitate social exchange amongst trainees. In the virtual trainings, groupwork was mediated by WebEx in break-out sessions (separate virtual discussion spaces which were open for trainers to follow virtually).

Case	#Trainees	Trainers
#1Physical Training	13	B and C
#2Virtual Training	9	A and B
#3Virtual Training	3	A and B

Table 1. Overview numbers of three trainings from which we report observations, discussions and interviews.

Themes for observation and interviews/discussions

Based on our overall research questions we were looking to observe

1. Interaction between trainees
2. Interaction between trainers and trainees
3. Interruptions

In interviews and group discussions we were looking again for these topics, but in addition asked

4. How did/would you decide between face-2-face and virtual trainings?
5. Did you actively participate in the pre-work phase – if yes, when and where?
6. What would be your ideal learning set-up?
7. What is your experience with virtual work/collaboration/home office?

Analysis

Case 1 was observed by three of the authors, *case 2* was observed by three of the authors whereby one also acted as trainer, and *case 3* was observed by all four authors, whereby one also acted as trainer. Authors discussed and compared observations and results from interviews directly after each training, in order to complete notes and impressions with the training still in fresh memory. In addition, observations and notes were reflected by the authors in relation to prior assumptions and literature review following an informed grounded theory approach (Thornberg, 2012). This means, that we first discussed the results along the three major themes we aimed to explore (interaction amongst trainees, interaction between trainees and trainers, immersion/interruptions) and then discussed themes that emerged directly from observations, group discussions and interviews.

DISCUSSION OF RESULTS

Interaction amongst trainees

In *case 1,* we observed frequent side-channel discussion amongst trainees, shared laughter, support for each other when one participant was asked a question by trainers etc. In groupwork, participants "huddled" in front of a shared laptop display or piece of paper. In *case 2*, where all participants were spatially distributed, such side-channel communications were not observed, but also not observable. There was no observable trainee-to-trainee discussion in the main group channel, however. Discussions that were possible through the chat function of WebEx between the participants did not take place. In *case 3*, where all participants were spatially co-located, we observed very little interaction amongst trainees. In the warm-up exercise, some joint discussion took place, in the spirit also of getting to know how WebEx works. Throughout the rest of the day, however, we observed that in a way, the laptop screens, via which the communication with trainees was mediated, captured the near-to-full attention of trainees. One expression of this is that in discussions, the focus of the trainees is on the screen, and not on the physically present other trainees.

Interaction between trainees and trainers

In *case 2* a few private chat conversations were held between trainers and trainees. Trainers followed up with some participants whether they were actively flowing the training. Active participation can be monitored by the trainers within WebEx. In *case 3* a follow up of participants using another application was not necessary. In the *physical training* one trainer walked around in the room and talked to participants if they were interrupted by other tasks while the other one was training in front of the class. However, this was only rarely necessary.

Interruptions

In *case 1*, participants felt immersed in training: Most participants had organized this day to be free of work obligations. Some participants were still communicating with colleagues via Skype, and two participants at least also took phone calls. Participants felt that this was necessary due to work-related deadlines close to the date of the training (upcoming in a few days). One participant stated: "*I also was personally interested in how things are going at the client, as the final report on the client will be sent out [in three days]… but of course one can organize such disruptions*" (i.e. scheduled into breaks or groupwork time).

General Preferences for Physical or Virtual Training

Participants in both settings were very open in terms of personally preferring physical or virtual trainings. One participant in *case 3* would have a very strong preference for virtual trainings that are timing wise flexible, and which he could also do at his own speed. One participant in the physical training said that "*I lost my general preference for physical trainings in the 2-hour traffic jam this morning*".

Organizational Learning Culture

The learning culture within this company *prioritizes working over learning, and does not promote virtual trainings* by having no explicit resource planning for virtual learning. If a person is at the client's site, (s)he needs to be available for interruptions throughout the day by the client. In addition, virtual trainings are not perceived within the organization to be on equal par with physical trainings: One participant said "*If I told my manager that I blocked a full day for a virtual training, he would think I'd gone crazy*".

Design Implications for Virtual Training Technology

The used technology (WebEx) is centered on presenting content rather than representing participants (no pictures or videos shown of participants). This makes concentration for a full day very hard, and opened up discussions that such a setup could be more useful for shorter trainings. Secondly, the focus on content rather than participants limits the communicative nature of virtual trainings (reduces social presence), even though virtual trainings are essentially set up to be synchronous and collaborative learning settings.

OUTLOOK

We are now working in two directions:

Qualitative – Design-Oriented: So far, the virtual trainings used WebEx. We aim to also explore video-conferencing technology. In difference to WebEx, this should strengthen the perception of interacting with other people than with a system; as it presents a richer channel of communication.

Quantitative: We are in the progress of implementing a study in which in both settings (classroom, virtual) trainees receive a knowledge test directly before and after the training, and six months to a year after the training for assessing the application in the field.

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