Does the Learning Channel Really Matter?
Insights from Commercial Online ICT-training

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Abstract: Evolving ICT has provided new options to participate to training. Online participation has been found to be cost effective, helping people to deal with the time and cost pressures they are facing on their jobs. Previous studies conducted in higher education sector indicates that student satisfaction or learning outcomes does not differ between online and classroom participants. However, little is known what is the situation in commercial ICT-training. This paper studied course feedbacks from courses having both online and classroom participants of a commercial ICT-training provider. Results revealed that the learning channel has no effect on satisfaction, perceived teacher's substance and teaching skills, or course arrangements. The results also revealed some areas how the commercial training providers could improve their online training.

1   INTRODUCTION

Information and communication technology (ICT) has evolved rapidly during the past few decades. Evolved ICT has provided, for instance, new communication ways allowing people to be virtually present in meetings and similar events. In education sector ICT allows students to participate to the training using standard affordable consumer equipment. Typically, all that is needed is a computer with internet connection and audio support. Modern laptops have a built-in microphone, speakers, and a camera.

Interest towards participating to training using computers with audio and video has increased during the last few years. For instance, American community colleges has faced over 32 percent increase in distance learning in five years between 2008 and 2013 (Lokken & Mullins, 2014). According to another recent report, the corporate e-learning will grow 13 percent per year (Ronald Berger, 2014). In 2016, 77 percent of American companies were using online training tools (Trainingmag, 2016).

Some reasons for the increased interests has been found. Two of the reasons are work related time and cost pressures (Ronald Berger, 2014). Due to latest recession in Europe, the number of workers has declied, leaving more jobs for those still working.

Thus the workforce has more pressure to use their time wisely so they prefer learning channels which does not require as much travelling. Travelling also requires money so cost pressures also directs to seek alternative learning channels.

Due to increased interest towards various kinds of online training, it is fair to ask: are the new learning channels as good as the traditional ones? Johnson et al. (2000) found no differences in learning outcomes between classroom and online training. Similarly, Allen et al. (2002) found no differences in student satisfaction between classroom and online training. There have been some critique towards studies conducted on the subject. Many of the studies have not ruled out other factors which may have effected the results (Merisotis & Phipps, 1999). Thus, many studies have failed to demonstrate what is cause and what is effect. For instance, some studies have compared two independent samples, one for online training and one for classroom training.

Aim of this paper is to study whether the used learning channel (i.e., online vs. classroom) effects the student satisfaction in commercial ICT-training.

1.1   Online Learning

Online learning is one of the learning methods used in various training settings. Learning methods can be

categorised as four archetypes; traditional learning, e-learning, participatory learning, and facilitated learning community (Leppänen & Syynimaa, 2015). In this paper, we regard online learning as a technology supported traditional learning, where teaching occurs in the classroom while at least some of the students are participating online using audio and video.

One concept closely involved to learning methods is Human Learning Interfaces (HLI). HLIs are the set of "interaction mechanisms that humans expose to the outside world, and that can be used to control, stimulate and facilitate their learning processes" (Koper, 2014, p. 1). Humans learn, for instance, by interpreting observations they make by utilising their senses, such as seeing, hearing, and touching. Teachers can observe and assess whether the learning has occurred using the same HLIs.

1.2 Challenges in Online Learning

Online learning limits the available senses to seeing and hearing, so also the number available HLIs are reduced to two. This affects both learners and teachers. Learners may not be able learn as effectively due to limited number of HLIs. For teachers, the effect is even bigger. Due to limited number of available HLIs, the teacher is not able to assess effectively whether the learning has occurred. For instance, they cannot see learner's gestures or body language, which is an important communication method for humans. Thus, teachers are not able to adjust their teaching in same way as they can do in the classroom.

2 METHOD

The data used in this paper is collected from a leading Finnish commercial ICT-trainer, *TrainingCorp*. *TrainingCorp* provides ICT-training to Finnish public and private sector organisations, and individual consumers. Training ranges from end-user and ICT-specialist training to CxO level management training. Training is provided in the form of full-day instructor lead courses (ILT) with typical length between 1 to 4 days. Since 2015 *TrainingCorp* has provided an online participation option, where learners participate to courses using either Microsoft Skype for Business (SfB) or Adobe Connect Pro (ACP). After each course *TrainingCorp* collects feedback from all participants.

The data used in this paper was collected from the feedback database from the years 2015 and 2016. To increase the validity of the research, only the courses having *both* classroom and online participants were included in sample. In this paper, we call these kind of course a hybrid course.

The hybrid course has both classroom (CR) and online (OL) participants. For classroom participants the training experience is similar to a pure classroom training. There is a microphone and speakers in the classroom which allows online participants to hear the teaching and to speak. On some courses there is also 360 degree camera which allows online participants to see the classroom. Tearchers are sharing their computer screen to online participants, so they can see the same content that is presented to classroom participants.

In total, there were 46 hybrid courses. The number of participants and given feedbacks can be seen in Table 1. Total number of online participants was 107, which represents 24% of the total participants.

Table 1: Participants and feedbacks.

Training type	Participants	Feedback	Feedb.%
Classroom (CR)	343 (76 %)	218 (75%)	64 %
Online (OL)	107 (24%)	73 (25%)	68 %

Available data variables are listed in Table 2. There are two nominal scale variables, type and teacher. The former variable refers to the training type (classroom or online) and the latter to the course teacher. The rest of the variables are interval scale variables containing average values calculated per course. The scale used in the feedback database is 1-5 where 5 is the highest value. Average values per course are used instead of individual answers because the unit of analysis is the course. The Type variable is used as a grouping variable and the last four as dependent variables.

As part of their feedback, respondents can also give open ended comments about the course. These comments was also gathered for analysis.

Table 2: Variables used.

Variable	Type
Type	Nominal
Teacher	Nominal
Overall satisfaction (SA)	Interval
Teacher's substance skills (SU)	Interval
Teacher's teaching skills (TE)	Interval
Course arrangements (AR)	Interval

As the previous studies suggests, there should be no differences in the perceived satisfaction between online and classroom training. However, as the online training does limit the number of used HLIs, it should

have effect on the overall satisfaction of the course. Moreover, the online training helps participants to ease the time and cost pressures they are facing. Therefore our first hypothesis is *H₁: learning channel has effect on the perceived overall satisfaction*. The training channel should be irrelevant regarding to teacher's substance and teaching skills. Therefore our next hypotheses are *H₂: learning channel has no effect on perceived tearcher's substance skills* and *H₃: learning channel has no effect on perceived teacher's teaching skills*. All online training is exposed to possible technical difficulties and problems. Therefore our last hypothesis is *H₄: learning channel has effect on the perceived course arrangements*.

3 RESULTS

3.1 Quantitative Analysis

The descriptive statistics presented in Table 3 indicates that the mean values for each variable is slightly smaller in online training. Also, the standard deviation is roughly double in online training when compared to classroom training. Next we will test whether there is statistically significant difference between online and classroom training.

Table 3: Descriptive Statistics.

Variable	Type	Mean	Std. Deviation
SA	CR	4.598	.3093
	OL	4.472	.6053
SU	CR	4.902	.1559
	OL	4.884	.3007
TE	CR	4.728	.2725
	OL	4.649	.4915
AR	CR	4.578	.3977
	OL	4.207	.8140

We are comparing two different groups of data so first we must test the normality of the dependent variables. We used Kolmogorov-Smirnov (Table 4) and Shapiro-Wilk tests (Table 5). The Kolmogorov-Smirnov test results indicate that only the overall satisfaction (SA) in classroom training is normally distributed (sig. .073 > .050). The Shapiro-Wilk tests showed no normal distribution at all. Thus, we cannot compare differencies between classroom and online training using ANOVA. Therefore, we decided to use a Kruskal-Wallis H test.

Table 4: Kolmogorov-Smirnov tests with Lilliefors Significance Correction.

Variable	Type	Statistics	df	Sig.
SA	CR	.125	45	.073
	OL	.297	43	.000
SU	CR	.357	45	.000
	OL	.488	43	.000
TE	CR	.174	45	.001
	OL	.344	43	.000
AR	CR	.156	45	.000
	OL	.214	43	.000

Table 5: Shapiro-Wilk tests.

Variable	Type	Statistics	df	Sig.
SA	CR	.924	45	.006
	OL	.777	43	.000
SU	CR	.676	45	.000
	OL	.427	43	.000
TE	CR	.878	45	.000
	OL	.713	43	.000
AR	CR	.856	45	.000
	OL	.834	43	.000

The results of Kruskal-Wallis H tests can be seen in Table 6. The test showed that there was no statistically significant difference in the overall satisfaction (SA) between the classroom and online training, $\chi2(2) = .111$, p = 0.739. Therefore we must reject the H₁ hypothesis. The test showed that there was no statistically significant difference in the teacher's substance skills (SU) between the classroom and online training, $\chi2(2) = 3.549$, p = 0.060. Therefore the H₂ hypothesis is not rejected. The test showed that there was no statistically significant difference in the teacher's teaching skills (TE) between the classroom and online training, $\chi2(2) = .233$, p = 0.637. Therefore the H₃ hypothesis is not rejected. The test showed that there was no statistically significant difference in the course arrangements (AR) between the classroom and online training, $\chi2(2) = 3.714$, p = 0.054. Therefore we must reject also the hypothesis H₄.

Table 6: Kruskal-Wallis H test (grouping by Type).

Variable	SA	SU	TE	AR
Chi-Square	.111	3.549	.233	3.714
df	1	1	1	1
Asymp. Sig.	.739	.060	.637	.054

As the results suggests, the used teaching channel has no effect to perceived satisfaction of the training what so ever.

3.2 Qualitative Analysis

In total, open ended comments related to online participation were given for 23 courses. The quotes presented in this section are translations from the original feedbacks given in Finnish. The number after each quote refers to the feedback number.

Most comments were related to technical difficulties, i.e., audio and video connection. For instance, one online participant stated that "constant technical problems ruined the whole and I missed the most part of the course" (31). Another one stated that "connection was okay for the first two days..on the third day there was some problems with the video..the broadcast were cut at least for 30 minutes before it was fixed" (8). However, there were also opposite experiences. For instance, one online participant stated that "online possibility worked well for the course" (15). Another participant stated that "this was my first online participation and everything worked perfectly!" (30).

Besides the technical matters, there was some other issues mentioned by online participants. Many participants felt that they were not able to participate to discussions same way than the classroom participants. For instance, one online participant stated that "as an online participant, I was not given attention to" (3). Another participants shared similar experiences, such as, "dialogue and communication was limited" (35) and "I would have liked to hear what other participants said or asked..as an online participant I totally missed this part" (29).

Another issue related to online participation was the usage of presentation techniques. Some participants were having problems to follow teaching when teacher used for instance flip board or pointer. For instance, one participant suggested that teacher could have used "an electronic flip board so that online participants would also see the content" (13). Another particpant suggested similarly that teacher could use "some drawing software instead of flip board" (3).

Only two participants stated that having both online and classroom participants is not a good idea. The first participant (classroom) simply stated that "onsite and online participants at the same time is not the best option" (25). Another participant (online) argued that either online or classroom participants are always "suffering" (37) due to arrangements.

Some participants also shared the reasons why they participated online. One participant stated that "it would have been nice to be onsite, but at least this is cheaper" (2). Another participant emphasised that "online participation gives a freedom to participate from wherever you like to" (28). Moreover, one participant stated that online participation is "a good alternative for travelling" (30).

4 DISCUSSION

Our premise for the research was that the learning channel has effect on participants' satisfaction of the course. Online training limits the number of HLIs and therefore it was anticipated that there would be some effect on satisfaction. However, the data analysis provided no support for this. Thus, our finding is in line with previous studies. Allen et al. (2002) found no differences on satisfaction between online and classroom students, and Sun et al. (2008) did not found any technological factor having effect on satisfaction. As the results suggests, we may draw a conclusion that the used learning channel does not matter. It has no significant effect on overall satisfaction, perceived teacher substance or teaching skills, or course arrangements.

Open ended feedbacks indicated some challenges in online participation. Biggest issues seems to be technical problems with video and audio. However, these issues were not faced by the whole class at the same time but by individual students. This finding is also in line with previous findings; technical problems are frustrating students (Sun et al., 2008). Some of the online participants felt that they did not receive enough attention from the teacher, and that they were "outsiders". One reason for this might be teacher's repertoire of presentation techniques. Some online participants reported that they could not follow all teaching when teacher used flip boards or pointers. Knipe and Lee (2002) have noticed similar pedagogical challenges; online participants does not receive as much information and explanations from the teacher as the classroom participants do.

As suggested by Ronald Berger (2014), participants indicated that online participation saves money in terms of travelling. It also gives the choice of freedom regarding from where to participate.

4.1 Limitations

In this research, we studied whether the used learning channel have effect on student satisfaction. As such, the results do not reveal any effects on actual learning outcomes.

4.2 Contributions to Practice

As the findings revealed, the learning channel had no

effect on participants' satisfaction. Therefore, we would like to encourage training providers to consider offering more online participation options. At the same time, however, there are some issues which should be noticed and dealt with. First, the reliable internet connection and video conferencing equipment should be used and tested beforehand. Teachers should also familiarise themselves with the used technology. Second, teachers should give more attention to online participants. This includes using appropriate teaching aids, such as electronic flip boards, and effective communication techniques, such as frequently asking questions.

4.3 Contributions to Science

The study confirms findings of previous studies conducted on higher education sector. Our findings show that commercial ICT-training does not differ from higher education in this matter.

4.4 Directions for Future Research

The findings pointed out some issues with used teaching aids. The *TrainingCorp* used two different technical solutions to provide online training. The feedback data did not include information on which tool was used on each course. Thus, the first interesting area for future research would be to study whether the used solution have effect on satisfaction. Second interesting area would be to study which kind of teaching aids for classroom and online training does the solutions provide. Third interesting area would be to study how teachers feel teaching classroom and online students at the same time. Finally, as indicated earlier, one should study whether the learning channel effects the actual learning outcomes.

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